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CONTENTS

ORIGINAL ARTICLES

Original Article

HISTOPATHOLOGICAL LESION OF GALL BLADDER MUCOSA ASSOCIATED WITH CHOLELITHIASIS

Vishram Singh*, Arvind Yadav*, Surendra Pal Sharma, Nidhi Verma****
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**Department of Pathology, LLRM Medical College, Meerut, UP, India

ABSTRACT

Aims & Objectives: To study the various changes in gall bladder mucosa in those gall bladder specimens who possesses gall stones and compare and correlate the data with the similar studies done in the past in different part of India.

Material & Methods: It is a hospital based study done in Santosh Medical College and Hospital, Ghaziabad. The duration of this study was 2 years. Total 131 open cholecystectomy specimens with complete gallstones were examined. We included male and female patients of all the age group. Patient of cholelithiasis diagnosed by radiology and recommended for cholecystectomy formed the study population. Autolysed cholecystectomy specimens and cholecystectomy specimens without gallstone were excluded from this study.

Results: We found that maximum number of specimens had chronic cholecystitis 97.7 %, followed by Rokitansky-Aschoff sinuses 22.9%, muscular hyperplasia 15.3%, epithelial hyperplasia 8.4%, fibrosis and ulceration 3.8%, carcinoma 3.1%, antral metaplasia 2.3%, xanthogranulomatous cholecystitis 2.3%, eosinophilic cholecystitis and intestinal metaplasia each presented with 0.8%. In our study, carcinoma was always present with pigment type stone.

Conclusion: Carcinoma of gallbladder was found in (3.10%) cases which is higher ever reported in India. With the advancement of investigational procedures, more cases related to gallbladder pathologies have come to light, thus making it very much relevant to pursue a research in this field. Moreover, this study will bring forth to light the knowledge which will be advantageous to the population, dieticians as well as medical practitioners.

Keywords: Cholelithiasis, cholecystectomy, adenocarcinoma, histopathology.

INTRODUCTION

Gallbladder (cholecyst/biliary vesicle) is a flask shaped blind-ending, hollow viscus which is grey-blue in colour. It mainly serves as reservoir of bile, concentration of bile (5 to10 times), emulsification and absorption of fats and elimination of bilirubin which is a product of hemoglobin metabolism. Gall bladder presents mainly 3 layers. The innermost layer is mucosa having lining epithelium of single layer of tall columnar cells (apical microvilli, basal nuclei, lightly stained cytoplasm) [1], smaller pencil cells (darkly staining columnar cells) and basal cells. Lamina propria is made of loose connective tissue, fenestrated capillaries, small vessels nerves, some diffuse lymphatic tissue and IgA containing plasma cells [2]. Second layer is muscular with large amount of elastic fibers intermingled with smooth muscle fibers, which are arranged in circular, longitudinal and oblique manner so this layer is also known as fibro-muscular layer. Outer layer is serosa which covers its entire surface except the hepatic, where an adventitia attaches it to the liver. The gallbladder has a wide layer of perimuscular loose connective tissue which contain blood vessels, lymphatics and nerves.

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MATERIAL AND METHODS

This hospital based study was done in Santosh Medical College and Hospital Ghaziabad. The duration of this study was 2 years. The study was done in total 131 open cholecystectomy specimens with complete gallstones. The study included male and female patients of all the age groups. Patients of cholelithiasis diagnosed by radiology and recommended for cholecystectomy formed the study population. Autolysed cholecystectomy specimens and cholecystectomy specimens without gallstone were excluded from this study. For the detail microscopic examination of specimen routine histology technique (H&E staining) was used. Equipments used in the study were automatic tissue processor, semiautomatic embedding centre, rotary microtome, high and low profile blade, floatation (water) bath, slide drying oven / hot plate and binocular microscope.

OBSERVATIONS AND RESULTS

Out of 131 open cholecystectomy specimens, maximum number had chronic cholecystitis 97.7 %, followed by Rokitansky-Aschoff sinuses 22.9%, muscular hyperplasia 15.3%, epithelial hyperplasia 8.4%, fibrosis and ulceration 3.8%, carcinoma 3.1%, antral metaplasia 2.3%, xanthogranulomatous cholecystitis 2.3%, eosinophilic cholecystitis and intestinal metaplasia each presented with 0.8% (Table 1, Fig. 1). In our study, carcinoma was always present with pigment type stone.

Table 1: Percentage incidence of mucosal changes in cholecystectomy specimens

Parameter	No. of cases	Percentage
Chronic Cholecystitis	128	97.7%
Xanthogranulomatus cholecystitis	3	2.3%
Eosinophilic Cholecystitis	1	0.8%
Intestinal metaplasia	1	0.8%
Antral metaplasia	3	2.3%
Muscular hyperplasia	20	15.3%
Epithelial hyperplasia	11	8.4%
Carcinoma	4	3.1%
Rokitansky-Aschoff sinuses	30	22.9%
Fibrosis & Ulceration	5	3.8%

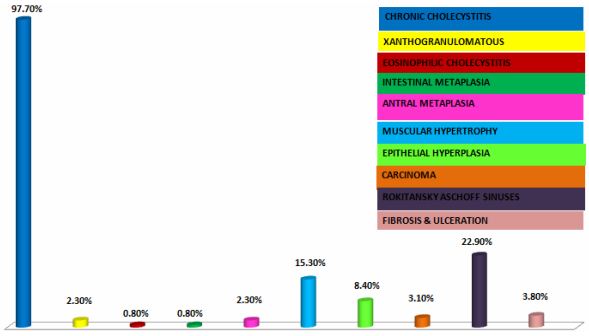

Fig.1: Bar chart showing the incidence (%) of microscopic findings of mucosal changes in cholecystectomy specimens

H & E staining was done for the detail microscopic examination. Specimens of chronic cholecystitis showed disrupted epithelium, infiltrated lymphocytes and plasma cells, lymphoid follicles and Rokitansky-Aschoff sinuses (Fig. 2). Xanthogranulomatous cholecystitis was usually associated with chronic cholecystitis in 66.66% cases and depicted occluded Rokitansky-Aschoff sinuses, mixture of infiltrated foamy histiocytes, lymphocytes, fibroblast, giant cells and multinucleated foreign body (Fig. 3). Antral metaplasia exhibited goblet cells, lymphocytes and glandular structures (Fig. 4). There was increase in thickness of fibromuscular layer in muscular hyperplasia of gall bladder specimens (Fig. 5). Specimens with epithelial hyperplasia of gall bladder presented increase lymphocytes and hyperplastic epithelium (Fig. 6). Carcinoma of gall bladder showed abnormally formed glandular structure lined by malignant epithelial cells i.e. hyperchromatid nuclei with variable shape and size of cells, infiltrated into stroma and tumor tissue is moderately differentiated (Fig. 7).

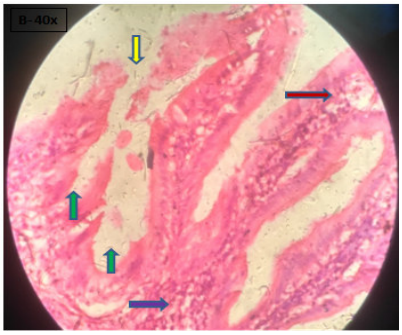

Fig. 2: Photomicrograph showing chronic cholecystitis of gall bladder as seen in H & E staining (B-40x). Disrupted epithelium (yellow arrow), infiltrated lymphocytes & plasma cells (red arrow), lymphoid follicles (purple arrow) and Rokitansky-Aschoff sinuses (green arrow).

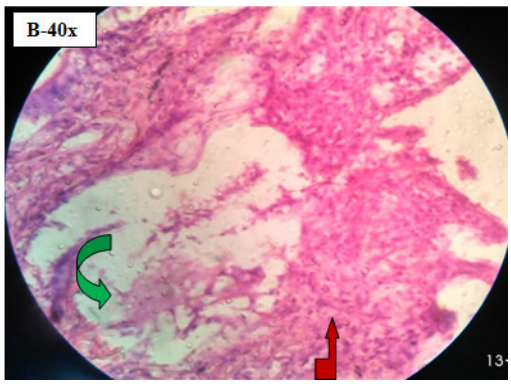

Fig. 3: Photomicrograph showing xanthogranulomatous cholecystitis of gall bladder as seen in H & E staining (B- 40x). Green arrow showing occluded Rokitansky-Aschoff sinuses whereas red arrow showing mixture of infiltrated foamy histiocytes, lymphocytes, fibroblast, giant cells and multinucleated foreign body.

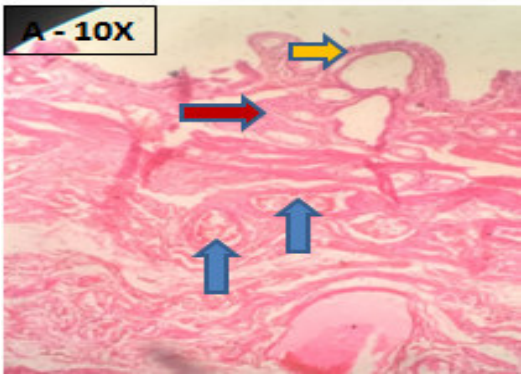

Fig. 4: Photomicrograph showing antral metaplasia of gall bladder as seen in H & E staining (A-10x). Yellow arrow representing goblet cells, red arrow lymphocytes and blue arrow glandular structures.

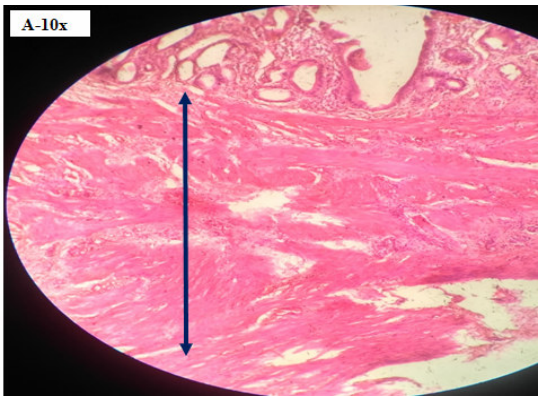

Fig. 5: Photomicrograph showing muscular hyperplasia of gall bladder as seen in H & E staining (A-10x). Blue arrow showing thickness of fibro-muscular layer.

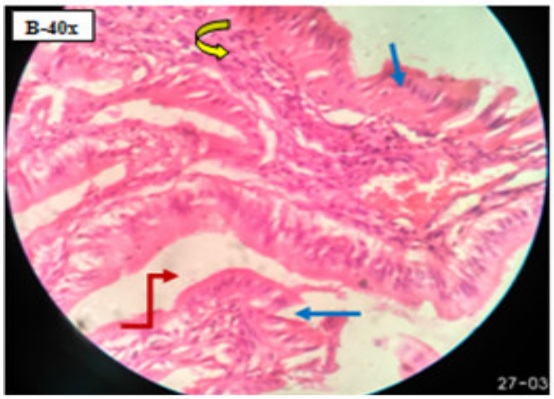

Fig. 6: Photomicrograph showing epithelial hyperplasia of gall bladder as seen in H & E staining (A-10x and B-40x). Yellow arrow- lymphocytes, blue arrow- hyperplastic epithelium, red arrow- Rokitansky-Aschoff sinuses.

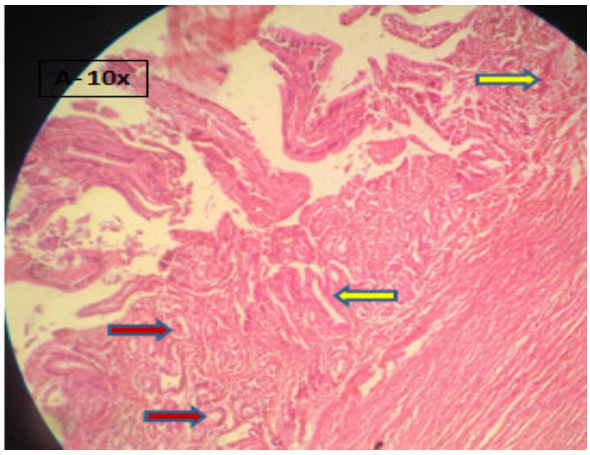

Fig. 7: Photomicrograph showing carcinoma of gall bladder as seen in H & E staining (A- 10x). Section from the growth of gallbladder shows abnormally formed glandular structure (red arrow) lined by malignant epithelial cells (yellow arrow- hyperchromatid nuclei with variable shape and size of cell), infiltrated into stroma, tumor tissue is moderately differentiated.

DISCUSSION

In the present study it was observed that the most common histopathological change in mucosa of gallbladder associated with cholelithiasis is chronic cholecystitis which is followed by Rokitansky-Aschoff sinuses, muscular hyperplasia, epithelial hyperplasia, fibrosis and ulceration, carcinoma, antral metaplasia, xanthogranulomatous cholecystitis, eosinophilic cholecystitis and intestinal metaplasia.

In the present study the most common finding was chronic cholecystitis reported in 97.7% cases. This fact

is supported by some previous studies [3-5], but it is in contradiction to other studies [6-8]. Maximum percentage of incidence of chronic cholecystitis was reported by Zahrani and Mansoor 97% [9], whereas minimum by Jain et al. who reported it to be 30.50% [10]. In maximum cases chronic cholecystitis is associated with Rokitansky-Aschoff sinuses.

The second most common finding was the presence of Rokitansky-Aschoff sinuses, which was present in 30 (22.90 %) cases. The presences of Rokitansky-Aschoff sinuses have been also reported by previous studies done in different parts of world in different time period. Zuhair and Mumtaz reported 33.2 % [11], Kaur et al. 44.80 % [12] and Terada et al. 65 % cases [13] in their studies.

In present study incidence of muscular hyperplasia was found in 20 (15.30 %) cases. This finding is very much coincides with that of Hamdani et al. [14], but contradicts by some other studies [9,15,16].

In present research work, epithelial hyperplasia was noted in 11 (8.40 %) cases. Epithelial hyperplasia was also reported by other researchers although in much higher percentage [11,16-18].

The incidence of xanthogranulomatous cholecystitis was found in 3 (2.30%) cases. Xanthogranulomatous cholecystitis was usually associated with chronic cholecystitis in 66.66% cases. It usually occurs when occluded Rokitansky-Aschoff sinuses rupture. This fact was supported by other studies also [1,8], but Kaur et al. reported very low 1.04% incidence [12] whereas Khan et al. reported highest 3.6% incidence [5].

In the present study, carcinoma of gallbladder was found in 4 (3.10%) cases. Gallstones appear to be the most important risk factor, being reported in 70-98% cases of gallbladder cancer, a far higher prevalence than that in age-matched general population [19]. Gallstones are responsible for generating a series of epithelial histopathological changes which may act as precursor of lesions of gallbladder cancer. Incidence of carcinoma of gallbladder found is nearly similar to some previous studies [3,4,6], but contradict the studies done by Khanna et al. [16] and Zahrani and Mansoor [9] who reported a very low incidence 0.7 % and 1% respectively.

A rare eosinophilic cholecystitis was observed in only 1 (0.80 %) case of all cholecystectomy specimens in our study which is comparable with that of some previous studies [4,5,8].

Metaplastic changes were present in total 4 cases (3.10 %) of which antral metaplasia was more frequent seen in 3 (2.30%) cases, followed by intestinal metaplasia which was observed in only 1 (0.80 %) case. Incidence of intestinal metaplasia was very low in present study in comparison to other studies, but it is in agreement with the study done by Jain et al. [10] who has reported 2.5 % incidence but is in contradiction with other studies[12,17,18]. Incidence of antral metaplasia was also very less in present study as compared to previous studies [10,12,16].

Fibrosis occurred in 5 (3.8 %) cases in present research. Fibrosis of gall bladder has been reported by other studies also but the reported prevalence was very high in these studies [16,20] in comparison to present study.

CONCLUSION

Carcinoma of gallbladder was found in (3.10%) cases which is higher ever reported in India. In this study it was observed that the carcinoma of gallbladder mainly occurs in elderly individuals but it may be present in young persons also. Presence of gallstones is the most important risk factor in case of gallbladder cancer. Gallstones are responsible for generating a series of epithelial changes which may act as precursor of gallbladder cancer. The incidence of carcinoma is increased in the last two decades due to migration of large number of people for searching job opportunity in cities (urbanization) and has changed their food habits, culture and environment. Excessive use of junk food, increase amount of fat, refined carbohydrates, decrease dietary fibers and physical exercise is an important risk factor for formation of gallstones.

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Original Article

AN ESTIMATION OF CORRELATION BETWEEN MAXIMUM HEAD LENGTH AND THE STATURE OF HUMAN ADULTS OF NORTH INDIA

Prem Singh*, Vasundhara Kulshreshtha*, Pradeep Singh*, Ved Prakash*
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ABSTRACT

Introduction: The stature can be defined as the natural height of a person in erect position and is one of the criteria of personal identification. Stature has a definite and proportional biological relationship with each and every part of human body i.e. head, neck, trunk and extremities. The present study was attempted to find out the correlation between maximum head length and the stature in adult North Indian population. It will be helpful in narrowing down the investigation process and thus provide useful clues to the investigating agency and forensic experts, in the cases where highly decomposed, fragmentary & mutilated human remains are brought to the medical autopsy. The objective of the study was to establish correlation between maximum head length and the stature and to derive linear regression equation for estimation of stature from maximum head length.

Material & Methods: The present study comprised of 200 medical students of age group between 18 yrs. to 25 yrs. of S. N. Medical College, Agra, not having any significant disease or deformity that could have affected the general or the bony growth. Maximum head length and stature was measured by using spreading caliper and stadiometer respectively. With these recorded data, Pearson's correlation coefficient between maximum head length and stature was determined which was 0.6071.

Results: A statistical significant fair positive correlation ($r = 0.6071$; P value < 0.00001) was observed between the stature & maximum head length of adult population of North India and regression equation for stature estimation was derived i.e. $Y = 68.543 + 5.373X$.

Conclusion: The findings of present study suggest that the maximum head length can be successfully used for stature reconstruction.

Keywords: Maximum head length, stature, anthropology, stadiometer.

INTRODUCTION

During legal investigations, especially in crime scenes resulting in fatalities or unknown human body remains are recovered by investigating agencies, the forensic expert is often required to give an opinion regarding personal identification of deceased.

When highly decomposed, unknown, fragmentary & mutilated human remains are brought to the medico-legal autopsy; in such situations estimation of stature becomes equally important along with other parameters like age, sex, race etc. [1].

The "stature can be defined as the natural height of a person in erect position" [2] is one of the criteria of personal identification hence helps in narrowing down the investigation process & thus provides useful clues to the investigating agency. It is also useful when stature can't be measured directly due to deformities like kyphosis, scoliosis, missing extremities (legs) etc. [2]. Stature has a definite & proportional biological relationship with each & every part of human body i.e., head, face, trunk & extremities [3]. This relationship

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helps a scientist to calculate stature from dismembered & mutilated body part during investigations.

The present study has been attempted to find out the correlation between stature and maximum head length by percutaneous measurements in normal and healthy human adults of North Indian population and to derive linear regression equation for estimation of stature from maximum head length.

MATERIAL AND METHODS

Sample for the present study comprised of 200 Medical students of age group 18 - 25 years of S.N. Medical College, Agra from North India. Age above 18 yrs has been chosen for the reason that by this age there is almost completion of skeletal growth. The subjects were selected irrespective of their caste, religion, dietary habits, socio-economic status, were apparently healthy and without any visible spinal or cranial deformity. Any subject with congenital or acquired cranial, spinal or bone deformity i.e. scoliosis, kyphosis, arthritis and amputated extremity etc. were excluded from the study.

Prior informed consent in writing was taken from each subject. Maximum head length and stature were taken at a fixed time of day between 12:00 noon to 4:00 pm to eliminate diurnal variations. The methodology for taking these measurements was adopted from Krishnan and Kumar (2007) [4].

Maximum head length was measured as the straight distance (in cm) between glabella and the opisthocranion, using blunt ended spreading caliper. Stature was measured as the vertical distance from the vertex to the floor and was measured using the Stadiometer to the nearest 0.1 centimeters with the students standing erect in bare feet against Stadiometer. Their buttocks and upper part of back were in contact with the Stadiometer upright. Their palms were turned inwards and fingers pointing downwards. Students were directed to align their head properly so that their head lie in the Frankfurt horizontal plane. Undue pressure was avoided while taking these measurements.

All these measurements were recorded three times to minimize subjective errors, and then their mean was taken as standard. All data was entered on MS excel sheet and the data was analyzed in PRIMER and SPSS version 22 for Windows statistical software package (IBM SPSS Statistics 22). Quantitative data was summarized in form of mean and SD (Standard Deviation). Pearson correlation coefficient was used to establish relations between stature and maximum head length. Linear regression analysis was done for estimation of stature using maximum head length as independent variables. The difference and relationships were deemed statistically significant when $P<0.05$. Mean±SD values of all variables were obtained, and $P<0.05$ was considered to be significant.

OBSERVATIONS

Stature and maximum head length (in centimeters) of all the participants were noted. Their minimum and maximum values, mean and standard deviation was calculated. The mean stature of subjects was 165.226 cm (147.0 cm- 187.2 cm) with standard deviation 8.4526 and the mean of maximum head length was 17.995 cm with the standard deviation of 0.9551. A statistically significant fair positive correlation was observed between the maximum head length and stature ($r=0.6071$; $P<0.00001$) by using Pearson's correlation coefficient. The $r^2= 0.3686$ i.e. 36.8 % of the total variation in maximum head length was explained by the linear relation with mean stature (Table 1, Fig. 1).

Table 1: Analysis for estimation of stature using maximum head length

Parameters	Min. (cm)	Max. (cm)	Mean (cm)	SD	r	r^2	p-val ue
Stature	147.0	187.2	165.226	8.4526			
Maximum head length	15.1	20.1	17.995	0.9551	0.6071	0.3686	<0.00001

(SD=Standard deviation, r = Pearson's correlation coefficient, p-value=Probability)

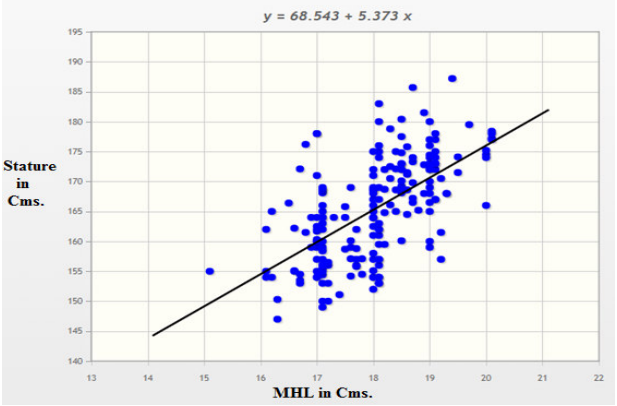

Fig. 1: Scatter plot illustrating Correlation between the Maximum Head Length (MHL) and Stature

A regression analysis is a statistical analysis assessing the association between two variables. Correlation gives the degree and direction of relationship between the two variables, whereas the regression analysis enable us to predict the values of one variable on the basis of other variable. Regression equation for present study was calculated on SPSS Version 22. Regression equation calculated for the estimation of stature for the present study carried out in North Indian population is as follows:

Y =68.543+5.373X

Where Y denotes dependent variable i.e. Stature, X is independent variable i.e. maximum head length (MHL).

The estimated stature of present study population using above regression equation will be- Stature=68.543+5.373×MHL

The value of mean of MHL for North Indian population is 17.995 cm. (Table 1).

So, Stature = 68.543+5.373×17.995 cm = 165.230 cm.

Therefore, the estimated stature of present study population is 165.230 cm which is almost equal to the observed and calculated mean stature of population i.e.165.226 cm (Table 1).

DISCUSSION

The stature of an individual is mainly genetically pre-determined characteristic but affected by different environmental factors also, the estimate of which is considered to be an important parameter in the identification of unknown and fragmentary human remains.

Table 2: Comparison of present study with previous studies

S. No.	Author	Year	Region	Correlation Coefficient (r)
1.	Saxena et al.	1981	Uttar Pradesh	+0.204
2.	Jadav & Shah	2004	Gujarat	+0.530
3.	Seema & Mahajan	2011	Punjab	+0.52
4.	Nemade (Khodke) Priti et al.	2015	Maharashtra	+0.718
5.	**Present Study**	**2017**	**North India**	**+0.607**

In 1981, Saxena et al. (1981) studied head length and height for males aged 25-30 yrs in Uttar Pradesh where the correlation coefficient being + 0.2048 [5]. Similarly in 2004, study done by Jadav & Shah (2004) in Gujarat also showed positive correlation between head length and height with correlation coefficient + 0.53 [6]. Seema and Mahajan (2011) did their study in Punjab region and observed a significant positive correlation coefficient +0.52 between head length and stature [7]. Maximum correlation between stature and maximum head length i.e. +0.718 was observed in Maharashtra region [8] (Table 2).

In the present study done on North Indian population, a fair positive correlation (r = +0.6071) which was statistically significant (p-value <0.00001) was observed between stature and maximum head length and linear regression equation for stature estimation (Y= 68.543 + 5.373X ± 6.73361) has been derived successfully. The estimated stature of present study population was 165.230 cm which was almost equal to the mean stature of population i.e. 165.226 cm.

CONCLUSION

The present study has shown the usefulness of head length in the estimation of stature. Regression formula for stature estimation from head length was successfully derived. Methods used in the study for measuring parameters are non invasive, non time consuming and non expensive, which do not need any specialized training hence, can be used by anyone. Out of the various parameters available for stature estimation, this appears to be equally accurate, less tedious and less cumbersome. The availability of the head or part of the head or even a dry skull is enough to assess the stature of the individual from the formulae derived in this study.

This Regression formula will be useful for the estimation of stature from head length in human adults i.e. if either of the measurement (maximum head length, stature / height) is known the other can be calculated and this can be used practically in medico legal investigations and in anthropometry.

Estimated stature (165.230 cm, calculated using linear regression equation) of the present study population is almost equal to average (mean) height of the subjects i.e. 165.226 cm.. So, the findings of present study suggest that maximum head length (MHL) can be successfully used for stature reconstruction for adult North Indian population.

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Original Article

STUDY OF NUTRIENT FORAMINA: A MORPHOLOGICAL AND TOPOGRAPHICAL ANATOMY IN THE LOWER LIMB LONG BONES IN NORTH INDIAN POPULATION

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ABSTRACT

Introduction: Bone and soft tissue surgery has been more common now days. Therefore knowledge of nutrient artery and nutrient foramina is very important.

Material & Methods: The study comprised examination of 463 lower limb dry long bones which included femora 195, tibiae 150 and fibulae 118 from the Department of Anatomy, Moti Lal Nehru Medical College, Allahabad. The nutrient foramina were identified, analysed macroscopically and the foramen index calculated.

Results: In case of femurs, single nutrient foramen in 62.05%, double foramen in 31.79%, triple in 0.5% and absent in 5.64%. In the case of tibiae, 92% showed single foramen, 2% double and in 6% of the cases the foramen was absent. In fibulae, 93.22% had single foramen and foramen was absent in 6.7%.The mean foraminal index was 44.67 for the femora, 33.92 for tibiae and 44.97 for fibulae. Foramina were located on the diaphysis 27-63% of the overall length of the femur, 23-61% for the tibia and 30-69% for the fibula. In addition, the number and the distribution of the foramina in relation to surfaces of the diaphysis were identified.

Conclusion: The double foramina were more common in femur and rare in the tibia and fibula. The foramina of the femur and fibula were commonly observed at their middle 1/3rd of bone but in the tibiae commonly present at upper part. This knowledge of the nutrient foramina has to be used during surgical procedures.

Keywords: Nutrient artery, foramen index, femur, tibia, fibula.

INTRODUCTION

The long bones are supplied by a nutrient artery. The main diaphysial nutrient artery enters individual bone obliquely through the nutrient foramen, which is directed away, as a rule, from the growing end [1,2]. It is well known that they seek the elbow and flee from the knee. This is because one end of the limb bone grows faster than the other do [3]. During childhood, long bones receive about 80% of the interosseous blood supply from the nutrient arteries [4].

When this supply is compromised, medullary bone ischemia occurs with less vascularization of the metaphysis and growth plate [5]. In cases where nutrient arteries are absent, periosteal vessels become the sole source of blood to the diaphysis of long bones [6]. The nutrient blood supply is very important in free vascularised bone grafting, and it must be preserved to promote fracture repair, with a good blood supply being necessary for osteoblast and osteocyte cell survival, as well as for facilitating graft healing in the recipient [7]. The knowledge of nutrient foramen is important in surgical procedures like bone grafting and more recently in microsurgical vascularised bone transplantation. Aims of this study were to observe the number of nutrient foramina in lower limb long bones i.e. femur, tibia and fibula; calculate the foramen index of each bone, observe the surface of bone where

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nutrient foramen is present and to see the direction of nutrient foramen.

MATERIAL AND METHODS

The study comprised of 463 dry lower limb long bones which included 195 femora (112 right, 83 left), 150 tibiae (78 right, 72 left) and 118 fibulae (63 right, 55 left). Bones were obtained from Department of Anatomy, MLN Medical College, Allahabad. Bones which had gross pathological deformities were excluded from the study. All the bones were macroscopically observed for the number, location and surface of the nutrient foramina. A magnifying lens was used to observe the foramina. Only diaphysial nutrient foramina were observed in all the bones and a 24 gauge needle was passed through each foramen to confirm their patency. The nutrient foramina were identified by the presence of a well marked groove leading to them and by a well marked, often slightly raised, edge at the commencement of the canal (Fig. 1). The number and topography of the foramina in relation to specific borders or surfaces of the diaphysis were analysed. The foramina within 1 mm from any border were taken to be lying on that border. An elastic rubber band was applied around these foramina. The photographs of the bones were taken by 10.1 megapixel digital camera. The measurements of the bones were done over the photographs in relation to measuring tape placed by side of the bones (Fig. 2). The positions of foramina were measured from upper end of all the bones.

Fig. 1: Photograph showing the grooved margins of nutrient foramina

Fig. 2: Photograph showing the method of taking measurements of bone

The foramen index (F.I.) was calculated by applying the Hughes formula, dividing the distance of the foramen from the proximal end (D) by the total length of the bone (L) which was multiplied by hundred [8].

$$F.I. = (D/L) \times 100$$

The data were tabulated on MS excel sheet. The foramen index was determined for all the bones which give the location of the nutrient foramen. In case of multiple foramina, the foramen index was calculated only for the largest foramen. All the measurements were taken in centimetres (cm).

OBSERVATION AND RESULTS

Out of 195 femurs, single foramen was present in 121 (62.05%), double foramina were noted in 62 (31.79%) while triple foramina in one bone only i.e. 0.5%. Eleven bones (5.64%) didn't have any foramen. Out of 150 tibiae, majority (92%) had single foramen, double foramina were rarely observed (only 2%), rest have no foramen. Triple foramina were not observed in any tibia. Out of 118 fibulae studied, most (93.22%) of the fibulae showed single foramen. None of the fibulae showed multiple foramina (Table 1).

Table 1: Number & percentage of nutrient foramen in different bones of lower limb

Bone	Single Foramen		Double Foramen		Triple Foramen		Absence of Foramen	
	No.	%	No.	%	No.	%	No.	%
Femur	121	62.05	62	31.79	1	0.5	11	5.64
Tibia	138	92	3	2	-	-	9	6
Fibula	110	93.22	-	-	-	-	8	6.78

The mean length of femur was 43.6 cm. The mean foramen index was calculated as 44.67. Foramina were located on the diaphysis 27-63% of the overall length of the femur. Majority of foramina (>50%) was seen between 30-40% of its overall length. The pattern of distribution of foramina was also seen and the maximum number of the foramina was found on linea aspera and minimum on popliteal surface (Fig. 3).

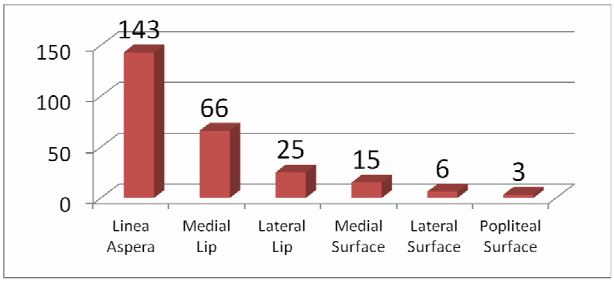

Fig. 3: Distribution of foramina with respect to surface of femur

The mean length of tibia was 37.0 cm. The mean foramen index was 33.92 for the tibiae. Foramina were located on the diaphysis 23-61% of the overall length of the tibia. Majority of nutrient foramina (>50%) was found between 30-40% of its overall length. All the tibiae showed the foramina at the posterior surface. The foramina were mostly present below the soleal line but some tibiae have foramen above the soleal line (Fig. 4).

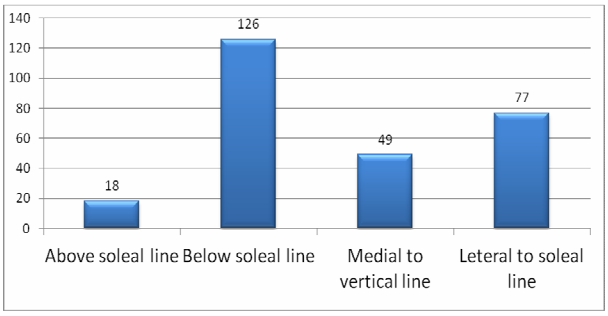

Fig. 4: Distribution of foramina with respect to soleal line and vertical line of tibia

The mean length of fibula was 35.8 cm and the mean foramen index was 44.97. Foramina were located on the diaphysis 30-69% of its overall length. Majority of nutrient foramina (>50%) was found between 35-45% of its overall length. By studying the distribution of nutrient foramina in fibulae, we observed that all the foramina were present on posterior surface either on medial crest, medial to medial crest, lateral to medial crest or on interosseous border (Fig. 5).

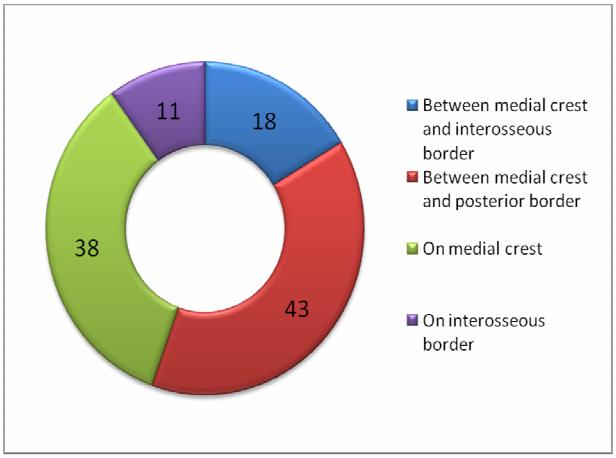

Fig. 5: Distribution of foramen in relation to medial crest of fibula

DISCUSSION

The nutrient foramen is an important topic for research since last century. Longia et al. (1980) studied the diaphyseal nutrient foramina of long bones. He found that the nutrient foramina are directed towards the elbow and away from the knee [7]. Hughes (1952) earlier described that one end grows faster than other, so bone moves away from growing and so the direction of nutrient foramina [8]. Our study also supports this fact. We studied the topography of nutrient foramina including site and length of lower limb long bones. We found 62% of femora, 92% of tibia and 93% of fibula had single foramina. Double foramina were seen in 32% of femur and only 2% of tibia. About 6% of femur, tibia and fibula had no foramina as we did not consider them as nutrient foramen through which 24 gauge needle could not pass. Our results are very much similar to Mohan et al. (2017) [9], the only difference is that they did not consider the absence of foramen. Kizilkanat et al. (2007) observed the location of nutrient foramina of femur, tibia and fibula between 29-69%, 27-63% and 26-83% of overall length [10], which were about the same range observed in present study for femur and tibia with little difference in higher range in the fibula. In our study, majority of nutrient foramina (>50%) was found between 30-40% at femora and tibia and between 35-45% at fibula. Seema et al. (2015) found that majority of foramina were present on flexor surface [11] and similar findings were also noted in our study.

The present investigation provides additional information on the nutrient artery foramina of long

bones of lower limb. Techniques such as micro-vascular bone transfer are becoming more popular, information relating to the anatomical description of these foramina is vital to preserve the circulation of affected bony structures. It is also of relevance for those clinicians involved in surgical procedures where patency of the arterial supply to long bones is important.

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Original Article

STUDY OF ANOGENITAL INDEX AND 2:4 DIGIT RATIO IN HUMAN FETUSES: AN ANTHROPOMETRIC STUDY FROM NORTHERN INDIA

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ABSTRACT

Introduction: Anogenital index (AGI) and 2:4 digit ratio (2D:4D) are sexually dimorphic and found to be markers of androgen and androgen receptor (AR) status. Studies in adults and children have shown both AGI and 2D:4D to be the predictor of external genitalia development, there abnormalities and adult reproductive disorder like infertility. However anthropometric study measuring the two indices in the fetuses, their association with crown rump length (CRL) and which marker can act as sexually dimorphic marker was not found. The aim of the present study was to measure anogenital distance (AGD), AGI and 2D:4D in apparently normal fetus, there correlation with CRL and to find out which one can act as better sexually dimorphic marker in fetuses.

Material & Methods: AGI was measured in 72 fetuses ranging from 6 cm to 37 cm of CRL. AGI (mm/kg) was calculated by dividing AGD with weight of fetus. The length of second and fourth digit was measured by fingers in full extension of right and left hand and ratio was obtained. The difference if any between the male and female AGD, AGI, 2D:4D ratio of left and right hand were observed. The Pearson correlation and p value of AGI and 2D:4D with CRL were calculated to prove statistical association.

Results: The mean AGI in fetuses was 22. AGI was more in male fetuses (28) in comparison to female fetuses (15). The ratio of mean male to female AGI was 1.86. The AGI showed linear decrease with increase in CRL in both male and female fetuses. The mean 2D:4D ratios in male and female fetuses were 0.92 and 0.93 for left hand respectively. The mean 2D:4D ratios in male and female fetuses were 0.92 and 0.98 for right hand respectively. The male to female ratio of 2D:4D for left hand and right hand was 0.99 and 0.94 respectively. The Pearson correlation and p value showed significant correlation between AGD and CRL in both male and female fetuses while only in female fetuses the 2D:4D ratio of both hand showed significant correlation.

Conclusion: Androgens exposure early in fetal life determines genital development, various congenital anomalies and reproductive disorders. Indirect markers showing sexual dimorphism are essential to observe effect of androgen. This anthropometric study found that AGD and AGI showed statistically significant association with CRL and can act as reliable marker of sexual dimorphism, while 2D:4D ratio cannot be used as sexually dimorphic marker in fetuses.

Keywords: Anogenital distance, anogenital index, 2D:4D ratio.

INTRODUCTION

Androgen exposure in early fetal life determines development of internal and external genitalia, congenital abnormalities and future reproductive disorders [1]. It is essential to study the levels of androgens and their effect on fetuses. It is not possible to directly estimate androgen levels in fetal blood, so the need of indirect markers arise to study the effect of androgens and other sex steroids on fetuses. Anogenital distance (AGD) is established as an important sexually dimorphic marker in fetuses with males having almost twice AGD than females [2].

Anogenital index (AGI) and 2:4 digit ratio (2D:4D) are two emerging sexually dimorphic variables and

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found to be markers of androgen and androgen receptor (AR) status [3-5]. Studies in adults and children have shown both AGD to be the predictor of external genitalia development, congenital abnormalities and reproductive disorder like infertility [6-9]. However anthropometric study measuring the AGI and 2D:4D ratio of fetuses and their comparison with CRL were not found.

In this study, we tried to find out whether AGI and 2D:4D ratio shows any difference between male and female fetuses. The correlation of AGI and 2D:4D ratio with CRL was calculated and association of these two factors with CRL was assessed. We tried to find out which among the two variables show better sexual dimorphism.

MATERIAL AND METHODS

This cross sectional study was conducted in Department of Anatomy, Government Medical College, Haldwani, Nanital, and Uttarakhand. A total of 72 fetuses including 38 male and 34 female with normal external genitalia were included in the study. Fetuses with congenital anomalies like epispadias, hypospadias, chordee, imperforate anus, meningocele and anencephaly were excluded from the study. Any fetus with abnormality involving digits were also excluded from the study. In addition, fetus with any perineal pathology like cyst and fistula were also excluded from the study. The variables studied were sex, weight, CRL, AGD, AGI and 2D:4D ratio. The weight of fetuses were recorded by electronic weighing machine in grams. The anogenital distance was measured by flexible ruler from center of anus to midline of posterior base of scrotum where corrugated skin fused with normal skin in male fetus, while it was up to posterior fourchette in female fetus (Fig. 1) [2].

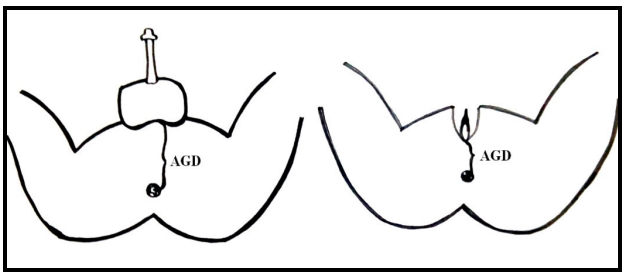

Fig. 1: Schematic diagram showing measurement of AGD

This technique was used as it is unaffected by body mass index, adiposity and age [10]. AGI (mm/kg) was calculated by dividing anogenital distance in millitimeter by weight of fetuses in kilograms [4]. The digit length was obtained by measuring distance from proximal most digital crease to distal most end of second digit (2D) or index finger and similarly from proximal most digital crease to distal most end of fourth digit (4D) or ring finger (Fig. 2) [10].

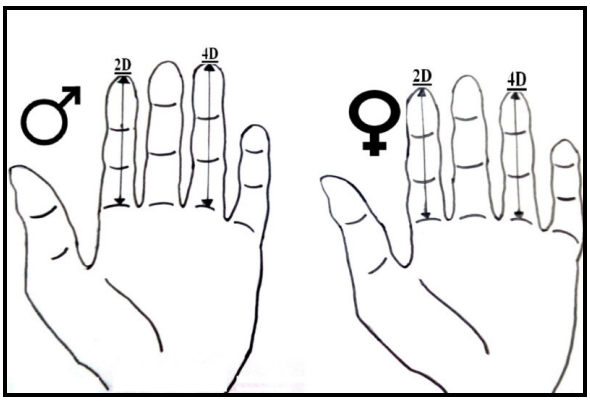

Fig. 2: Diagram showing measurement of second (index finger) and fourth (ring finger) digits

The 2D:4D ratio was then obtained by dividing second digit length from fourth digit length. Both AGI and 2D:4D ratio values were then plotted against the respective CRL. The Pearson correlation and p value were calculated to find out statistical correlation and significant association of AGI, 2D:4D ratio with CRL. The attempt was made to find out which parameter showed better correlation with CRL. The ratio of mean male to female AGD, AGI and 2D:4D ratios of right and left hand were compared in an attempt to find out which marker showed better sexual dimorphism. The ratio of mean male to female AGD, AGI and 2D:4D ratios of right and left hand in different subcategories of CRL were compared to find out sexual dimorphism at different CRL.

OBSERVATIONS AND RESULTS

A total of 72 fetuses were included in the study with 38 male and 34 female fetuses. The smallest fetus was of 6 cm CRL and the largest one of 37 cm. Both male and female AGD increased with increase in CRL. In males, AGD ranges from 0.1 cm in smallest fetus to 3 cm in largest fetus, while in female fetuses it ranges from 0.2 to 1.4 cm. But the overall mean AGD in males was 1.68 times that of females. The AGD showed strong positive correlation with CRL in both male and female fetuses with Pearson correlation of 0.92 and

0.88 respectively and showed significant association when p value less than .05 was taken as significant.

Weight was also increasing with increase in CRL and ranges from 11-2776 gm in male and 56-2447 gm in female fetuses.

The AGI was calculated by dividing AGD with weight of fetuses (mm/kg). The mean AGI in fetuses was 22. The mean AGI in male and female fetuses was 28 and 15 respectively. The male to female ratio of mean AGI was 1.86 indicating that males having greater AGI than female fetuses. The CRL were categorized in to four categories of less than 10 cm, 11-20 cm, 21-30 cm and greater than 30 cm. In all four categories, AGI in males were greater than females (Table 1). It was also noted that with increase in CRL, the AGI of fetuses decreases (Fig. 3).

Table 1: Male to female ratio (M/F) of AGD, AGI, 2D:4D ratio of left and right hand at different subgroup of CRL

CRL (cm)	M/F (AGD)	M/F (AGI)	M/F (2D:4D left)	M/F (2D:4D right)
<10	1	2.5	0.89	1
11 to 20	1.68	1.5	0.99	0.96
21 to 30	1.4	2.2	1	0.99
>30	1.84	1.7	0.99	1.02

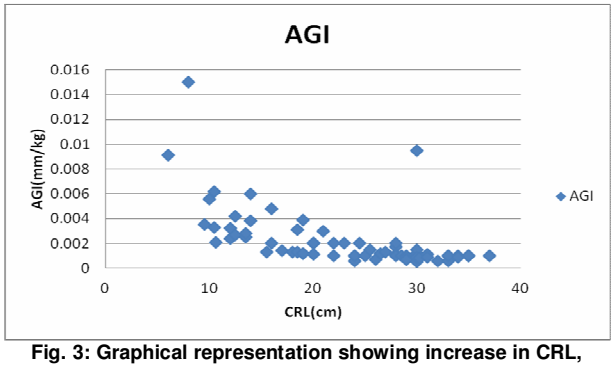

Fig. 3: Graphical representation showing increase in CRL, reduces AGI

The 2D:4D ratio of left and right hand fingers were calculated. No marked difference was observed in 2D:4D ratio in male and female fetuses (Fig. 4 & 5). The mean 2D:4D ratio were 0.92 in both right and left hand in male fetuses, while in female fetuses the ratio of right and left hand were 0.93 and 0.98 respectively. Male to female ratio of mean 2D:4D of left hand was 0.99 (Table 1) while it was 0.94 for right hand, indicating that female fetuses had more 2D:4D ratio than males but the difference was not significant. No marked difference in 2D:4D ratio of left and right hand in all subcategories of CRL was found in male and female fetuses (Table 1). No sexual dimorphism was observed in 2D:4D ratio on right hand side and only slight dimorphism was seen on left hand with males having less 2D:4D ratio than females.

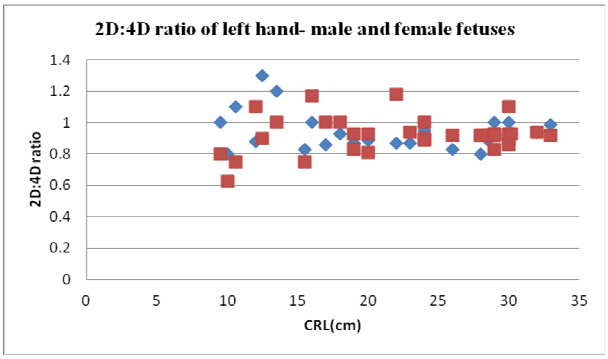

Fig. 4: Graph showing no marked difference in 2D:4D ratio of left hand in male (brown square) and female fetuses (blue square) at different CRL

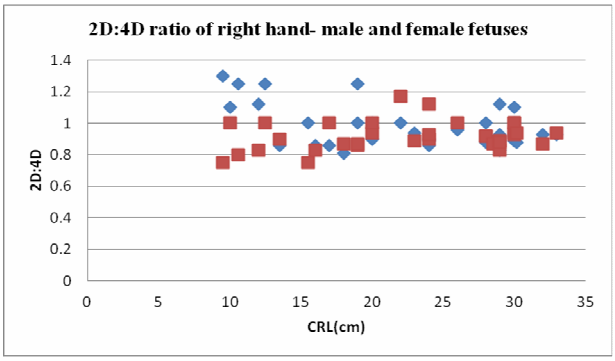

Fig. 5: Graph showing 2D:4D ratio of right hand with slightly high 2D:4D ratio in female fetuses (blue square) than male fetuses (brown square) at different CRL

The Pearson correlation was calculated between CRL and AGI in male and female fetuses and a negative correlation with value of -0.61 and -0.79 were obtained. The p value was also calculated and it was found that AGI was significantly associated with CRL when p value of less than .05 was taken as significant.

The Pearson correlation was calculated between CRL and 2D:4D ratio for left hand in male and female fetuses and a weak correlation with value of 0.117 and -0.28 were obtained. The p value was also calculated and it was found that 2D:4D ratio for left hand in males

was not significantly associated with CRL while in females there was significant association, when p value of less than .05 was taken as significant.

The Pearson correlation was also calculated between CRL and 2D:4D ratio for right hand in male and female fetuses and a weak correlation with value of 0.196 and -0.48 were obtained. The p value was also calculated and it was found that 2D:4D ratio for right hand in males was not significantly associated with CRL while in females there was significant association, when p value of less than .05 was taken as significant.

The ratio of male to female mean AGD, AGI and 2D:4D ratio of left hand and right hand were compared and found that the ratio was markedly high for AGD and AGI in comparison to 2D:4D ratio of both right and left hand (Table 2, Fig. 6). Mean M/F ratio of AGD, AGI, 2D:4D ratio of left and right hand was observed in different subgroups of CRL, while AGI and AGD showed sexual dimorphism with males having higher AGD and AGI than females, 2D:4D ratio did not show marked sexual dimorphism (Table 1, Fig. 7).

Table 2: Male to female ratio of mean AGI, 2D:4D digit ratio of left and right hand with only AGI showing significant dimorphism compared to 2D:4D ratio

Markers	M/F	Sexual dimorphism
AGD	1.69	Yes
AGI	1.86	Yes
2D:4D Right	0.99	No
2D:4D Left	0.94	Slight

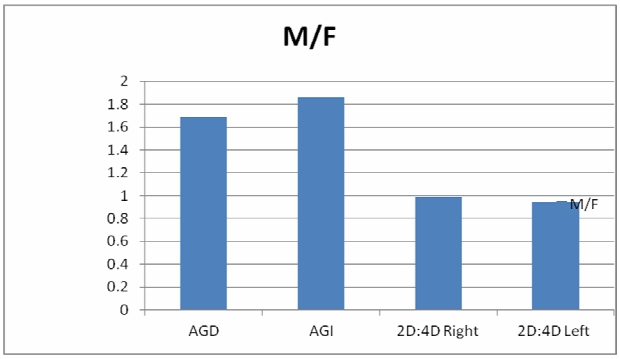

Fig. 6: Bar diagram showing sexual dimorphism by mean of M:F ratio. AGI and AGD shows sexual dimorphism while digit ratio of both hand did not show marked sexual dimorphism

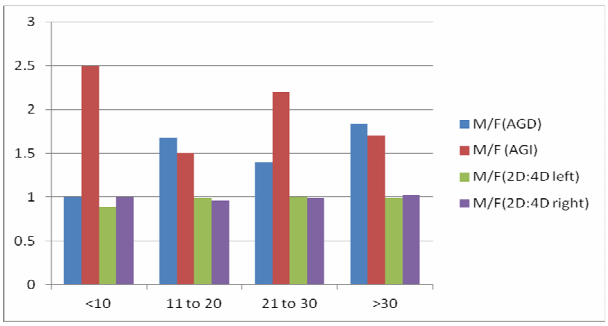

Fig. 7: Bar diagram showing mean of AGI, 2D:4D digit ratio of left and right hand in different subgroup of CRL

DISCUSSION

Early in fetal development, SRY gene on Y chromosome leads to differentiation of leydig cells [11]. Leydig cells secrete testosterone and leads to differentiation of wolfian duct into male internal genitalia while DHT, a derivative of testosterone leads to development of penis from genital tubercle. In absence of testosterone, wolfian duct degenerates and female internal and external genitalia develops [12,13]. Testosterone also causes caudal migration of genital tubercle, leading to higher AGD in male, in comparison to females [14]. This difference begins to appear in fetuses at around 11th week of gestation due to effect of testosterone in fetuses. The difference get maximum at 20th weeks and this difference remains up to birth [15]. Although after birth, the difference reduces slightly but males will always have higher AGD than females.

Therefore optimum levels of testosterone levels are required in this critical period of genitalia development. Testicular dysgenesis syndrome (TDS) causes abnormal development and function of testis, associated with low levels of testosterone at this critical window leading to various congenital abnormalities like hypospadias in fetal life, while in adult this underexposure can lead to problem of infertility like low sperm count [16]. In females, overexposure of testosterone in this critical period also leads to masculinization of external genitalia, physical changes and various gynecological disorders including infertility, polycystic ovarian syndrome and endometriosis [17-19]. Therefore assessment of testosterone in fetal life is essential to rule out congenital abnormalities as well as reproductive disorders in adults.

To assess the effects of testosterone, direct estimation of its levels in fetal blood at critical period of development is required, but this is not possible in humans. Although testosterone levels can be measured in amniotic fluid but testosterone levels in fetal blood and amniotic fluid differs, as amniotic fluid had lower levels of testosterone. Testosterone levels can also be estimated from umbilical cord and gravid maternal blood but both these approach are also unsatisfactory as testosterone levels in umbilical and maternal blood differs from fetal blood [10]. AGD [20], AGI and 2D:4D ratio [21] reflects androgen status; these markers can be used to assess androgen status and its effect.

Although as in our study, AGD showed sexual dimorphism in nearly every study. The literature on AGI is very much limited on fetuses, with only few studies on boys were found. The AGI was correlated with phthalate exposure in a study by Swan et al. (2005) [4]. They found that AGI was associated with testicular descent with males having short AGI were associated with incomplete testicular descent in comparison to intermediate and large AGI. They also found that small or indistinct scrotum was also associated with short AGI. Penile volume was also found to be associated with AGI. They found that in phthalate exposure, which is an antiandrogen, shorter AGI was associated with high phthalate score while longer AGI was associated with low phthalate score [4].

2D:4D ratio is considered as a sexually dimorphic marker, although the difference is proposed to appear at around 14 week of gestation [22,23], the dimorphism become more apparent from 2 year onwards [22] and becomes more with age however its dimorphic pattern is not so well established in fetuses. In adult males, fourth digit is found to be longer than second digit in comparison to the females [24], establishing it as a sexually dimorphic marker, however different studies had given different opinion. This effect may be due to prenatal, postnatal and pubertal factors. In prenatal period, aromatization of testosterone occur and growth is mediated by estrogen receptors. The post natal effects are mediated by estrogen on metaphysis of bone. Estrogen causes excessive stimulation of chondroblast, causing there hypertrophy and accelerated degeneration [25,26]. In fetuses, the 2D:4D ratio shows lesser degree of sexual dimorphism. Early in gestation various sex steroids are expressed on fetal anlagen but their exact effects on anlagen are poorly understood, although the effect is thought to be estrogen receptor mediated [26,27]. Studying 2D:4D digit ratio in fetal life gives us opportunity to indirectly study effect of sex steroid on phalangeal anlagen.

In our study, mean 2D:4D ratio of right hand in both male and female fetuses were nearly equal and no sexual dimorphism was observed while females were found to have higher 2D:4D digit ratio than males for left hand. Previous studies have shown both right as well as left hand showing sexual dimorphism in adults however no anthropometric study comparing 2D:4D ratio of left and right hand in fetuses were found [5]. The 2D:4D ratios is influenced by numerous factors including age, sex, racial, geographic and ethnic factors, others factors affecting bone growth including different steroid sensitivity of bone and there receptors, pattern of growth, onset of chondrification , ossification and difference in timing of bone growth can also affect 2D:4D ratio [23].

According to our study, AGI was found to be more in males in comparison to females, however 2D:4D digit ratio did not showed any marked difference. AGI showed strong correlation with CRL in both male and female fetuses while 2D:4D ratio showed only statistically significant association in left hand of females only.

As discussed above, sexual dimorphism in AGD and AGI can be mainly attributed to testosterone while difference in 2D:4D ratio in male and female fetuses may be estrogen mediated, therefore both markers does not reflect common androgen exposure. Hurd et al. [28] compared AGD with digit ratio in mice and found that while AGD showed sexual dimorphism, the 2D:4D ratio showed no difference between male and female mice. They found no correlation between the two and hence propose that AGD and 2D:4D ratio does not reflect common androgen exposure. In this study also, we found that while AGD showed strong sexual dimorphism with males having nearly twice AGD than females, no such difference was appreciated in 2D:4D ratio. Therefore it is necessary to measure AGD, AGI and 2D:4D ratio to assess action of androgen and estrogen on fetuses.

AGD measurement have a great potential to predict disorders related to testicular dysgenesis syndrome (TDS) and can be clinically applied to predict congenital abnormality involving reproductive tract and future reproductive disorders like slow sperm count [16]. But absence of standard measurement technique used and lack of age specific normal range, limits the application of this potentially useful marker.

Since AGI is calculated by dividing AGD with weight and there is few if any anthropometric study available for fetuses measuring AGI. This study provides an insight that AGI similarly to AGD shows sexual dimorphism and is strongly correlated with CRL.

As far as 2D:4D digit ratio is concerned, this study shows that this marker does not show significant sexual dimorphism as well as association with CRL in fetuses. In addition it is very hard to measure 2D:4D digit ratio in utero by ultrasound, as fingers of fetuses cannot remain in state of full extension. While AGD and weight of fetuses, can be reliably measured by ultrasound and AGI can be easily calculated [29].

CONCLUSION

Androgens, early on in fetal life determine genital development and abnormal androgen levels can lead to various congenital anomalies and reproductive disorders. Due to inability to directly measure androgen levels in fetuses, indirect markers showing sexual dimorphism are essential. This anthropometric study found that while AGD and AGI showed statistically significant association with CRL and can act as reliable marker of sexual dimorphism, 2D:4D ratio cannot be used as sexually dimorphic marker in fetuses.

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Original Article

RADIOLOGICAL EVALUATION OF INTERVERTEBRAL FORAMINA OF LUMBAR REGION IN SYMPTOMATIC AND ASYMPTOMATIC SUBJECTS

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ABSTRACT

Introduction: Spinal stenosis is defined as the narrowing of central spinal canal or its lateral recesses. Stenosis of spinal canal becomes important only when it results in interference with the normal functions of the contents of the canal. The present study was aimed to evaluate the clinical relevance of stenosis of intervertebral foramina through the most recent technique MRI.

Material & Methods: Antero-posterior diameter (APD) of intervertebral foramina of both sides was taken into account to ascertain any deviation from normal. The data was statistically analyzed using unpaired "t" test with Welch correction. Antero-posterior diameter of intervertebral foramina were compared between symptomatic and asymptomatic subjects and statistically analyzed. The data was represented as mean ± SEM (Standard Error of Mean). A probability (p) value of less or equal to (≤) 0.05 was considered statistically significant and all diameters were taken in millimeter.

Results: The diameter of intervertebral foramina of left and right side was maximum at L_1L_2 level and minimum at L_4L_5 level in both symptomatic and asymptomatic subjects. The diameter of left neural foramina was slightly more than that of right ones. Minimum diameter was seen at L_4L_5 level making this level susceptible to compressive symptomatology.

Keywords: Stenosis, intervertebral foramina, radiological study.

INTRODUCTION

Spinal stenosis is defined as the narrowing of central spinal canal or its lateral recesses. Stenosis of spinal canal becomes important only when it results in interference with the normal functions of the contents of the canal. Ruetten et al. (2013) stated that there are many entities that lead to lateral recess stenosis such as thickening of ligamentum flavum or hypertrophy of facet joint that are often seen in degenerative disease together with bulging of intervertebral disc [1]. Epstein et al. (1979) gave much clear classification of spinal stenosis as general, segmental or local and emphasized the importance of lateral recess and foraminal canal pointing out that the intervertebral foramen was not simply an opening but was a definite canal [2]. Suzuki and Shimamura (1994) studied the reliability of MRI measurement of spinal cord. They scanned and measured a formalin fixed cadaveric spinal cord and found that measurements mode on T1 weighted MR images yielded nearly the same values as the spinal cord [3]. Steurer et al. (2011) also stated that there is no generally accepted "gold standard" for diagnosis of lumbar spinal stenosis (LSS) [4]. MRI still remains the imaging modality of choice for assessment of LSS. According to Kim et al. (2013), the three dimensional Proset- MRI is very useful and

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sensitive technique to diagnose the symptomatic foraminal and extraforaminal stenosis at L_5-S_1 [5]. Cinnoti et al. (2002) stated that the integrity of the intervertebral disc has a bearing on the vertical diameter of the intervertebral foramen [6]. Narrowing of spinal canal seems to be a normal part of advancing age. It may be congenital or acquired. Absolute measurement of intervertebral foraminal diameter either through radiological studies or surgery or in cadaveric spine can act as a rough guide to this condition. The present study was conducted with the aim to measure and compare the dimensions of intervertebral foramina in clinically symptomatic and asymptomatic subjects in lumbar region.

MATERIAL AND METHODS

The present study was carried out in the Department of Anatomy in collaboration with the Department of Radio-diagnosis and NMC-Sky Imaging Centre, LLRM Medical College, Meerut. The study was a longitudinal comparative type with a sample size of 68 subjects both symptomatic and asymptomatic, enrolled randomly coming with the referral from neurosurgery and orthopedics departments to radio-diagnostic center for MRI of lumbosacral region. Out of total 68 cases, 50 were symptomatic having complaints suggestive of spinal cord/spinal nerve compression. Rest 18 subjects were asymptomatic volunteers included in the study for comparison. Subjects with lumbar vertebral fracture, vertebral abnormalities, previous spinal injury, spinal tumors, Pott's spine, Paget's disease and any gross spinal pathology were excluded from the study.

A detailed history was recorded and examination of every case was also done. Questions were put regarding complaints of backache, leg pain, muscular weakness, site and radiation of pain, aggravating and relieving factors, bladder and parasympathetic disturbances and duration of symptoms. The MRI machine of 1.5 tesla of G.C.Company with LCD projector was used to measure intervertebral foramina of both sides by anteroposterior diameter in mm (Fig. 1&2).

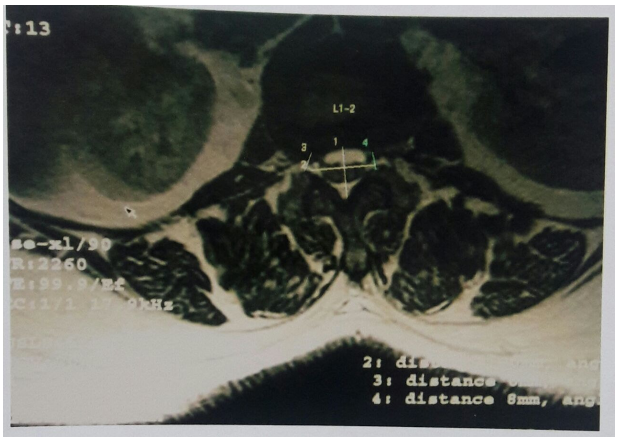

Fig. 1: MRI scan showing measurement of right intervertebral foramen (line 3) and left intervertebral foramen (line 4)

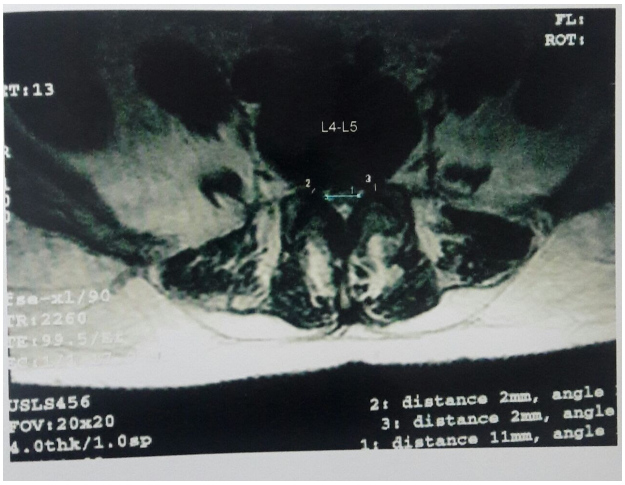

Fig. 2: MRI scan showing measurement of right intervertebral foramen (line 2) and left intervertebral foramen (line 3)

OBSERVATIONS AND RESULTS

The data was statistically analysed using unpaired 't' test with welch correction. The data represents as Mean±SEM (Standard error of mean). A probability 'p' value ≤0.05 was considered as statistically significant.

On comparing the mean values of diameter of right intervertebral foramina in symptomatic with asymptomatic cases at various levels the results were found to be statistically significant at all levels. The diameter of right intervertebral foramina at various levels was found to be maximum at L_1L_2 level and minimum at L_4L_5 level. This also shows that diameter gradually decreased from L_1L_2 downwards (Table 1).

Table 1: Comparison of diameter of right lumbar intervertebral foramina in symptomatic and asymptomatic subjects

Level	Diameter of Right Intervertebral Foramina (mm) (Mean ± SEM)		p value
	Symptomatic cases (n=50)	Asymptomatic cases (n=18)	
L_1L_2	5.06 ± 0.14 ***	7.28 ± 0.16	0.0001
L_2L_3	4.32 ± 0.16 ***	6.33 ± 0.14	0.0001
L_3L_4	3.80 ± 0.16 ***	5.72 ± 0.16	0.0001
L_4L_5	3.20 ± 0.14 ***	5.06 ± 0.10	0.0001

Significance: *Mild, **Moderate, ***High
NS = Nonsignificant; SEM = Standard Error of Mean

On comparing the mean values of diameter of left intervertebral foramina in symptomatic cases with asymptomatic cases at various levels the results were found to be statistically significant at all levels. The diameter of left intervertebral foramina at various levels was found to be maximum at L_1L_2 level and minimum at L_4L_5 level. This comparison also shows that diameter gradually decreased from L_1L_2 downwards (Table 2).

Table 2: Comparison of diameter of left lumbar intervertebral foramina in symptomatic and asymptomatic subjects

Level	Diameter of Left Intervertebral Foramina (mm) (Mean ± SEM)		p value
	Symptomatic cases (n=50)	Asymptomatic cases (n=18)	
L_1L_2	5.20 ± 0.17 ***	7.44 ± 0.17	0.0001
L_2L_3	4.62 ± 0.13 ***	6.50 ± 0.15	0.0001
L_3L_4	3.94 ± 0.15 ***	5.72 ± 0.14	0.0001
L_4L_5	3.66 ± 0.15 ***	5.17 ± 0.15	0.0001

Significance: *Mild, **Moderate, ***High
NS = Nonsignificant; SEM = Standard Error of Mean

By observation of these tables we found that the diameter of left neural foramina are slightly more than that of right neural foramina at all levels.

DISCUSSION

Lumbar spinal stenosis may be congenital or acquired resulting from degenerative changes or as consequences of local infection or trauma. Cuchanski et al. (2011) stated that percentage occlusion of spinal canal and intervertebral foramen depends on magnitude and direction of load. Exiting neural elements at the location of the intervertebral foramen are the most vulnerable to impingement and generation of pain [7]. Silav et al. (2016) stated that dorsal root ganglia in lumbar region play a key role in occurance of low back pain and sciatica, so accurate position of dorsal root ganglia be useful to perform safe surgical intervention in the lumbar foraminal region [8]. Normal data of spinal canal dimensions are essential for radiological diagnosis of spinal canal stenosis. There are only few studies available regarding the intervertebral foramina of lumbar region. Ruhli et al. (2005) studied human osseous intervertebral foramina width (IFW) and observed no correlation of IFW with the individual age or stature [9]. In our study, we found that in both symptomatic and asymptomatic subjects, the maximum diameter of intervertebral foramina was at L_1L_2 level on both right and left sides and there was a gradual decrease of diameter from L_1L_2 to L_4L_5 in both symptomatic and asymptomatic subjects on both sides. These results show that the nerves passing through lower intervertebral foramina i.e. from L_3L_4 to L_4L_5 onwards are more liable to get compressed than that of upper ones. Kirkaldy et al. (1982) stated that foraminal diameter of 5 mm or more is considered as normal, up to 4 mm is borderline and <3 mm is definitely stenotic [10]. On comparing the present study with Kirkaldy et al. (1982), at L_3L_4 and L_4L_5 with values of 3.80 ± 0.16 and 3.20 ± 0.14 respectively which come in borderline in symptomatic subjects. Devi and Rajagopalan (2005) stated that vertical diameter of intervertebral foramina show increase from L_1-L_2 and thereafter decrease from L_3 - L_5 [11]. Hadidi et al. (2003), after studying asymptomatic Jordanian cases, found a craniocaudal increase in foraminal heights, reaching a maximum at L_2/L_3 level in females and L_3/L_4 level in males and there was a significant decrease below this level reaching a minimum value at L_5/S_1 [12]. Tong et al. (2006) found mean osseous spinal canal diameter gradually decreases from L_1L_2 to L_4L_5 but mid-line thecal sac diameter and lateral recess, antero-posterior diameter were relatively unchanged [13]. Our study in contrast revealed that foraminal diameter gradually decrease from L_1L_2 level to L_4L_5.

CONCLUSION

Variation in dimensions of intervertebral foramina as reported in the present study and by earlier workers may be due to racial variation and morphometric methodology adopted. The present study clearly shows that the diameter of intervertebral foramina of left and right side was maximum at L_1L_2 level and minimum at L_4L_5 level in both symptomatic and asymptomatic subjects. The diameter of left neural foramina was slightly more than that of right ones. Minimum diameter was seen at L_4L_5 level making this level susceptible to compressive symptomatology.

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Original Article

VARIATION OF LUMBRICALS IN HAND: A CADAVERIC STUDY

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ABSTRACT

Introduction: The human hand is a revolution in evolution. Indeed the lumbricals of the hand by producing flexion at the metacarpophalangeal joints and extension at the interphalangeal joints helps in writing, stitching and any other forms of precision work. The lumbricals of index and middle finger are unipennate muscles originating from the radial side of the flexor digitorum profundus tendon. The lumbricals of ring and small finger arise from bipennate muscle bellies on the adjacent surfaces of the flexor digitorum profundus tendons. This study was undertaken to note the variation in pattern of lumbricals and correlate it clinically.

Material & Methods: This study was conducted in SRMS IMS, Bareilly during period of five years on 30 cadavers. We found different pattern of lumbricals in cadaveric hands.

Results: Bilateral absence of lumbricals was noted in one cadaver. Absence of 3rd and 4th lumbricals in the left hand while intact 1st and 2nd lumbricals were seen. Origin and insertion of rest of the lumbricals were normal. In the right hand, all 4 lumbricals were absent. In another cadaver, fourth lumbrical was absent in one hand. We also observed hypertrophy of lumbricals in a cadaver.

Conclusion: This type of variation is interesting not only to anatomists, but also to orthopedic surgeons, physiotherapists, and radiologists. The above reported variation may be significant during the hand surgery.

Keywords: Lumbricals, hand, absence, variation.

INTRODUCTION

Lumbricals are small worm like muscles, arises from each of the four profundus tendons and passes along the radial side of the corresponding metacarpophalangeal joint on the palmar surface of the deep transverse metacarpal ligament, to be inserted by a tendon into the extensor expansion on the dorsum of phalanges. The proximal attachments of lumbricals are not to bone but to tendons, and are therefore mobile. Lumbricals play a vital role in precise movements of the hand. Lumbricals produces up and down strokes of fingers for skilled works. The lumbricals thus provide muscular and hence proprioceptive bridges between flexor and extensor muscles – a unique occurrence – which may have important implications in adjusting the position of finger joints when using the hand. Acting via the extensor apparatus, the lumbricals extend both interphalangeal joints. The two medial lumbricals are innervated by the ulnar nerve and the two lateral lumbricals by the median nerve. Lumbricals supplied by ulnar nerve are bicipital each arising by two heads from adjacent profundus tendons, while those supplied by median nerve are unicipital [1].

The first and second lumbricals are used as muscle flaps for the coverage of the median nerve and its palmar branches. Hypertrophy of the lumbrical muscles causes compression of the radial and ulnar collateral arteries, leading to chronic sub-ischemia [2]. Therefore, present study was undertaken to know the variation in the lumbricals.

The functional significance and morphological variations of lumbrical muscles as described in the literature, prompted us to undertake a detailed study of these muscles to know more about it and its significant

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value in designing of surgical procedures.

MATERIAL AND METHODS

The present study was conducted on 30 forearm specimens obtained from embalmed cadavers of Department of Anatomy from SRMS IMS, Bareilly. The dissection of these forearm specimens was done as per standard guidelines [3]. A longitudinal incision was made from the distal end of flexor retinaculum, upto the level of metacarpophalangeal joint of middle finger. The superficial fascia, deep fascia and flexor retinaculum were dissected and reflected. Then the tendon of flexor digitorum superficialis, flexor digitorum profundus, branches of median nerve and superficial palmar arch were retracted. The lumbrical muscles were carefully observed and isolated [4]. Lumbricals were observed carefully for their existence (present or absent), hypertrophy and architecture (unipennate/ bipennate/sinuous course. Lumbricals were then followed to their tendons which pass to the lateral side of the base of each finger and later, the tendons of each of the lumbrical muscles were traced up to their insertions.

OBSERVATIONS

Normally there are four lumbrical (worm-like) muscles, each of which is associated with one of the fingers. Different patterns of lumbricals were observed and their incidence was noted (Table 1).

Table 1: Patterns of lumbricals and its incidence

Pattern	Number of cases	Incidence
Normal	26	86.66%
Absence of all four lumbricals	1	3.33%
Absence of third and fourth lumbricals	1	3.33%
Absence of third lumbrical	1	3.33%
Absence of fourth lumbrical associated with unipennate third lumbrical and hypertrophy of first lumbrical	1	3.33%

In present study, normal pattern i.e. intact all four lumbricals of which 1st and 2nd unipennate while 3rd and 4th bipennate were seen in 26 cases. Variation according to presence or absence was observed in remaining 4 specimen. Absence of all the four lumbricals in one case (Fig. 1),third and fourth lumbricals were absent in one case (Fig. 2), absence of third lumbrical in one specimen (Fig. 3) and absence of fourth lumbrical associated with unipennate third lumbrical and hypertrophy of first lumbrical in one forearm (Fig. 4). One specimen showed sinuous course of fourth lumbrical (Fig. 5).

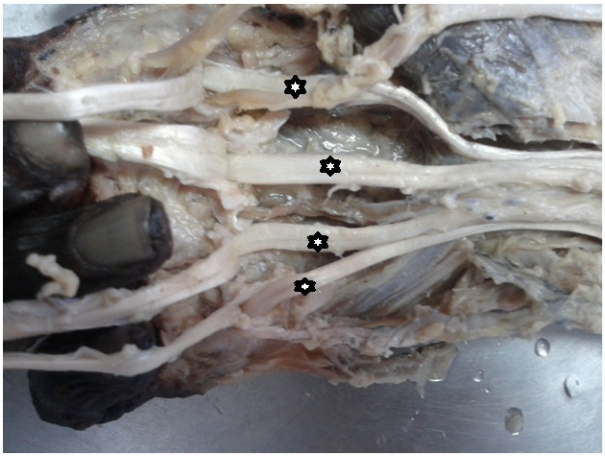

Fig. 1: Photograph showing absence of all four lumbricals (star)

Fig. 2: Photograph showing absence of third and fourth lumbricals (star)

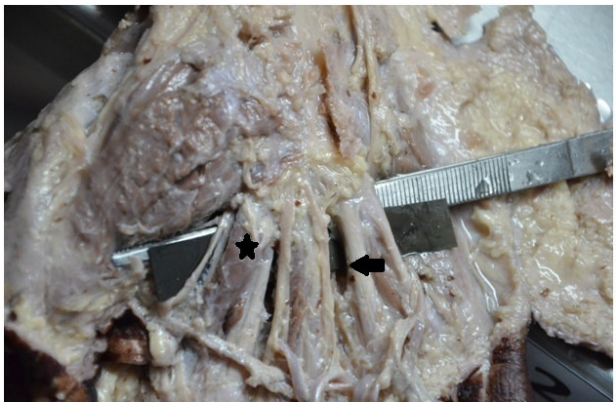

Fig. 3: Photograph showing absence of third lumbrical (arrow) and hypertrophic first lumbrical (star)

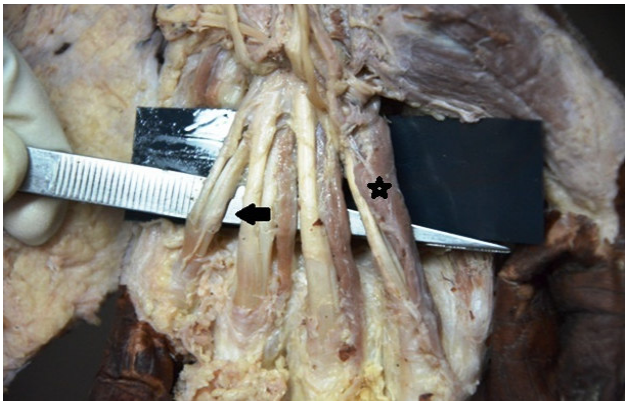

Fig. 4: Photograph showing absence of fourth lumbrical (arrow), unipennate third lumbrical and hypertrophic first lumbrical (star)

Fig. 5: Photograph showing sinuous course of fourth lumbrical (arrow)

DISCUSSION

Limb musculature is derived from dorsolateral cells of the somites that migrate into the limb to form muscles and initially, these muscle components are segmented according to the somites from which they are derived. Upper limb buds lie opposite the lower five cervical and upper two thoracic segments. As soon as the buds form, ventral primary rami from the appropriate spinal nerves penetrate into the mesenchyme. Spinal nerves also play an important role in differentiation and motor innervation of the limb musculature [5]. Lumbricals are important small intrinsic muscles of the hand, which arise from the tendons of the flexor digitorum profundus in the palm distal to the flexor retinaculum and are inserted on to the dorsal digital expansion. Braithwaite et al. (1948) quoted evidence that more than four lumbricals occurred frequently and that the third lumbrical was most frequently missing [6]. In present study, we also found absence of third lumbrical.

Basu and Hazary (1960) found that it was the fourth lumbrical which was missing more frequently and not the third one [7]. But we found equal incidence of absence of both third and fourth lumbricals.

In present study, absence of fourth lumbrical was also found. Kurzumi et al. (2002) also reported that the fourth lumbrical was the most frequently absent lumbrical [8]. Few studies reported absence of first and second lumbricals [9,10]. Macalister (1875) reported that the first and second lumbricals may be absent but all the lumbricals were absent in one specimen in his study [9]. We also observed absence of all lumbricals in one hand. Hosapatna et al. (2013) observed hypertrophic lumbrical in 3.3 % hands while absent third lumbrical in 3.3% hands [4]. Our findings are very much similar to this study.

CONCLUSION

This type of variation is interesting not only to anatomists, but also to orthopedic surgeons, physiotherapists, and radiologists. Absence of lumbricals may affect extension at metacarpophalangeal joint and flexion at interphalangeal joint, therefore it may affect precise movements of hand. So clinicians should be aware of frequency of variation in morphology of lumbricals in order to avoid and reduce the mortality during hand surgery.

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Original Article

OSTEOLOGICAL STUDY OF SEXUAL DIMORPHISM IN RAMUS WIDTH OF MANDIBLE

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ABSTRACT

Introduction: The metric data of mandible are used to identify gender of an unknown individual in the field of anthropology and forensic science. Due to its hard density, mandible is commonly available in complete or fragment form and therefore it has a vital role in sex determination. Various metric traits like angle of mandible, gonial width, ramus length has been studied for gender variation. In addition to these, width of ramus need to be assessed for gender variation.

Material & Methods: Total 60 dry human mandibles of both sexes were taken for the study. Mandible with any discrepancy and damage were excluded. Sliding caliper was used to measure maximum and minimum ramus width of mandibles.

Results: Study showed that there was no significant difference between the mean minimum width of ramus of right side in male and female mandibles whereas significant difference was seen on left side for same variable of male and female. There was a significant difference between the mean maximum width of ramus of male and female mandibles of both right and left sides.

Conclusion: Variations in width of ramus might be due to some functional difference of masticatory muscles in a race but this variation can be utilized in sex determination and designing implants.

Keywords: Ramus width, mandible, sex determination.

INTRODUCTION

The increasing incidences of violent activities are resulting in large numbers of unidentified bodies being referred to the anthropological investigator**.** Recent researches need to be focused on using various skeletal elements to quantify variation related to sexual dimorphism. Metric traits of skull after pelvic bones are primarily used for determination of sex and race in unknown skeletal remains.

Mandible is mostly available in fragments after mass explosions otherwise it retains its shape better than other bones. Each hemi-mandible is formed by a horizontal body with a posterior vertical extension called ramus. Various studies indicate that the adult mandible can be used to identify both sex and population affinity with increased sensitivity and objectivity. Angle of mandible and ramus height has already been described as important metric traits for identifying sex of an individual. Ramus of mandible is one of the common fragment available most of the time after explosion and any significant gender variation in width can be additional advantage in identification of sex. The cause of this correlation may be explained by the differential growth and development of the soft tissue due to genetical and functional aspect of the cranium which exert effect on both metric and non-metric traits**.**

MATERIAL AND METHODS

Total 60 dry human adult mandibles of both sexes consisting of 30 male and 30 female each, were

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collected from Department of Anatomy, Shri Guru Ram Rai Institute of Medical & Health Sciences, Dehradun. Only intact mandibles with body, ramus, and gonion having mental foramen between upper and lower borders of the body were included in the study. Damaged mandible, mandible with other than specified position of mental foramen and mandible with any discrepancy during age or sex determination were excluded from the study. Segregation of mandibles into male and female was done based on gonial eversion and shape of chin (Table 1, Fig. 1) [1, 2].

Table 1: Criteria for segregation of mandibles into male and female

Feature	Male	Female
Gonial eversion	Marked	Slight/absent
Chin	Square	Pointed/rounded

Maximum Ramus Breadth (31): Distance between the most anterior point on the mandibular ramus and a line connecting the most posterior point on the condyle and the angle of the jaw (Fig. 1).

Minimum Ramus Breadth (30): Least breadth of the mandibular ramus measured perpendicular to the height of the ramus (Fig. 1).

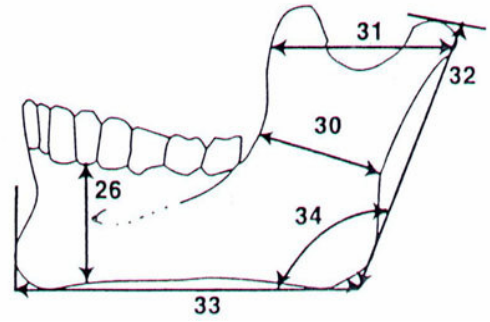

Fig. 1: Measurements of the mandible in lateral view [3]

(30: minimum ramus width, 31: maximum ramus width)

The maximum and minimum width of ramus of mandible was measured by sliding caliper (Fig. 2) on both right and left sides of each mandible of male and female.

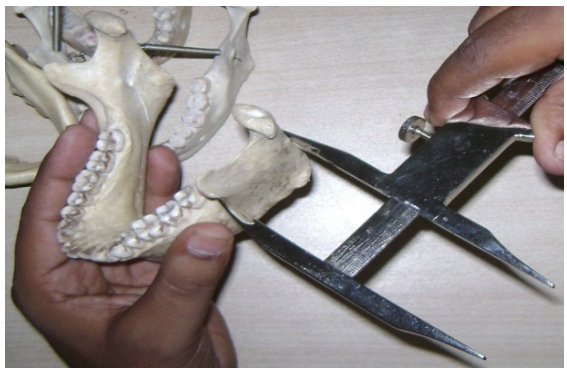

Fig. 2: Measurement of width of mandible by sliding caliper

OBSERVATIONS AND RESULTS

The minimum and maximum ramus width of male (30) and female (30) mandibles on right and left sides were measured. Minimum ramus width in males was 2.6-3.9 cm on right side and 2.5-3.5 cm on left side while in females, it was 2-4 cm on right and 3.3-4.4 cm on left side. Maximum ramus width in males was 3-4.5 cm on right and 3.3-4.5 cm on left side while it was 3-4.5 cm on right side and 4.3-6.5 cm on left side in females (Table 2).

Table 2: Range of minimum and maximum ramus width of mandible in males and females

	Minimum Ramus Width (cm)		Maximum Ramus Width (cm)	
	Right side	**Left side**	**Right side**	**Left side**
Male	2.6-3.9	2.5-3.5	3-4.5	3.3-4.5
Female	2-4	3.3-4.4	3-4.5	4.3-6.5

The data was analyzed using the discriminant procedure of the statistical package SPSS 13.0. There was a significant difference between the mean minimum width of left ramus and maximum width of right and left ramus of male and female mandibles applying Independent samples 't' test when level of significance was 0.05 and calculated degree of freedom was 58. Significant difference was not found between the mean minimum width of right ramus of male and female mandibles (Table 3).

Table 3: Statistical analysis of ramus width of mandible in males and females

Variable	FEMALE			MALE		
	Mean (cm)	SD	SE	Mean (cm)	SD	SE
Min. Ramus width (R)	2.98	± 0.42	0.08	3.09	±0.35	0.06
Max. Ramus width (R)	3.63	± 0.44	0.08	3.92	±0.38	0.07
Min. Ramus width (L)	4.00	±0.35	0.06	2.99	±0.24	0.04
Max. Ramus width (L)	5.39	±0.65	0.12	3.97	±0.26	0.05

DISCUSSION

Physical anthropologists use physical morphology to categorize populations [4-6]. After pelvis, mandible is considered next best bone for determination of sex, age and race [7]. It is of special importance for anthropological work to establish population-specific standards for sex determination from mandibles of unknown skulls [8]. Morphological features alone could have problem in identifying sex but additional metric traits put weight in identification of sex and race. Each hemi mandible is composed of a horizontal body with vertical extension ramus**.** The superior part of ramus bifurcates into an anterior coronoid and a posterior condylar process [9].

There are statistically significant sex difference in the mandibular angle and length in context to gender and race for example the average mandibular angle of the Black Zimbabweans was greater than the values reported for some Black African populations [10]. Rai et al. (2007) concluded that in Indian population, mean angle of mandible was 118 degree for male and 121 degree for female whereas ramus height was about 5.39 cm in males and 5.18 cm in females [11]. Giles (1964) found that the sex of the mandible can be determined with accuracy of 85% by using anthropometric measurements like mandibular ramus height, maximum ramus breadth, and minimum ramus breadth [12]. Researchers observed that increase in number of metric parameter used for determination of sex actually increases the percentage of accuracy [13]. Steyn and Iscan (1998) achieved an accuracy of 81.5% with five mandibular parameters in South African Whites [14] whereas Dayal et al. (2008) considered mandibular ramus height as best parameter with accuracy of 75.8% [15]. In present study, minimum ramus breadth measurement of right side was not significant for gender difference whereas left side of both sex showed significant difference in ramus width. Vodanovic et al. (2006) found breadth measurement to be dimorphic in his osteometric study [16]. Ramus width differences are due to difference in musculoskeletal development and different growth trajectory in males and females [17]. In a study by Anderson (1998) on 7 regional samples, he observed largest ramal width in Eskimos than the temperate Europeans with smallest ramal breadths [18]. In the present study, significant sexual dimorphism was seen in ramal width. Enlow & Harris (1964) considered balance between the process of resorption and deposition on the buccal and lingual aspects of the mandibular ramus as an important factor causing variation in anteroposterior width of the ramus [19] and later Humphrey et al. (1999) supported the same in his comparative study [17]. In Uttarakhand population, mean angle of mandible and ramus height in male was found to be 117.3 degree and 5.62 cm respectively whereas in female it was 111.3 degree and 4.11 cm respectively [20]. Data of our study in relation to ramus width will further increase the accuracy of sexual dimorphism of mandible. Variations in the mandibular rami morphology are most likely to be associated with adaptations to demands on the masticatory system. Retraction of the jaws beneath the cranium and forward migration of the anterior temporalis muscle due to functional emphasis may be the underlying cause of variant rami width.

CONCLUSION

Knowledge of data on gender based variation in mandibular morphology of population is of great importance when only fragments remains are available post explosion and mass disaster. In such instance, ramus width data of this study would be of additional advantage in increasing accuracy of determining sex of an individual. Limitation of this study is the number of sample and number of variables taken.

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Original Article

ANATOMICAL VARIATION IN ORIGIN OF CENTRAL BRANCHES OF THE MIDDLE CEREBRAL ARTERY

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ABSTRACT

Introduction: The knowledge of origin of the central branches of the middle cerebral artery (MCA) have been of great significance for the radiologists and neurosurgeons dealing with cerebrovascular pathological conditions. A number of variations have been earlier reported for the course of MCA and its branches. The present study was performed to observe whether there are any further variations existing other than those reported earlier.

Material & Methods: The study was performed on 60 (38 males and 22 females) formalin fixed brains, obtained from the Department of Anatomy and Forensic Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi. The brain tissue was dissected and MCA in each brain was picked up and observed for the branching pattern under the dissecting microscope.

Results: The study revealed that the central branches that originated from the M1 segment of MCA were either single or double or multiple in number, instead of two groups as described earlier. In few cases, these central branches originated not only from the M1 segment, but also from other artery of the Circle of Willis. After their origin, all the branches travelled through anterior perforating substance to reach the basal area of the sub cortical zone.

Conclusion: The present study reveals that there exist variations in the origin and course of MCA and its branches in addition to those reported previously.

Keywords: Middle cerebral artery, variation, branches, anterior perforating substance, basal area.

INTRODUCTION

The middle cerebral artery (MCA) is one of the largest cerebral branches of the internal carotid artery [1]. The MCA is divided into central (perforating/ lenticulostriate) branches. These central branches are small and are further subdivided into extracerebral segment (ES) and intracerebral segment (IS). Even though the central branches are small their course is quite complicated. The ES after originating from the MCA runs at the level of anterior perforating substance (APS) whereas the IS is reported to be involved in vascular diseases leading to ischemic disorders and haemorrhages. Further, the course of the central branches of MCA becomes clear from the dissection on human cadavers and it is reported that they arise from M1 segment of MCA and supply to the basal nuclei region of the cerebrum. The proximal segment of MCA is most commonly involved in neurological diseases and therefore the knowledge of the proximal segment of MCA and its branches becomes relevant. Moreover, the study of central branches is required for the early detection of cerebrovascular strokes in neurological practice [2,3]. Therefore, the present study was performed to understand the branching pattern of central branches of MCA.

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MATERIAL AND METHODS

In present study, variation in origin of the central branches of the MCA was observed in total 60 (38 males and 22 females) formalin fixed brains (with intact Circle of Willis). The brains were washed with tap water gently for removing external blood clots, if any. The M1 segment of the MCA was identified as per the description [1] and the pattern of origin of small tiny central branches of MCA was observed. The variations in origin of the central branches were recorded. Thereafter, the brain tissue was dissected under the dissecting microscope to observe the sub central branches. Finally, these central and their sub central branches were traced up to the basal region of the cerebrum.

OBSERVATIONS

The various pattern of origin of the central branches from M1 segment of MCA were classified into four groups, i.e., single, double, multiple and variable branches.

Group 1

In the first group (n = 5 (8.33%) cases; 3 males and 2 females), a single central branch originated from the M1 segment of MCA. Further in the course, this single branch got divided into two subcentral branches after piercing through the anterior perforating substance (APS) (Fig. 1A&B).

Group 2

In the second group (n = 7 (11.66%) cases; 3 males and 4 females), two central branches originated from M1 segment of MCA. In most of the cases of this group, both central branches formed an arterial arcade after piercing through the APS (Fig. 1C&D). It was further found that the subcentral branches in this group originated from the arterial arcade (Fig. 1C&D).

Group 3

In the third group (n = 39 (65%) cases; 28 males and 11 females), multiple central branches originated directly from M1 segment of MCA which ramified into subcentral branches deep to the APS (Fig. 2A&B).

Group 4

In the fourth group (n = 9 (15%) cases; 5 males and 4 females), there was variation in origin of the various central branches. In most of the cases of this group, the central branches originated from both M1 and M2 segments of MCA (Fig 2C), whereas in two cases, two central branches originated from the M1 segment, one from M2 segment and one from anterior cerebral artery (ACA) (Fig. 2D). These central branches originated not only from the M1 segment of MCA, but also from the other segments and ACA. These central branches originated from the different arteries of Circle of Willis, united together to form arterial arcade deep to the APS and the subcentral branches originated from this arterial arcade.

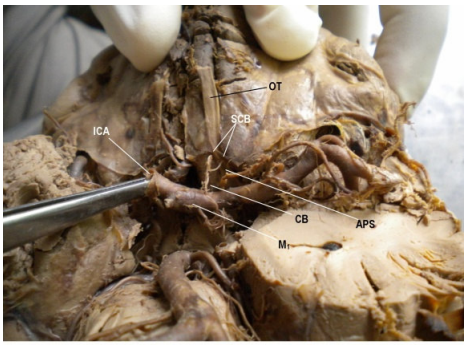


Fig. 1A: Photograph showing origin of single central branch from MI segment of MCA that divides into two SCB branches.

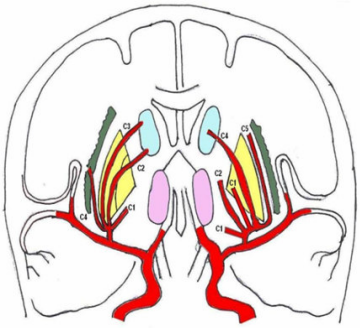


Fig. 1B: Diagram showing origin of single central branch from M1 segment of MCA.

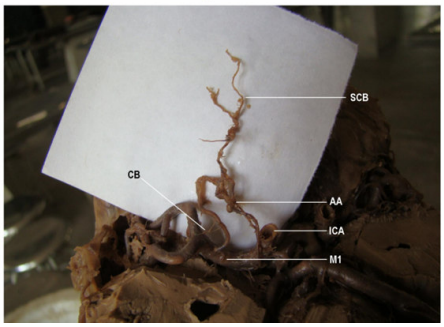


Fig. 1C: Photograph showing two central branches from MI segment of MCA and form an arterial arcade.

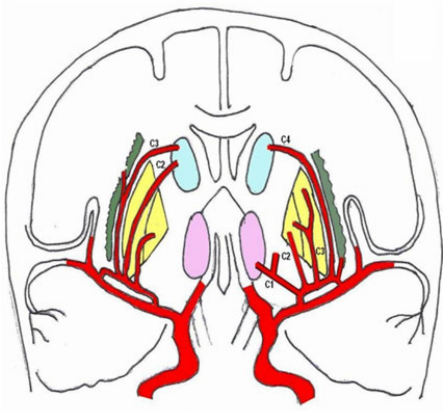


Fig. 1D: Diagram showing origin of two central branches which form the arterial arcade.

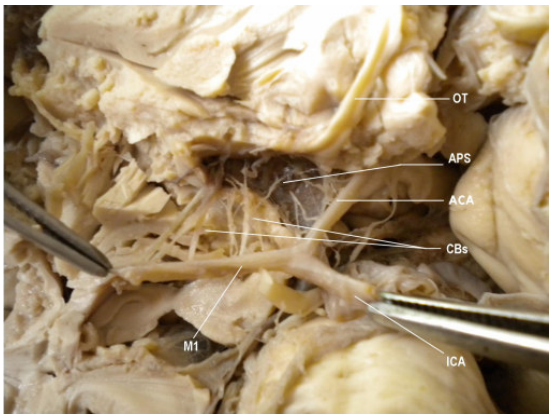
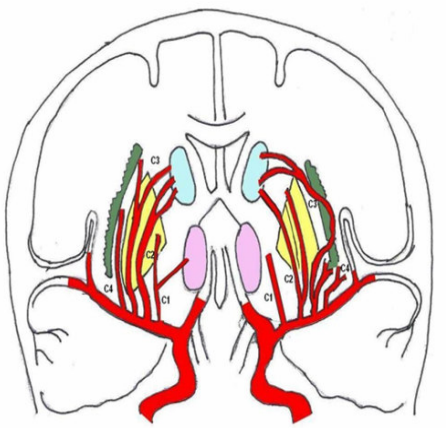


Fig. 2A: Photograph showing origin of multiple central branches from MI segment of MCA.



2B: Diagram showing origin of mulitple central branches from M1 segment of MCA.

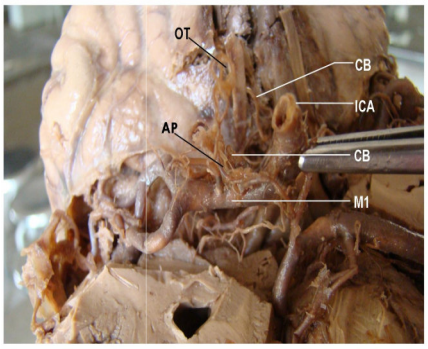


Fig. 2C: Photograph showing the variation in origin of the central branches of MCA

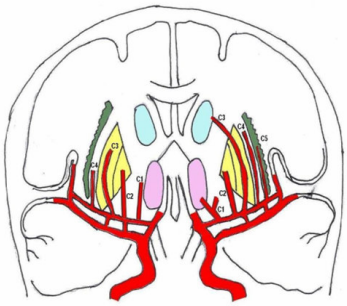


Fig. 2D: Diagram showing the variation in origin of the the central branches of MCA.

DISCUSSION

The central branches of MCA usually originate from the M1 segment that are defined as arteries of the corpus striatum or striatal branches [4-6]. In present study, the various segments of MCA were observed as per the pattern of Standring (2008) [1].

The microsurgical anatomy and angiographic anatomy of the central branches from M1 segment of MCA had been studied in the past by many researchers. Usually there are two groups of lenticulostriate arteries, which originate from the M1 segment of MCA i.e. lateral and medial [7]. Though there are typically 5-17 lenticulostriate arteries, all are not identified by angiography [8]. The existence of common stems of central branches have been reported earlier [4,5,9] whereas Aydin et al. [10] reported that in 52% cases the central branches originated from MCA, as a common stem. This ratio was also found in the study of Umansky et al. [5]. Further, Aydin et al. reported that in 85% cases the

central branches originated from the proximal segment of the MCA. This finding was supported by Umansky et al. [5] in 96% of cases and by Rosner et al. [11] in 97% cases. In present study, it was found that the central branches originated not only from the M1 segment (one or two or multiple in numbers), but also from the other segments of MCA as well as other arteries of the Circle of Willis. The single central branch originated from M1 segment of MCA in 8.33% cases, double branches in 11.66% cases and multiple branches in 65% cases. This variation in number of origin of central branches were observed in both sexes, whereas Standring [1] earlier reported that the central branches originated from the M1segment in both sexes.

Yasargil [9] described that in 3% of cases the central branches originated either from a large single lateral fronto-orbital branch or from a common trunk with the lateral fronto-orbital artery. However, in this vascular variation, the central branches with the lateral fronto-orbital artery originated from the infero-medial aspect of M1 segment of MCA. He further described that this anatomical vascular variation could be misunderstood as the point of bifurcation of MCA. Extraparenchymal anastomoses between the medial and lateral lenticulostriates were not found in his study, whereas in the present study the extra and intra parenchymal anastomoses between these branches have been observed. Donzelli et al. [12] described that the central branches originated either from the main stems, or terminal stems or from collateral (cortical) branches of the MCA. According to Liebeskind et al. [8], the lenticulostriate arteries, which are end arteries originated from the M1 segment in arterial trunk and were found outside the APS. The subcentral branches originated from this common arterial trunk that perforated the APS and formed an arterial plexus (AP) in subcortical zone of hemisphere. In the present study, variation in origin of these central branches was observed in 15% cases (5 males and 4 females) in which the central branches originated other than M1segment of MCA. These central branches originated not only from the M1 segment of MCA, but also from the other segments and ACA. Further, in a number of cases these central branches originated from different arteries of Circle of Willis. These branches united together to form an arterial arcade deep to the APS and the subcentral branches originated from this arterial arcade. This pattern of variation in origin of the central branches of the MCA might be due to the abnormal early ramification of the embryological stage of the branches of the MCA that may occur either proximal or distal to the origin of the main MCA trunk.

The knowledge of the anatomical characteristics of the central branches of MCA and their subcentral branches have clinical implications for the neurosurgeons and interventional radiologists and hence the knowledge of variations in the origin and branching pattern of MCA might be of use in the diagnosis and treatment of patients suffering from cerebrovascular abnormalities.

Conflict of interest: All authors have none to declare.

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Original Article

AUTOSOMAL TRISOMY: A CYTOGENETIC STUDY IN LUCKNOW REGION

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ABSTRACT

Introduction: Trisomy refers to chromosomal aneuploidy in which cells possess a karyotype that is not a multiple of the haploid complement. It is the most common numerical chromosomal abnormality. It usually occurs due to the meiotic non – disjunction of chromosomes. Trisomy of autosomes is most commonly associated with Trisomy 21 or Down's syndrome, Trisomy 18 or Edward syndrome, Trisomy 13 or Patau syndrome. Other rare trisomies are trisomy 8, trisomy 9, trisomy 2.Confirmation of trisomy syndromes is done by cytogenetic techniques which help in the diagnosis of various chromosomal aberrations associated with these trisomy syndromes. This study was carried out with the aim to carry out a cytogenetic evaluation of suspected cases of trisomy in both sexes, to find the frequency of trisomy disorder, to study the frequency of types of trisomies, to evaluate the type of chromosomal anomalies in different trisomy.

Material & Methods: Karyograms of suspected cases of trisomies was prepared from the peripheral blood using GTG banding technique. The karyograms were analysed using cytovision software.

Results: Out of 52 suspected cases of trisomy; karyograms could be obtained in 46 cases. Out of these 46 cases 43 (93.5%) had trisomy 21 and 6 cases showed no abnormality. Other trisomy disorders could not be reported.

Conclusion: Down's syndrome was found to be the most common trisomy disorder in Lucknow region. Hence it is important to carry out a cytogenetic analysis of all the suspected cases to confirm the diagnosis, so that they can be managed appropriately for various clinical co-morbidities.

Keywords: Aneuploidy, trisomy, karyotype, GTG banding.

INTRODUCTION

Trisomy refers to the presence of an additional chromosome to the normal diploid number. It is the most common abnormality of the chromosome number. The usual cause of this numerical error is meiotic non – disjunction of chromosomes, resulting in a gamete with 24 instead of 23 chromosomes and subsequently in a zygote with 47 chromosomes [1]. Approximately 5% of all pregnancies are associated with trisomy or monosomy of chromosomes most of which are associated with intra uterine death, thus this makes the aneuploidy the leading known cause of pregnancy loss. But some conditions like trisomy 21 are compatible with life therefore resulting in aneuploidy being the leading cause of congenital birth defects and mental retardation. Since monosomies almost always abort spontaneously, this makes trisomies the leading cause of congenital birth defects in humans [2]. As far as the origin of extra chromosome is concerned Hassold and Hunt (2001) proposed three general 'rules' of human non-disjunction. First, regardless of the specific chromosome, most trisomies originate during oogenesis; second, for most chromosomes, maternal meiosis I (MI) errors are more common than maternal meiosis II (MII) errors; and third, the proportion of cases of maternal origin increases with maternal age. However, against this background, chromosome specific differences in non-disjunction have become apparent. For example, maternal MI errors

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predominate in trisomy 21, while trisomy 18 typically involves maternal MII errors [2]. Trisomy of autosomes is associated with three main syndromes: Trisomy 21 or Down syndrome (DS), Trisomy 18 or Edward syndrome, Trisomy 13 or Patau syndrome. Other rare trisomies include trisomy 8, trisomy 9, trisomy 2.Trisomy 21 constitute the most common chromosomal abnormality among live births (1 in 730 live births) and the most frequent form of intellectual disability [3-5].The cytogenetic profile of Down syndrome includes free trisomy 21, Robertsonian translocations, mosaicism, duplication of the DS critical region and other structural rearrangements involving chromosome 21 [6-8].Trisomy 18 (Edward syndrome) is the second most common autosomal trisomy observed in live births with its prevalence ranging from 1/3600 to 1/10,000 with the best overall estimate in live borns as 1 in 6,000 [9,10]. The trisomy 18 (Edwards syndrome) phenotype results from full, mosaic, or partial trisomy 18q [11-13]. Trisomy 13 (Patau syndrome) constitutes the third most common autosomal trisomy in live births. Its incidence is 1 in 12000 live births [1]. As with other trisomy disorders, there are three types of Patau syndrome of which full trisomy 13 is the most common type. People with this type have three full copies of chromosome 13. Partial trisomy 13 in which people have two full copies of chromosome 13 and an extra part of chromosome 13. Mosaic trisomy 13 where some of the body's cells have three copies of chromosome 13 whereas others have two normal copies [14] .Trisomy 18 and Trisomy 13 are associated with various malformations which are incompatible with life and therefore majority of prenatally diagnosed cases of trisomy 18 and trisomy 13 fetuses die in utero [15,16]. Fifty percent cases of affected infants die within the first two weeks of life and only 5- 10% survive till 1st year [17-20]. Hence this explains the low incidence of trisomy 18 and trisomy 13. Trisomy 8 is a relatively common chromosomal abnormality but because of extremely variable phenotypic and cytogenetic expression quite often it is undiagnosed. The estimated frequency is about 1:25,000 to 50,000 births [21]. Causes of chromosomal nondisjunction are still unknown [22]. Trisomy 9 is a rare chromosomal abnormality accounting for only 2.7% of all trisomies and mainly results in early miscarriage. Few cases of live born babies have been described, but the outcome was extremely poor [23]. Complete trisomy 2 is a lethal chromosomal abnormality found in about 1% of first trimester spontaneous miscarriages [24]. According to Hahnemann and Vejerslev,1997; Benn and Hsu, 2004, trisomy 2 is one of the most frequently involved trisomies in pseudomosaicism [25,26] in contrast, true trisomy 2 mosaicism is rare and has been reported in only one in 58 000 cases [27]. The outcome of fetuses with true trisomy 2 mosaicism is poor [27,28]. Aim of this study was to carry out a cytogenetic evaluation of suspected cases of trisomy in both sexes, to find the frequency of trisomy disorder, to study the frequency of types of trisomies and to evaluate the type of chromosomal anomalies in different trisomy.

MATERIAL AND METHODS

This descriptive type of study was approved by the review board of King George's Medical University UP, Lucknow. Blood samples were cultured using suitable methods and karyogram were prepared by GTG banding and analyzed using cytovision software. The study was conducted in the cytogenetic laboratory of the Department of Anatomy, King George's Medical University UP, Lucknow. Screening of the patients was done in the Department of Pediatrics, and samples were collected from the same department. Patients included in our study were suspected cases of trisomies on the basis of clinical features and patients with informed consent. Patients lacking the consent were excluded from the study.

OBSERVATIONS AND RESULTS

We studied 52 suspected cases of trisomy disorders. Out which successful karyograms were obtained in 46 cases (88.5%). Out of these 46 cases, 43 were diagnosed to have trisomy 21 (93.5%) and rest 3 cases showed no abnormality (6.5%). There was no case of trisomy 18, trisomy 13 or other trisomies (Table 1).

Table 1: Incidence of type of trisomy disorders

Type	No.	Percentage (%)
Trisomy 21 (Down's syndrome)	43	93.5
Trisomy 18 (Edward syndrome)	0	0
Trisomy 13 (Patau syndrome)	0	0
Other trisomies	0	0
No abnormality	3	6.5

Among patients with Down syndrome, free trisomy (n=40; 93%) (Fig.1,2) was most common followed by Robertsonian translocation (n=2; 4.7%) (Fig 3,4) and Mosaic trisomy (n=1; 2.3%) respectively (Table 2).

Majority of patients were males (n=30; 65.2%). There were 16 (34.8%) females. Male to female ratio of study population was 1.88. All the cases with normal genotype and those depicted trisomy with translocation/mosaic were males. Among those with free trisomy only there were 60% males and 40% females.

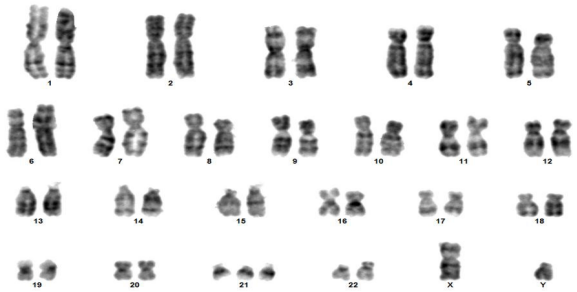

Fig. 1: Karyogram of trisomy male 47XY,+21

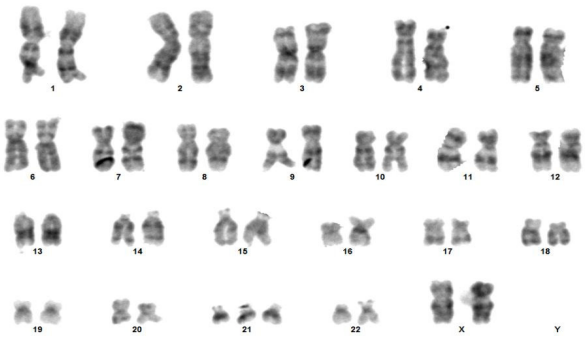

Fig. 2: Karyogram of trisomy female 47XX,+21

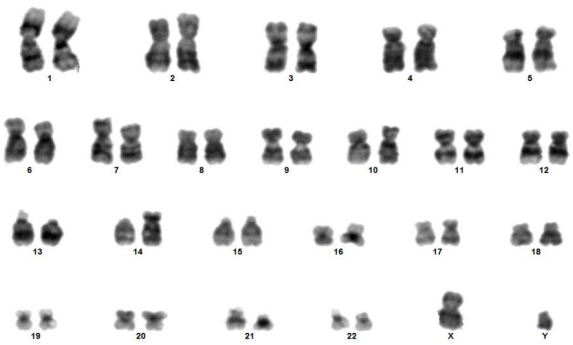

Fig. 3: Karyogram showing 46, XY, +21, t (14; 21) (q10; q10)

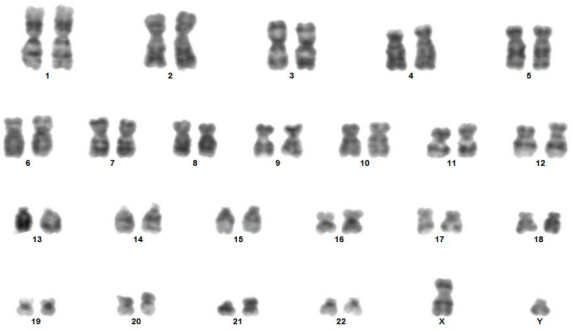

Fig. 4: Karyogram showing 46, XY, +21, rea (21; 21) (q10; q10)

Table 2: Genotype of Down syndrome

S. No.	Genotype	No.	Percentage (%)
1.	**Free trisomy**		
	47XY,+21	24	55.8
	47XY,+21	16	37.2
2.	**Robertsonian Translocation**		
a)	46, XY, +21, rea (21; 21) (q10; q10)	1	2.3
b)	46, XY, +21, t (14; 21) (q10; q10)	1	2.3
3.	**Mosaic** 47XY,+21/46XY	1	2.3

Maximum number of mothers were aged 36-40 years (50%) followed by those aged 31-36 years (34.8%), <30 years (10.9%) and >40 years (4.3%) respectively. Among 40 mothers of only trisomy 21 patients, maximum (n=22; 55%) were aged 36-40 years followed by 31-35 years (30%), ≤30 years (10%) and >40 years (5%) respectively. Among those showing trisomy with Robertsonian translocation, there was 1 (33.3%) mother each in age group ≤30 years and 31-35 years respectively. In single case of mosaic, the maternal age was in age group 36-40 years.

DISCUSSION

There has been a drastic change in the social dynamics in recent years in terms of marriage which may culminate into late marriages and child bearing at

an advanced age which possess a very high risk of having a child with various congenital disorders of which trisomies are most frequent. This consequently may result into an increased incidence of these disorders [29]. Our findings were in accordance with the study conducted by Polipalli et al. (2016). They conducted a retrospective study in North Indian population and tried to identify the frequency of chromosomal aberrations in patients over a period of 5 years. They studied 371 patients with chromosomal abnormalities out of which 357 (96.2%) were confirmed with Down's syndrome [30]. Uwineza et al. (2016) conducted a retrospective study in Rwandan pediatric patients presenting with global developmental delay, intellectual disability and/or multiple congenital anomalies over a period of 5 years. Their study revealed that trisomy 21 was the most common numerical chromosomal aberration which constituted 84.23% of all autosomal trisomy cases. Trisomy 21 was followed by trisomy 18 which was present in 9.54% patients. Trisomy 13 constituted 6.23% of all autosomal trisomy [31]. Ghazaey et al. (2013) in their retrospective study conducted in Iranian population over a period of 6 years also reported Down's syndrome as the most common autosomal trisomic disorder. They observed its incidence to be 98.4%. Down's syndrome was followed by Edward syndrome (trisomy 18) and Patau Syndrome (trisomy 13) which constituted 0.5% and 1.1% respectively [32]. In a prospective study conducted in Kashmiri population, Balwan and Gupta (2012) revealed that Down's syndrome is the most common autosomal trisomic disorder which was present in 96.72% of cases of all suspected cases of autosomal trisomies followed by Patau syndrome (3.28%) [33]. The findings of our study is very much similar to this study. Our study is also in agreement with that of Zeina and Monem (2011) who also conducted a retrospective study and aimed to evaluate the pattern of referral for cytogenetic analysis and to determine the frequency of chromosomal abnormalities in Syrian population between 2007 and 2010. They concluded that Down's syndrome was the most common autosomal aneuploidy among the referred patients whose incidence was 95.5% i.e. 43 out of 45 [34]. Also in a study conducted in Egyptian population by Mohammed et al. (2011) Down's syndrome was the most common trisomic disorder (84.21%) which was followed by Edward syndrome (10.52%) and Patau syndrome (5.27%) [35]. Our results are also consistent with their findings. A prenatal study carried out by Soler et al. (2011) in Spanish population over a period of 9 years demonstrated that trisomy 21 is the most common autosomal trisomy which constituted the majority in their findings followed by trisomy 18 and trisomy 13 [36]. Yashwanth et al. (2010) also studied children with congenital malformation retrospectively in South Indian population over a period of 5 years. Their study revealed that out of 30 cases suspected of having autosomal trisomies 27 (90%) were trisomic for chromosome 21 and 1 (3.33%) had trisomy 18. Our study is also in agreement with this study which shows that trisomy 21 is the most common autosomal trisomy [37]. Studies conducted in the different parts of the world indicate that trisomy 21 or Down's syndrome is the most common autosomal trisomy worldwide. Our study also agrees with this observation (Table 3).

Table 3: A comparative analysis of incidence of trisomies

Author	Year	Study Type	Population	Trisomy 21	Trisomy 18	Trisomy 13
Yashwanth et al.	2010	Retrospective	South Indian	90%	3.33%	None
Zeina et al.	2011	Retrospective	Syrian	95.5%	None	None
Mohammed et al.	2011	Prospective	Egyptian	84.21%	10.52%	5.27%
Balwan et al.	2012	Prospective	Kashmiri	96.72%	None	3.28%
Ghazaey et al.	2013	Retrospective	Iranian	98.4%	0.5%	1.1%
Polipalli et al.	2016	Retrospective	North Indian	96.2%	None	None
Uwineza et al.	2016	Retrospective	Rwandan	84.23%	9.54%	6.23%
Present study	**2017**	**Prospective**	**North Indian**	**93.5%**	**None**	**None**

Table 4: Comparative analysis of cytogenetic variants of Down syndrome

Author	Year	Population	Free Trisomy (%)	Robertsonian Translocation (%)	Mosaicism (%)	Non-Classical (%)
Demirhan et al.	2015	Turkish	92.5	2.4	2.5	2.6
Zhao et al.	2015	China	93.52	4.43	1.35	0.7
Ramirez et al.	2015	Mexico	93.02	4.79	1.61	0.58
Uwineza et al.	2016	Rawanda	97.04	2.4	0.56	0
Belmokhtar et al.	2016	Algeria	91	4.5	4.5	0
Polipalli et al.	2016	North India	85.5	10.6	3.9	0
Present study	**2017**	**North India**	93	4.7	2.3	0

In present study, we did not found any case of trisomy 18 and trisomy 13. This observation could be explained by the fact that we conducted a postnatal study and fetuses with trisomy 18 and trisomy 13 has many congenital anomalies which are incompatible with life and result in intra-uterine death. These anomalies include agenesis of the corpus callosum, meningomyelocele, ventriculomegaly, choroid plexus cysts, posterior fossa anomalies, micrognathia, omphalocele, diaphragmatic hernia, renal anomalies, cardiac defects, single umbilical artery [14]. Many authors have concluded that the mean survival of children with trisomy 18 and trisomy 13 is 3-14.5 days. 60%-75% of children survive upto 24 hours, 40%-60% till one week. One month survival of these patients is 22%-44%. 9%-18% survive upto 6 months and only 5%-10% survive after one year [38]. The mean age of children enrolled in our study was 5.6±1.6years. This can safely explain our findings where we could not report any case of Edward and Patau syndrome.

A comparative analysis of cytogenetic variants of DS was done with the previous studies (Table 4). Belmokhtar et al. (2016) conducted a karyotype analysis on 22 Algerian children with Down's syndrome [39]. Our results are in very strong congruence with their findings. The chromosomal analysis were undertaken in 22 cases, out of which 20 (91%) cases had free trisomy 21, 1(4.5%) case had trisomy 21 with translocation (46, XY,+21, rob (21; 21) (q10; q10)), and 1(4.5%) case had mosaic trisomy 21 (47,XY,+21/46,XY) [39]. Polipalli et al. (2016) reported that out of 302 successfully karyotyped cases of DS, 258 (85.2%) cases had free trisomy 21, mosaicism was found in 32 (10.6%) cases followed by translocations in 12 (3.9%) cases [30]. The higher incidence of mosaic cases in comparison to our study can be explained by genetic variations in selected study populations. The present study shows a strong similarity with a retrospective study conducted in Mexican population by Ramirez et al. (2015). In their study, out of 1921 cases of DS, a free trisomy 21 was identified in 1,787 cases (93.02%); in four patients (0.21%) another non-contributory chromosomal abnormality in addition to the free trisomy 21 was identified. Robertsonian translocation (21;21) was present in 92 cases (4.79%), mosaicism in 31 cases (1.61%), five (0.26%) patients had other contributory structural rearrangements and in two patients double aneuploidy was detected (0.10%) [40]. Uwineza et al. (2016) in their retrospective study conducted on 203 cases of DS in Rwandan pediatric patients reported, 197 (97.04%) had free trisomy, 5 (2.4%) had robertsonian translocation and remaining 1 (0.56%) was mosaic [31]. Demirhan et al. (2015) retrospectively evaluated 1213 children and newborns for suspicion of DS, postnatally in Turkish population. They observed free trisomy in 92.5% cases, robertsonian translocation in 2.4% cases and mosaic in 2.5% cases. Rest 2.6% cases belonged to non-classical DS [41]. These 3 classical cytogenetic variant was also found in our study. In a postnatal study conducted in Chinese population by Zhao et al. (2015) who studied 7,133 cases with trisomy 21. Free trisomy was present in 93.52% karyotypes, 4.43% karyotypes showed robertsonian translocation while mosaicism was found in 1.35% karyotypes. 0.7% karyotypes showed presence of non- classical DS [42].

Present study will give an insight into the prevalence of trisomy disorder and its various cytogenetic variants in Lucknow region and will help the pediatricians in treating the various co-morbidities associated with this condition. It will also provide an opportunity for offering genetic counseling to elderly mothers for prenatal diagnosis of this condition so that the pregnancy can be managed appropriately. There are certain limitations to present study like non-classical chromosomal anomalies could not be detected by conventional cytogenetic techniques. Chromosomes tend to spread poorly, which appear blurred with indistinct margins making banding studies difficult. Advanced molecular techniques are required to confirm the findings of this study and map the various genes which are responsible for the different phenotypes of trisomy disorders.

CONCLUSION

In this study, we made an attempt to carry out a cytogenetic evaluation of suspected cases of trisomy in both sexes, to find the frequency of trisomy disorder, to study the frequency of types of trisomies, to evaluate the type of chromosomal anomalies in different trisomy. We concluded that trisomy 21 is the most common trisomy disorder in Lucknow region. Free trisomy made the most common cytogenetic variant followed by robertsonian translocation and mosaic trisomy. Cytogenetic analysis contributes greatly towards the diagnosis of these patients and further management of these patients.

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ABSTRACTS

ABSTRACTS
POSTER PRESENTATION

BIFID RIB: A RARE ANOMALY

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AIM OF STUDY: The present study focuses on a rare case of congenital anomaly of typical rib and to understand significance of such anomaly.

MATERIAL AND METHOD: A Bifid rib was found during routine bone study in museum of Department of Anatomy of Rohilkhand Medical College and Hospital Bareilly Uttar Pradesh India a detail study was done focusing on anatomical features and clinical symptoms and radiological findings.

RESULTS: The findings are discussed and conclusions are drawn. Knowledge of Bifid rib is necessary for clinicians, surgeons & radiologists and for differential diagnosis of various diseases.

CONCLUSION: Findings are of considerable, radiological, racial & anatomical significance.

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THE ANTINOCICEPTIVE EFFECTS OF AN ANTICONVULSANT IN COMPARISON WITH CONVENTIONAL NONOPIOID ANALGESIC IN RAT PAIN MODELS OF SHORT (ACUTE) AND LONG DURATION (CHRONIC) STIMULI

Dr. Saurabh Kansal, Dr Priti Sinha, Dr Ruchika Agarwal

Introduction- Some anticonvulsants have been shown to be clinically efficacious in treatment of neuropathic pain and being used by clinicians.

Material & Methods-This study determined the analgesic effect of Gabapentin (A novel anticonvulsant) in rats in different types of acute & chronic (inflammatory) nociceptive tests like Tail flick (Short duration stimuli- phasic pain model) and Formalin test (long duration stimuli-tonic pain model) having characteristic 2 phases, 1st phase i.e. early phase reflect acute while 2nd phase i.e. late phase denoting chronic inflammatory pain and compared its potency with a conventional non opioid analgesic Diclofenac.

Results- Per oral administration of Gabapentin produced significant antinociceptive effect in late phase of formalin test but not or negligible suppress the pain in tail flick test and also in early phase of formalin test while control drug diclofenac produced significant reduction of pain in tail flick as well as in both phases of formalin test.

Conclusion- As tail flick and early phase of formalin test reflects acute pain while second phase of formalin test reflects chronic inflammatory pain, the results showing that Gabapentin could be effective and significantly suppress the pain in various clinical condition associated with chronic inflammatory pain as Gabapentin has been found significantly effective only in second phase of formalin test in our study.

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COMPARATIVE EFFICACY OF LAMOTRIGINE, A NOVEL ANTIEPILEPTIC IN ACUTE AND CHRONIC PAIN MODELS IN RODENTS WITH DICLOFENAC

Dr. Dhanesh Kumar, Dr. Priti Sinha, Dr. Saurabh Kansal

Dr. Dhanesh Kumar- Dept. of General Surgery, Subharti Medical College, Meerut. Dr. Priti Sinha- Dept. of Anatomy, Subharti Medical College, Meerut. Dr. Saurabh Kansal- Dept. of Pharmacology, Subharti Medical College, Meerut.

Introduction- Some anticonvulsants have been shown to be clinically efficacious in treatment of neuropathic pain and being used by clinicians.

Material & Methods-This study determined the analgesic effect of Lamotrigine (A novel anticonvulsant) in rats in different types of acute & chronic (inflammatory) nociceptive tests like Tail flick (Short duration stimuli- phasic pain model) and Formalin test (long duration stimuli-tonic pain model) having characteristic 2 phases, 1st phase i.e. early phase reflect acute while 2nd phase i.e. late phase denoting chronic inflammatory pain and compared its potency with a conventional non opioid analgesic Diclofenac.

Results- Per oral administration of Lamotrigine produced significant antinociceptive effect in late phase of formalin test but not or negligible suppress the pain in tail flick test and also in early phase of formalin test while control drug diclofenac produced significant reduction of pain in tail flick as well as in both phases of formalin test.

Conclusion- As tail flick and early phase of formalin test reflects acute pain while second phase of formalin test reflects chronic inflammatory pain, the results showing that Lamotrigine could be effective and significantly suppress the pain in various clinical condition associated with chronic inflammatory pain as Lamotrigine has been found significantly effective only in second phase of formalin test in our study.

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A CASE REPORT ON CONJOINED TWINS WITH OMPHALOCELE

SHIVANI DHINGRA, ADIL ASGHAR U.P.U.M.S, Saifai, Etawah

Introduction: Conjoined twins are identical/non-identical twins whose bodies are joined together. Incidence is 1 in 50,000 births. 40% are still born. Seen only in monozygotic twins. Omphalophagus is 2nd most common type of conjoined twins.

Aim of study: To study various defects in conjoined twins with omphalocele and limb defects.

Material and Methods: 35 years old Mrs. X with parity G3P2 delivered at 22 weeks, still born conjoined identical twins with omphalocele with single placenta along with limb defects in Department of Obstetrics and Gynaecology, UPUMS, Saifai and further findings were studied in Department of Anatomy, UPUMS, Saifai. Measurements were done with digital vernier calipers.

Results: Tagged fetus has a biparietal diameter of 48.77mm so estimated age of this fetus is 22 weeks non tagged fetus has a biparietal diameter of 51.54mm so estimated age of this fetus is 23 weeks. Common findings include- Single placenta, omphalophagus with joined coils of intestine, external genitalia and pelvis cannot be appreciated in both the fetuses. Tagged fetus in addition has fused lower limbs but separate toes.

Conclusion: There are no cranio-facial anomalies in either of the fetuses. The split in embryonic disc if occurs after 13th -14th day then the twins share body parts in addition to sharing their chorion and amnion.

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HISTOPATHOLOGICAL CORRELATION OF CHRONIC DIARRHOEA WITH RECTAL BIOPSY IN A NORTH INDIAN POPULATION

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ABSTRACT

BACKGROUND: The prevalence of chronic diarrhea in children worldwide ranges from 3% to 20%. The reliable data for adults are lacking as well as there are controversies regarding the importance of biopsy of large intestinal mucosa in the investigation of these patients.

AIM: To evaluate chronic diarrhoea histopathologically by means of rectal biopsy.

MATERIAL AND METHODS: It is an open randomised study carried out on 100 adult patients presenting with diarrhea of > 4 weeks duration. They underwent flexible sigmoidoscopy and biopsies were taken from the rectum by means of biopsy forceps.

RESULTS: Histopathologically, 89% cases were abnormal of which 39% had non-specific chronic colitis (branching intestinal crypts and increased inflammatory cells both in surface epithelium and lamina propria), 20% cases were microscopic colitis [19% lymphocytic (accumulation of lymphocytes in colonic epithelium and

connective tissue) and 1% collagenous (a thickened subepithelial collagen layer)] and 9% were Inflammatory Bowel Disease (IBD), 33.33% of which were Ulcerative Colitis (mucosa inflamed and ulcerated, cryptitis, crypt abscesses, submucosal fibrosis). 11% had normal sigmoidoscopy as well as rectal biopsy, more than half of which presented with symptoms compatible with Irritable Bowel Syndrome. 1% had mucin-secreting adenocarcinoma and 1% solitary rectal ulcer syndrome.

CONCLUSIONS: Thus, we conclude that inspite of normal sigmoidoscopic appearance, histopathological lesions can exist in significant percentage of cases which may be missed out without biopsy. In our study, out of the 42 normal sigmoidoscopies, 31 were having abnormal rectal biopsy. The above facts indicate that histological examination by biopsy should be taken in all patients of chronic diarrhoea irrespective of normal/abnormal sigmoidoscopic/colonoscopic findings.

KEYWORDS: *Chronic diarrhoea, Sigmoidoscopy, Rectal biopsy.*

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THE AZYGOS LOBE: AN UNUSUAL ANATOMICAL OBSERVATION WITH PATHOLOGICAL AND SURGICAL IMPLICATIONS

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UPUMS, Saifai, Etawah.

Introduction- An azygos lobe is found in approximately 0.4% of patients. In contrast to other accessory lobes, the azygos lobe does not correspond to a distinct anatomical bronchopulmonary segment. It forms during embryogenesis when the precursor of the azygos vein fails to migrate to its medial position in the mediastinum, where it normally arches over the origin of the right upper lobe bronchus.

Aim of study- To study morphology of azygos lobe.

Case Study-The anomaly was found in a 40-years-old male cadaver during the routine undergraduate dissection in Department of Anatomy, UPUMS, Saifai, Etawah. Examination of the right lung revealed an azygos lobe. Measurements were done with digital vernier caliper.

Results- Right lung had a azygos lobe in lower lobe ,with a fissure arising from starting point of oblique fissure. Azygos lobe was in a position medial to the right upper lobe and above the hilum. It had the shape of an egg and was 6.0cm hight, 3.3 cm wide and 1.6 cm thick. The azygos fissure was in a vertical form. Left lung was morphologically normal.

Conclusion-This observation of an azygos lobe is unusual. Azygos lobe present in lower lobe of right lung is a very rare variety and left lung has no anomaly. Azygos lobe participates in the ventilation of lobe of which it is a part. The azygos lobe presents no specific pathology but may be related to Spontaneous Pneumothorax, Pancoast tumour and the association to Extralobar Pulmonary Sequestration and other anomaly that impedes some surgical interventions.

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DELAYED PRESENTATION OF POST TRAUMATIC DIAPHRAGMATIC HERNIA: A CASE REPORT

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ABSTRACT:

Traumatic diaphragmatic injury (DI) is a unique clinical entity that is usually occult and can easily be missed. Their delayed presentation can be due to the delayed rupture of the diaphragm or delayed detection of diaphragmatic rupture, making the accurate diagnosis of DI challenging to the trauma surgeons. These type of injuries are also missed due to poor diagnostic tools availability in rural areas and are diagnosed at urban settings in our country. An emergency laparotomy and thorough exploration followed by the repair of the defect is the gold standard for the management of these cases. We report a case of blunt DI in an elderly gentleman with an ICD in stomach and present a comprehensive overview for the management of traumatic injuries of the diaphragm.

KEYWORDS: Diaphragmatic injury, Diaphragm, trauma, herniation and strangulation.

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ISOLATED CYSTIC DUCT DILATATION. A RARE CASE REPORT OF TYPE-VI CHOLEDOCHAL CYST.

Dr. Anshul Vishnoi, Dr. Deepak, Dr. P.C. Attri, Dr. Satyam Khare, Dr. Sumit Kumar Kansal

The choledochal cyst which refers to the cystic dilatation of the biliary tract is rare lesions generally seen in children. Choledochal cyst of cystic duct is an uncommon entity, often associated with the choledochal cyst of rest of the biliary tree. Isolated cystic duct dilatation is quite rare. The widely used Todani classification does not include such type of lesions. Modern cross sectional imaging methods have facilitated pre- operative recognition and characterisation of cystic duct cysts enabling formulation of appropriate management strategy. We present a rare case of young boy 20 years old with isolated cystic duct dilatation choledochal cyst, diagnosed pre-operatively on MRCP, confirmed intra operatively and the difficulties encountered during surgery. While such lesions are extremely rare, they do occur and need ti be recognised as a separate entity in the Todani classification.

KEYWORDS: Choledochal cyst, Cystic duct dilatation, biliary tree abnormalities, MRCP.

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ABSTRACTS

ORAL PRESENTATION

AN ANTHROPOMETRIC ANALYSIS OF SCAPULAR GLENOID CAVITY IN WESTERN UP

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Introduction: Morphometric variations of bone are clinically important. An understanding of the normal glenoid cavity morphometry is important in corroborating the basis of luxation at the glenohumeral joint (GHJ). The lateral angle of scapula becomes truncated and broadened and form glenoid cavity. Presence of notch in the antero-superior part of glenoid cavity, which gives its different shape. When the notch is absent glenoid cavity appears oval shaped, when it is distinct it looks like inverted comma shape, when the glenoid notch is indistinct its shape is piriform.

Aim & Objective:- Analysis of anthropometric measurements of glenoid cavity of scapula and compare the present study with the similar studies which have been cited earlier.

Material and Methods: The Present study was carried out on 102 scapulae which were collected from department of anatomy and also from the 1st year MBBS students of Saraswathi Institute of Medical Sciences, Hapur UP over a period of 2 years. The age and gender of the bones used in the study was not predetermined. Broken, damaged or scapulae showing degenerative changes were excluded from the study. Following parameters were studied using vernier caliper. (i)Height of glenoid cavity (Ht) was measured as maximum distance between the most prominent point on the supra-glenoid tubercle to the inferior margin of the glenoid cavity. (ii) The width of the glenoid was measured at three different levels. Anteroposterior width (AP1) was measured as the maximum breadth perpendicular to the height of glenoid in the lower half. Anteroposterior width (AP2) was measured as AP diameter of upper half of the glenoid cavity midway between superior margin and midequater.

Result: Shape of the glenoid cavity was noted as oval, pear shaped or inverted comma shape. The morphometric analysis will be discussed during presentation.

Conclusion: The knowledge about different shape and dimensions of glenoid are very important during designing and fitting of glenoid component for total shoulder arthroplasty as the most common complication of total shoulder arthroplasty is

loosening of glenoid component. The morphometry of glenoid cavity has clinical implication in orthopaedic joint replacement,glenohumeral instability,and rotator cuff tear management. Since the current study was performed on a limited number of scapulae, further cadaveric, radiological and clinical studies are indicated.

Key words: *Glenoid cavity, Shoulder prosthesis, Morphometry*

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SPINAL CANAL DIAMETER IN DEGENERATIVE LUMBAR SPINAL STENOSIS

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Aims of the study: The purpose of the study was to determine changes in vertebral body morphometry and diameters of osseous lumbar spinal canal with age.

Materials and methods: The study was conducted on individuals aged 20-80 years, selected on the basis of pre-defined low back pain (LBP) questionnaire, clinical signs and symptoms for lumbar spinal stenosis (LSS). Further, MRI scans were utilized to divide the individuals into two groups; Group I which included 57 healthy subjects and Group II which had 43 subjects with positive MRI findings for stenosis at L3-L5 lumbar levels. Each group was further subdivided into young (20-39yrs), middle (40-59yrs) and old (60-80yrs) age subgroups. Vertebral canal diameters and vertebral body morphometry were compared within and between the groups. Relationship of observed parameters with age was analysed using SPSS analysis tool.

Results: The spinal canal diameters and vertebral body height (except at L3) were significantly lower in Group II at the vertebral levels. The anteroposterior diameter, which is categorically used to define LSS, was not associated with age in both the groups.

Conclusion: Degenerative spinal stenosis suggests changes should occur with advancing age but no significant association of spinal canal diameters with age was evident in our study.

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MORPHOLOGICAL & MORPHOMETRIC STUDY OF VERMIAN FOSSA

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(*Assistant Professor, **Professor, ***Professor & Head, Department of Anatomy Rohilkhand Medical College & Hospital, Bareilly)

Aims: Vermian fossa is also known as middle cerebellar fossa of verga. It is present at lower part of internal occipital crest of occipital bone, over which inferior vermis of cerebellum lies. As very few studies done on VF, so the present study was aimed to know the incidence, morphology and morphometry of VF in adult dry human skull.

Material & Methods: In present study 60 dry human skull were examined for presence or absence of VF, shape & depth of VF. Morphometry of VF was done with digital Vernier caliper.

Results: In present study incidence of VF was **66.7%** (in 40 skulls). Among observed VF (40), **32(80%)** are Type1 (triangular) & **8 (20%)** are of Type2 (quadrangular) in shape and **75%** are shallow & **25%** were deep. Average length of VF was **16.98+4.3mm** and width was **13.52+ 2.25** mm.

Conclusion: In present study, incidence of VF was quite higher than other studies but almost similar to other Indian studies. Although the sample size of the present study is less but this may provide some help to neurosurgeons, clinicians and morphologist as the studies on VF are very less.

Key Words: Vermian Fossa, Vermis, Cerebellum, Occipital Bone.

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KNEE CAP: A MORPHOMETRIC STUDY

Dr Preeti Agarwal*, Dr S.H.H. Zaidi**, Dr Rakesh Gupta***

(*Assistant Professor, Varun Arjun Medical College & Rohilkhand Hospital, Banthara, ** Professor & Head, *** Professor, Department of Anatomy Rohilkhand Medical College & Hospital, Bareilly)

Aims: Patella is the largest sesamoid bone which develops with in the tendon of quadriceps femoris muscle. Morphometric study of patella is important anthropologically as well as clinically. Because of paucity of literature this study was aimed for morphometric analysis of patella.

Material & Methods: A total of sixty patellae were studied which were obtained from department of anatomy Varun Arjun Medical College, Banthara and Rohilkhand Medical College & Hospital Bareilly. Six parameters were measured by Digital Vernier caliper and statistically analyzed. Patellae were classified according to Koyunu's classification as class A, Class B & Class C.

Results: Out of 60 patellae, 34 were of right side and 26 were of left side. Mean height of patella was 39.53+5.58 mm, mean width was 41.27+3.67mm, mean thickness 19.84+1.76mm, mean of width of medial articular facet (WMAF) was 17.50+1.88mm, mean of lateral articular facet (WLAF) was 20.82+2.72mm and mean thickness of ridge was 7.48+1.37mm. No patella was of class A, 86.66% patellae were of class B and 3.33% patellae were of Class C (Koyunu's classification).

Conclusion: This study compares the patellar morphometric dimensions with other populations & describe basic values so that orthopedic surgeons, clinicians, anthropologist can perform well handling of patellae.

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COMPARATIVE HISTOLOGY OF RAT, RABBIT, GOAT, BUFFALO AND HUMAN SPLEEN

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AIMS: Spleen is the largest secondary lymphatic organ in the body designed to respond immunologically to antigens circulating in blood. Spleen performs important functions such as red blood cells production, their destruction, blood filtration, storage of blood and phagocytosis. Most of the text books of microscopic anatomy show picture of human spleen as the combination of findings derived from various animals. The present study was undertaken to compare histological difference between Rat, Rabbit, Goat, Buffalo and human spleen as they differ according to their functions.

MATERIAL AND METHODS: Normal Rat, Rabbit, Goat, Buffalo and human spleens were procured and were kept in Bouin's fluid for fixation. Sections were cut after paraffin embedding. Slides were stained by Haematoxylene and Eosin, Masson's Trichrome, and observed under light microscope.

RESULT: Capsule and trabeculae contains collagen and elastic fibers with few smooth muscle fibers in Rat, Rabbit, Goat, Buffalo and human spleen but density of cells and reticular fibers increasing gradually. White pulp was more in human than Rat, Rabbit, Goat, and Buffalo but red pulp showed prominent in these animals.

CONCLUSION: Histological features are well defined in storage type of spleen as in Rat, Rabbit, Goat, and Buffalo than the defensive human spleen. Framework of spleen stronger in human than these animals. Histological features of Rat, Rabbit, Goat, Buffalo spleen are useful in better understanding of microscopic anatomy and can be used for teaching purpose.

Keywords: human spleen, Rat spleen, Rabbit spleen, Goat spleen, Buffalo spleen, spleen microscopy, comparative spleen histology.

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MORPHOMETRIC STUDY OF BODY OF LATERAL VENTRICLES OF THE BRAIN BY COMPUTED TOMOGRAPHY

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AIM & OBJECTIVES: Morphometric analysis of lateral ventricles of brain is important for evaluating changes due to growth, ageing, intrinsic and extrinsic pathologies. The present study was done to provide more information regarding size of body of lateral ventricles of the brain in normal western UP population. The objectives of the present study were,(1) measurement of the dimensions of body of lateral ventricles. (2) To compare the data with reference to gender, side in different age groups.

MATERIAL & METHODS: The present study was carried from May 2014 to September 2015 on 200 patients [100 males and 100 females] in the age group of 10-80 years. GE OPTIMA CT 660 was used for obtaining the scans.

RESULT: With regard to side and gender , the length of body of right side has the range between 40.0-54.0mm and 40.0-56mm on the left side .In males, the morphometric measurements were more as compared to females.The length of body is more on left side than the right side in both the sexes with an insignificant increase in the size as the age increases.

CONCLUSION: The measurements of the body of lateral ventricles were more on the left side in both sexes and also more in males. This study may be useful while diagnosing visual disturbances, hydrocephalus, schizophrenia and psychotic disorders.

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A STUDY OF ORBITAL MORPHOMETRY IN NORTH INDIAN DRY SKULLS

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AIMS AND OBJECTIVE: The aim of present study was to assess orbital index, which differs with race, regions, and within same race. Assessment of orbital dimensions is important for knowledge of the anatomical disposition of orbital structures and surgical management of orbital pathologies.

MATERIAL AND METHOD: The present study includes 50 dry intact adult fully ossified human skulls from the Anthropology Museum of Department of Anatomy, GSVM Medical College, Kanpur. The sex of the skulls was documented and all the measurements were done by vernier calliper.

RESULT: The mean orbital height was found to be 32.83mm on right and 33.50mm on left side. The mean orbital breadth was 38.63mm, same on both Right and Left side. The mean orbital index was 85.06mm and 86.85mm on the right and left sides respectively. The mean of measured biorbital distance was 92.73mm and mean of measured interorbital distance was 19.07mm. Based on orbital index finding studied group of Indian population comes under Mesoseme category.

KEYWORDS: Orbital index, Indian skulls, mesoseme category, Vernier caliper.

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MORPHOMETRIC AND TOPOGRAPHIC STUDY OF OCCIPITAL CONDYLES

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Aims & Objective- Occipital Condyles are an important landmark for neurosurgeons and used for various surgical procedures in the posterior cranial fossa. The present study deals with the morphometry and distance of Occipital condyles from vital anatomical landmarks of surgical significance.

Material & Methods- The study was conducted on 50 dry human skulls, available in the museum of Anatomy Dept. in G.S.V.M. Medical College, Kanpur. The length, breadth of occipital condyles and its distance from hypoglossal canal, the foramen magnum was measured on both sides. The data was statistically analysed.

Result and Conclusion- The mean length of occipital condyle was 23.75 +/- 2.87mm, mean breadth was 13.07 +/- 1.86 mm. The mean distance of anterior end of occipital condyles from basion, Hypoglossal canal on intracranial and extracranial aspect was 11.00+/- 1.43mm, 11.62+/- 1.98 mm and 11.53+/- 2.02 mm. The mean distance of posterior end of occipital condyle from opisthion, Hypoglossal canal on intracranial and extracranial aspect was 28.28 +/- 2.7mm, 9.98+/- 1.47mm and 14.54 +/- 1.67 mm. Other parameters will be discussed in detail at conference. The data is helpful for neurosurgical practices in the Posterior cranial fossa.

KEYWORDS: basion, foramen magnum, hypoglossal canal, opisthion, condylectomy.

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A SKULL BASED MORPHOMETRIC STUDY OF STYLOMASTOID FORAMEN

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Introduction: Stylomastoid foramen is a rounded opening on the inferior surface of Petrous temporal bone between mastoid and styloid process of temporal bone.

Aim: To study the morphometry of stylomastoid foramen and its location for facial nerve block.

Material & Methods: 50 dry skulls from Department of Anatomy, Integral Institute of Medical Sciences & Research, Lucknow and G.S.V.M. Medical College, Kanpur were studied and the position of stylomastoid foramen was noted. The distance from center of stylomastoid foramen to the tip of mastoid process and center of jugular foramen was measured.

Result: The most common position of foramen was found to be anterior to the line passing through anterior border of mastoid process. The mean distance of Stylomastoid foramen from its center to the tip of mastoid process was 11.0 +1.36 mm on right side and 12.1 +1.82 mm on left side. The distance from center of stylomastoid foramen to center of Jugular foramen was 12.6 + 1.72 on right side and 12.8 +2.06 mm on left side.

Conclusion: This study makes possible to identify the exact position of stylomastoid foramen and thereby utilize the knowledge in facial nerve block.

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MORPHOMETRIC STUDY OF LUMBAR SPINE ANATOMY BY MRI

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BACKGROUND: Backache is an extremely common human phenomenon; a price mankind had to pay for the upright posture. Low backache and nerve root compression are the commonest c auses of occupational and domestic disability in industrialized societies. It is a common cause of morbidity, disability and loss of productivity in elderly population as well as in young due to the changes in life style. The knowledge of anatomical variations in lumbar spine might help in understanding the etiology as well as pathology of low back pain. It is well established that the morphometric data varies within different sex, race and regions. The clinical significance of these variations and differences in morphometric assessment of lumbar spine has been reported in the past from several countries.

AIM: The present study was carried out with an aim to study the normal anatomy of lumbar spine by magnetic resonance imaging in North Indian population.

MATERIAL & METHOD: We carried out an observational study for analyzing lumbar spine anatomy. The study group included adult subjects referred to Department of Radio diagnosis, Era's Lucknow Medical College & Hospital, Lucknow for MRI of lumbosacral spine. A total of 130 subjects (79 males; 51 females) fulfilling the inclusion criteria of the study were enrolled in the study, with

an aim to study the normal anatomy of lumbar spine by magnetic resonance imaging in North Indian population.

RESULTS: Assessment of anteroposterior diameter of canal from L1-L2 to L4-L5 showed the diameters ranging 0.95cm to 2.19cm. Mean diameters of canal at L1-L2, L2-L3, L3-L4, L4-L5 were 1.37cm ±0.23cm, 1.36cm ±0.18cm, 1.37cm ±0.19cm and 1.36cm ±0.20 cm respectively. In males it ranged from 1.03cm to 2.19 cm. and in females it was from 0.95 to 2.01.

CONCLUSION: The parameters found in the present study could be applied as a universal range in adult North Indian population irrespective of gender. The data can be utilized for anatomical studies or clinical research and may assist in radiological studies or surgical management.

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BILATERAL PRESENCE OF AXILLARY ARCH - A MUSCULAR ANOMALY OF AXILLA : A CASE REPORT

Priya A, Gupta N, Sharma A

Introduction: Axillary arch or Langer's muscles or axillopectoral muscle is a rare muscular anomaly in the axillary region. It is found to extend from the lower border of lattisimus dorsi across the front of the axillary vessels and nerves to join with the pectoralis major, coracobrachialis or biceps brachii.

Case Report: During routine dissection classes for undergraduate students in the department of Anatomy, School of Medical Sciences and Research, Sharda University, Greater Noida, bilateral presence of axillary arch was noted in an adult female cadaver aged 45 years. On reflection of pectoralis major and minor during the dissection of axilla, axillary arch was noted. Few of the fibres of latissimus dorsi were observed to be inserted to the pectoralis major making visualisation of axillary artery and cords of brachial plexus difficult.

Discussion and Conclusion: Knowledge of presence of axillary arch and it's morphology is important for the surgeons operating in the axillary region and also presence of axillary arch may be associated with some vascular compression and neuropathy.

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STUDY OF INCA BONES IN NORTH INDIAN POPULATION

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Objective: The squamous part of occipital bone consists of two parts, supraoccipital and interparietal. The interparietal portion may remain separated from the supraocciptal by a suture; it is then called the interparietal or Inca bone. Inca ossicles are accessory bones found in human skulls due to ossification failure. The Inca bones are rarely seen among other inter sutural bones and are accepted as variants of the normal. The incidence of the Inca bones has been researched in different populations. This study mainly aiming at the number, location, shape and incidence of these accessory bones on human dry skulls. It is important to know about these bones because they can mislead in the diagnosis of fracture of skull bones. They may also be very useful in forensic identification of an unknown individual.

Material & Methods: The present study was carried out on 128 dry adult human skulls of unknown age and sex which were collected from osteology lab of Anatomy Department of K.G. Medical University, Lucknow, U.P. The skulls were cleaned, dried properly and were looked for the presence of Inca bones in respect to its location, number and shape. The Inca bones were macroscopically determined and analysed.

Observation & Results: In the present study, the incidence of Inca bones was seen in 11 skulls (8.59%) out of 128 skulls in the squamous part of the occipital bone.

Out of the eleven skulls with interparietal bones, tripartite interparietal bone was observed in one skull, whereas other ten skulls showed single piece interparietal bone. Five skulls showed almost diamond shaped single midline interparietal bone. Three skulls were having a very small midline fragment.

Conclusion: The presence of Inca bones can mislead the fractures of skull. Radiologists and neurosurgeons should keep in mind about such occurrence of accessory bones before doing craniotomy surgeries.

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ANOMALOUS SUBAORTIC LEFT BRACHIOCEPHALIC VEIN

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ABSTRACT

Anomalous subaortic left brachiocephalic vein is an extremely rare venous anomaly in which the left brachiocephalic vein courses downwards and to the right underneath the arch of aorta and posterior to ascending aorta to drain into normally positioned superior vena cava at or below the level of azygos vein. This anomaly is most commonly associated with congenital anomalies of the heart (Tetralogy of Fallot) or aortic arch (right aortic arch) and is seen in about 0.5% - 1.7% of all children with congenital heart disease. While analysing contrast enhanced CT scans of chest of 710 patients, we have noted the presence of anomalous subaortic left brachiocphalic vein in 2 cases (2 out of 710 cases; 0.28%). In a female patient, subaortic left brachiocephalic vein was observed in isolation without any associated congenital cardiac or aortic arch anomalies. In another female patient, this anomaly was associated with a right sided aortic arch with retroesophageal left subclavian artery arising from a Kommerell's diverticulum. Thorough anatomical knowledge of these anatomical variations is essential to avoid misinterpretation of images and complications during any interventionl and surgical procedures.

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RELATION OF SACRALIZATION OF FIFTH LUMBAR VERTEBRA TO POSITION OF AURICULAR SURFACE IN SACRUM

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Introduction: Inverted 'L' shaped auricular surface on lateral mass of sacrum has role in weight transmission. Any shift in extent of auricular surface can alter the dynamics of load transmission at the lumbosacral and sacroiliac articulations leading to several morphological changes responsible for spinal deformities.

Aim: To study the relation between sacralization of fifth lumbar vertebra to variable positions of auricular surface of sacra.

Material and methods: Total 52 adult dry human sacra of both sexes were collected from the Department of Anatomy at Himalayan Institute of Medical Sciences, Dehradun. All sacra with high type of auricular surface i.e. beginning high above first sacral segment were identified, separated and then morphological features of those sacra were noted.

Result: High type of auricular surface was seen in 3 sacra among 52. Most prominent feature of these sacra was complete fusion of fifth lumbar vertebra & first sacral vertebra i.e. sacralization. The prevalence of sacralization seen was 5.7%.

Conclusion: Sacra with higher type of auricular surface requires additional higher vertebral segment as extra support for proper body weight transfer under changed biomechanics.

Key words: Sacralization, Auricular Surface, Sacra

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EFFECT OF MOBILE PHONE RADIATION ON TESTIS OF RATS

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Aim: - To study the effect of electromagnetic radiation emitted by mobile phones on testis of rats.

Material & Method: - Study was done in BRD Medical College, Gorakhpur in central animal house with approved ethical clearance from the committee .8 rats of

species Spargue Dawley were included under control & experimental group. Time period of 3 months were utilized for the experimental with rats being sacrificed every month. Blood sample for hormonal analysis & tissue in 10% formalin were collected for histological studies.

Result: - Drastic alteration of testosterone & altered histology of testis was observed.

Conclusion: - Electromagnetic radiation emitted from mobile phone is causing a drastic change at the tissue as well as at hormonal level.

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CONGENITAL ANOMALOUS UNILATERAL HYPOPLASTIC FOETAL KIDNEY

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Saraswati Medical College Unnao

Aims of the study- Anomalies of kidneys form a significant portion of congenital malformations. Anomalies may occur in number, position, shape, size and rotation of kidney. Unilateral small kidney may be due to agenesis of kidney which may confused by suprarenal gland, hypoplastic kidney, dysplastic kidney and pyelonephritic shrinkage. Unilateral agenesis is 4-8 times more than bilateral and in males. It is due to failure of the ureteric bud to arise, or failure of the bud to engage with renal mesenchyme. Rudimentary dysplastic kidneys are called as hypoplastic kidney. Renal hypoplasia is autosomal dominant **Material and methods-** Dissection of 70 normal human fetuses (31 female and 39 male) was done and gross study was done thoroughly.

Result- Incidentally we found a male foetus having an under developed left kidney. lobulated left kidney situated in lower lumbar region is of irregular shape and decreased length, width, thickness and weight in comparison to normal right kidney. Microscopy revels less number of nephron with less developed medulla and less vascularization.

Conclusion- Hypoplastic kidney may cause hypertension and urinary tract infection may occur in later age and contralateral kidney has to do more function so urinary system may be compromised. We have to take care of it if it is diagnosed prenatally and its importance while, screening of donors, and also during interpretation of various radiological diagnostics and percutaneous procedures related to the kidney.

Keywords- Hypoplastic kidney, agenesis of kidney, renal mesenchyme.

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THE STUDY OF CORRELATION BETWEEN STATURE AND MORPHOLOGICAL FACIAL LENGTH IN NORTH INDIAN POPULATION

***Dr. Neha Yadav, *Dr. Vasundhara Kulshreshtha, *Dr. Shikky Garg, *Dr. Anjali Gupta.**

INTRODUCTION: Stature can be defined as natural height of person in erect position. Stature has a biological relationship with each and every part of body i.e. head, face, trunk and extremities (Kewal Krishan, 2008). Stature estimation is important parameter when human remain such as mutilated body or facial remain of skull is bought for medicolegal examination. This correlation will also helpful in anthropological and geographical research. The aim of our study is to estimate the stature from morphological facial length.

MATERIAL & METHOD: The study was conducted among 150 medical students of both sexes aged between 18 to 25yrs in department of Anatomy, SN Medical College, Agra. Stature of person was measured by anthropometric rod & morphological facial length was measured by digital Vernier calliper between nasion and ganthion. The mean, standard deviation, regression equation, were calculated.

RESULT: We observed correlation between stature & morphological facial length and developed regression equation for it.

KEYWORDS: Stature, Morphological facial length, Digital Vernier Calliper.

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ORIGIN OF RIGHT CORONARY ARTERY (RCA): A STUDY BY 64 SLICE COMPUTED TOMOGRAPHIC (CT) CORONARY ANGIOGRAPHY (CA) IN NORTH INDIA

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Abstract- The right coronary artery (RCA) presents a wide spectrum of morphological expressions regarding its sites of origin and termination. RCA usually arises from the Anterior Aortic Sinus (AAS) and traverses through the right atrio-ventricular groove. Anomalous origin of the right coronary artery is a rare congenital anomaly that was first described in 1948 by White and Edwards.

Several clinical and pathological scenarios like hemodynamic procedures, cardiac surgery in heart trauma and arrhythmias from coronary occlusive disease management have importance of variations in the origin of RCA.

The aim of this study was to assess the incidence of different sites of origin of RCA in north Indian population and to find any anatomic variant of its origin. This prospective study was carried out on 50 routine subjects of different age groups who came to the Department of Radiodiagnosis, King George's Medical University U.P., Lucknow in the year 2010- 2011 with known or suspected Coronary artery disease. All the cases were investigated on a 64 slice Multidetector Computed Tomographic (MDCT) scanner. The incidence of different sites of origin of RCA was determined.

In the present study, RCA originated from anterior aortic sinus in 47 (94%) individuals. 3(9.38%) males showed anomalous origin of RCA from left posterior aortic sinus (LPAS). In this study we concluded that the most common site of origin of RCA was anterior aortic sinus and incidence of anomalous origin of RCA was more in males as compare to females.

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STUDY ON MORPHOLOGICAL CHANGES AFTER EXPOSURE TO IMIDACLOPRID ON CHICK EMBRYOS

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Introduction: Pesticide substances are biologically active and must be tested to ensure that their use will not give rise to any unacceptable risks to non-target organisms (i.e. humans, animals, plants and environment). Imidacloprid is one of the major representatives of the new generation of neonicotinoid insecticides.

Methods: Present study was carried out in the department of Anatomy Govt. Medical College, Ambedkar Nagar and Santosh Medical College Ghaziabad U.P. on 270 fertile eggs of white leghorn chicken obtained from government poultry farm after taking permission from animal ethical committee. Chicken eggs exposed to Imidacloprid with doses of 10ug, 20ug, and 40ug in a volume of 10ul, 20ul and 40ul respectively and control same as test group. Morphological changes observed and recorded.

Results: The results show that experimental group had comparatively more cases of morphological changes, growth retardation resulting into failure of retraction of yolk sac, limbs defects and Ectopia Viscerale as compared to controls.

Conclusion: Imidacloprid exposure increases the risks of morhological and comparatively higher doses proved more toxic and also caused many developmental defects.

Keywords: Imidacloprid, chick embryos and morphological effects.

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ARTERIAL SUPPLY OF SA NODE -A CADAVERIC STUDY

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Aims- To study the anatomical variations of sino atrial nodal arteries in cadaveric hearts and analyse its association with coronary dominance.

Materials and Methods- Thirty five Hearts were collected from the department of anatomy of Institute of Medical Sciences, Banaras Hindu University. The preserved hearts were dissected and veins and coronary sinus were removed to see the proper arterial course. The branches of coronary arteries were observed for dominance and their association with Sinoatrial nodal arteries were analysed .The arteries were painted to enhance the contrast and photoimaged.

Result-Out of 35 Hearts , 32 were of right dominance (91%) and one of left dominance (2%), and two of (5.71%) co-dominance types of coronary circulation were observed. In present study sinuatrial nodal arteries arise from Right coronary artery in 22 cases (63%), Left circumflex artery in 7cases (20%) and from both Right coronary artery and Left circumflex artery in 6cases (17%).

Conclusion-The origin of sinuatrial arteries is not related to the coronary artery dominance pattern. The knowledge of variation in the origin, course is very important to cardiac surgeon during cardiac interventions like mitral valve surgery and treating arrhythmias.

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MORPHOMETRICAL CHANGES IN PLACENTA OF UNDERNOURISHED MOTHERS AND ITS EFFECT ON FOETAL WEIGHT

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Introduction: Placenta is a membranous vascular organ that develops in female mammals and mediates maternofoetal exchange of gases, nutrients and metabolites. The examination of placenta during period of pregnancy and post-partum provides valuable information about the state of foetus well-being. Maternal nutrition during pregnancy has a pivot role in the regulation of placental-fetal development, there by affects the lifetime health and yield of offspring.

Materials and methods: In the present study 194 placentae were collected under 2 groups. Group-I (Control group): normal pregnant women. Group II (Study group) consists of Subgroup IIA -Undernourished mothers with anaemia, Subgroup-IIB: Undernourished mothers without anaemia, Subgroup-IIC: Anaemic mothers with pre-pregnancy BMI>18.5kg/m2. Out of 194 placentae, 92 were of group I, 41 of group IIA, 15 were of group IIB and 46 were of IIC.

Results: The weight, diameter, the number of maternal cotyledons of placentae and fetal weight were significantly decreased in undernourished group particularly in undernourished mothers with anemia (Subgroup IIA).

Conclusion: Within the limitations of the present study it can be concluded that in undernourished mothers, there was reduction of placental weight, placental diameter, and the number of maternal cotyledons leads to placental insufficiency which impact on the foetal growth resulting to low birth weight.

Key Words: Placenta, Undernourished Mothers, Anaemia, Morphometric Changes, Foetal weight.

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A STUDY TO EVALUATE PLACENTAL AND FOETAL WEIGHT IN DIFFERENTGRADES OF TOXEMIA OF PREGNACY

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Introduction: The placenta is a unique organ, short lived by design. Its existence is vital for the persistence of human embryo/foetus in the intra uterine environment. Structural and functional derangement of placenta arouses a considerable interest, as this may be the only index to measure adequacy of the fetal environment. Hypertensive disorders are generating complications during pregnancy (Toxemia of pregnancy) which are common and forming deadly characters along with hemorrhage and infection. Maternal hypertension (toxemia of pregnancy) is diagnosed in 6-10% of all deliveries which is related with 22% of perinatal foetal deaths and 30% of maternal death.

Material and Methods: The present study has done in 100 pregnant mothers, divided into four groups 20 cases of mild preeclampsia, 20 cases of severe preeclampsia, 20 cases of Eclampsia, 40 cases of control (Normotensive) pregnant women admitted in Department of Obs and Gynae, Rama Medical College, hospital and research Centre, Mandhana, Kanpur, U.P (India). The placentae were weighed with a standard weighing machine. The fetal weight was noted from the case records provided.

Result & Conclusion: In this present study the mean placental, birth weights were significantly low in different grades of toxemia of pregnancy when compared with control group. The fetoplacental weight ratio was higher in cases of mild and severe preeclampsia when compared with control group but the difference is insignificant.

Keywords: Placenta, foetus, weight, feto-placental weight ratio, Toxemia of Pregnancy, statistical significant.

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SUPERFICIAL FASCIA: A DEBATABLE STRUCTURE

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A debate on superficial fascia starts right from its nomenclature. The superficial fascia defined by Anatomists is different from that interpreted in clinical circle. The membranous layer of superficial fascia is actually termed as superficial fascia by clinicians. The second debate is regarding its extent in the body. In the text books of Anatomy, membranous layer is described in lower part of abdomen only. The present study was conducted in Department of Anatomy, KGMU, in which high resolution ultrasonography of 10 individuals (5 male, 5 female) was done to observe the presence of membranous layer of superficial fascia in different regions of body. It was found to be present in upper limb, lower limb, front and back of trunk with some variations in thickness. In certain parts it was found to be multilayered. It divided the so called superficial fascia into superficial adipose tissue (SAT) and deep adipose tissue (DAT).

Functionally superficial fascia determines the shape of body, insulates it, plays role in integrity of skin and supports subcutaneous structures like veins. It has been implicated that this superficial fascial system plays a pivitol role in excisional and noninvasive body contouring procedures. Therefore, the knowledge of its presence in almost every region of body can be very useful for the surgeons.

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COMET ASSAY ASSESSMENT OF DNA DAMAGE IN CARCINOMA BREAST PATIENTS ON CHEMOTHERAPY

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Background and Objectives: Generalized genomic instability is reported in cancers with accumulating mutations, in genes controlling cell cycle check points and mutations in genes responsible for DNA repair mechanisms, transforming normal cells to clonally proliferate. BRCA1 mutation, by weakening DNA repair mechanism, is implicated in familial breast cancer. Multi- treatment strategies use a combination of chemotherapy, surgery, radiotherapy and hormones. Of interest here are the chemotherapeutic drugs acting via DNA damage mechanisms to control the disease. An attempt is made here to study this damage using Comet Assay, an electrophoretic technique; the comet tail lengths a measure of DNA damage.

Material and Methods: Fifteen cases of carcinoma breast, 38 to 76 years age, were randomly chosen for this study. Nine of them newly detected with it formed

our controls. Six of them receiving their cycles of neo- adjuvant chemotherapy formed our cases. Lymphocytes from these subjects were subjected to comet assay. The tail lengths of 2250 comets of these groups were reported in ocular units (1 OU = 2um).

Results: Comparing the mean comet tail length of cases post neo- adjuvant chemotherapy (56.75 + 3.43) to that of controls (41.72 + 1.57) it was found to be statistically significant (P< 0.001).

Conclusion: Comets in controls reflect the generalized genomic derangement. We conclude that extra DNA damage in cases has been caused by the chemotherapeutic agents, adding to already existing DNA damage. This damage, in time; and hence requiring follow up studies; is amenable to repair, though there is impairment of the repair mechanism due to the malignant process per se.

Abbr: BRCA1- Breast Cancer 1 gene

Key words: Breast Cancer, DNA damage, Chemotherapy, Comet Assay.

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TRICUSPID VALVE COMPLEX- A STUDY ON ITS VARIATIONS IN NORTH INDIAN POPULATION AND CLINICAL IMPLICATIONS

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Aims of the study: Since cardiovascular diseases are emerging as major cause of morbidity and mortality in modern era, emphasis is on understanding of normal as well as variant cardiac anatomy. Moreover, the advancement in diagnostic and therapeutic cardio-invasive techniques have prompted the revision of our existing knowledge and understanding about fine details of atrio-ventricular valvular and chordo-papillary complexes. This study is an endeavour to establish the morphology of tricuspid valve and chordo-papillary complex of right ventricle in eastern Indian population and to compare it with previously provided data by different workers.

Materials and Methods: The study was conducted by dissecting 52 formalin fixed adult human hearts and architecture of tricuspid valve and chordo-papillary complexes was studied.

Results: The presence, number, shapes, length, number of additional heads of the papillary muscles were observed. The morphology of tricuspid valve was also noted.

Conclusions: The morphology and morphometry of the tricuspid valve and papillary muscles was defined. Awareness of such information, whether normal or variant, is considered prerequisite for successful, uncomplicated cardiac surgeries and interventional radiology.

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VARIATIONS IN ANTERIOR CIRCULATION OF HUMAN BRAIN- A CADAVERIC STUDY

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Preamble: Variations in Anterior Circulation of the brain assume importance in Neuro- Surgical Interventions, particularly related to Aneurysms and Craniotomies.

Aims: Our aim was to attempt a study of such variations of Anterior Circulation of Brain.

Material and Methods: 28 brains (56 cerebral hemispheres), obtained from human cadavers at Department of Anatomy, Subharti Medical College, Meerut, India, were dissected as per protocol.

Results: In each cerebral hemisphere, the Anterior Cerebral Artery was found to originate normally, from Internal Carotid Artery, and was present as a single trunk, giving off its branches. No variations were found with reference to Anterior Communicating Artery and Recurrent Artery of Heubner.

Keywords: Anterior Cerbral Artery (ACA), Anterior Communicating Artery (AcoA), Recurrent Artery of Heubner (RAH), Internal Carotid Artery (ICA).

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INTERACTIVE TEACHING IN ANATOMY

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Aims of the study: The study was undertaken to review the current Anatomy teaching methodology in light of MCI's medical education technology guidelines with special reference to its emphasis on interactive teaching methodology and to make the role of Anatomy more relevant to match and fit the fast changing needs of rapidly changing medical education of quality global standards.

Materials and methods: A brief review of both the MET guidelines about Medical education and its emphasis on interactive teaching methodology and current Anatomy teaching scenario was studied using multiple resources of review of literature and compared for compatibilities and contradictions to draw significant conclusions for making Anatomy role more relevant to meet the demands in fast changing quality medical education for providing much better health care of global standards.

Results and Conclusion: Considerable mismatch and contradictions were detected in the present study. Significant conclusions were drawn for improvement in Anatomy teaching methodology with suggestions to implement interactivity in to meet the needs of quality medical education of global standards. The findings are discussed.

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ANTHROPO METRIC STUDY OF EXTERNAL EAR OF MEDICAL STUDENTS IN INDIA REGION

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ABSTRACT:-Anthropometry refers to the measurement of living human body dimensions to understand human physical variation as it plays an important role in plastic surgery, prosthetic, cosmetic and for data collection. Statistical data about the distribution of body dimensions in the population are useful for apparel sizing, forensics and optimize products. In human ear is the defining feature of the face and its structure showing signs of age and sex and its relation with individual height. The aim of our study is to determine the mean value of different morph metric measurements like

1. Total Ear Length (T.E.L)

2. Total Ear Width (T.E.W)

3. Lobular Height (L.H)

4. Lobular width (L.W)

5. Ear Index (E.I)

6. Lobular Index (L.I)

It is taken of Right and Left Ear in both genders of age group between 19-24 years. Also these parameters are correlated with height. For this we have taken anthropometric measurements of external ear on 135 medical students (71 boys and 64 girls) of M.B.B.S first year in Saraswati Medical College, Unnao from all over India. Observations, discussion and conclusion will present at the time of conference.

KEY WORDS: - Anthropometric measurements, plastic surgery, lobular index.

CORRELATION BETWEEN ABNORMAL BODY MASS INDEX AND PREVALENCE OF THE TYPE2 DIABETIC MELLITUS IN THE AREA OF KANPUR

Anant Sachan, R.K. Srivastava, Shirin Jahan, Pranjal Pankaj

The type 2 diabetes mellitus in India are a result of societal influences and changing of life style. Diabetic patients have been known in the India as a disease of affluent class. The purpose of this study to determine the relationship between BMI and type2 diabetes mellitus. Data on body mass index is calculated by using the formula Weight (Kg)/Height (mt^2) and Using the HBA1C test for determining the type 2 Diabetic patients, were collected from 160 subjects having abnormal BMI, age between 35-60years. The subjects were examined in the Rama Medical College Hospital and Research Centre, Kanpur. The hypothesis of this study is as BMI increased from norms to overweight and obese ranges, the probability of occurrence of type 2 diabetes mellitus also increased.

Keywords: Prevalence of the Type2 Diabetic mellitus, Obese, over weight.

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MUTATIONAL ANALYSIS OF MYBPC3 GENE IN DILATED CARDIOMYOPATHY PATIENTS IN NORTH INDIAN POPULATION

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Aim of Study: This study was conducted to identify the possible genetic change in Dilated Cardiomyopathy in North Indian Population.

Methods: Blood samples of dilated cardiomyopathy patients were collected from Cardiology OPD, Sir Sunderlal Hospital, Banaras Hindu University. DNA was isolated using salting out method. PCR was done to amplify exons 32, 33 and 34 of MYBPC3 gene. The PCR product was sequenced to detect the mutational changes in Exons 32-34 of MYBPC 3 gene.

Result: There were 65 control samples and 65 DCM samples were collected. Total 76 intronic variations were reported. In three (BHU/15/425, BHU/15/450, BHU/16/89) patients disease causing pathogenic variant c3624_3625insC (rs397516029, HMGD CD0910628) was reported in MYBPC3 gene. Insertion of G at 47354119 47354120 position was reported that lead to a frameshift mutation in three subjects. Several Missence variants were also reported 47354121G>C, 47353899C>T, 47353715C>A, 47353647A>C, 47353626G>T that are present in coding region and may lead to alteration in protein structure and function.

Conclusion: Evidence from previous study reported that MYBPC3 play important role in cardiac contraction and responsible for pathogenesis of dilated cardiomyopathy. Therefore, the identification of frequent genetic transmission of dilated cardiomyopathy provides an important tool for the study of pathogenesis of this disease, which is a frequent cause of admission to the hospital and of heart failure.

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ANOGENITAL INDEX OR 2:4 DIGIT RATIO, WHICH ONE BETTER CORRELATE WITH CRL: AN ANTHROPOMETRIC STUDY IN HUMAN FETUSES FROM NORTHERN INDIA

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Background: Anogenital index (AGI) and 2:4 digit ratio (2D:4D) are sexually dimorphic and found to be markers of androgen and androgen receptor (AR) status in fetuses. Studies in adults and children have shown both AGI and 2D:4D to be the predictor of external genitalia development and there abnormalities and infertility. However anthropometric study measuring the two indices in the fetuses and there comparison with CRL were not found.

Aims and Objective: To measure AGI and 2D:4D in apparently normal fetus and there correlation with CRL and to find out which out of two showed better correlation with CRL.

Methods: AGI was measured in a total of 72 fetus ranging from 6 cm to 37 cm of CRL. AGI is calculated by dividing AGD with weight. The length of second and fourth digit is measured by fingers in full extension of right and left hand and ratio is obtained. The Pearson correlation® and p value of AGI and 2D:4D with CRL were calculated to prove statistical association and compared.

Results: The mean AGI in fetuses were .0022, with .0015 in female fetuses and .0028 in male fetuses respectively. AGI was more in male fetus in comparison to female fetuses. The AGI show linear decrease with increase in CRL in both male and females fetuses. The mean 2D:4D ratios in male and female fetuses were .92 and .93 for left hand respectively. The mean 2D:4D ratios in male and female fetuses were .92 and .98 for right hand respectively. The Pearson correlation® and p value showed significant correlation between AGD and CRL in both male and female fetuses while only in female fetuses the 2D:4D ratio showed significant correlation.

Conclusion: In this study AGI came out to have a better association with CRL as compared to 2D:4D ratio. Therefore author suggest AGI to be a better marker than 2D:4D ratio.

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OSTEOPOROSIS AND ITS RELATION WITH HYPERTHYROIDISM; A CROSS SECTIONAL STUDY IN FEMALE

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AIMS OF STUDY: To evaluate if there is any relationship between bone mineral density (BMD) and elevated thyroid hormones in female patients suffering with hyperthyroid.

Material and Methods: A total ninety one female hyperthyroid patients and fifty eight female euthyroid subjects were included in this cross sectional study. The biochemical thyroid function, vitamin D and serum calcium were estimated. Dual electron x-ray absorptiometry (DXA) technique was use to measured BMD at the femoral neck. 'X' ray of femur was done on MDX - 100.

Results: In the present study serum calcium and vitamin D were significantly low in group II hyperthyroid patients. BMD (-1.26±0.54 g/cm^2 vs -1.06±0.32 g/cm^2, $p<0.009$) in hyperthyroid patients was significantly low in comparison to euthyroid subjects. 'X' ray of long bone (femur) in both group participants showed a significant difference.

Conclusion: Current study suggests that increased level of thyroid hormones is associated with decrease level of calcium, vitamin D and BMD in female patients, which in turn increases the risk of fracture in these patients. Therefore, present study advocates that early evaluation of BMD, serum calcium and vitamin D can prevent the risk of fracture in female hyperthyroid patients.

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STUDY OF FINGERPRINT PATTERNS IN OLIGOSPERMIC/ AZOOSPERMIC MALE

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Introduction: Dermatoglyphics is the study of the patterns of the ridged skin of the digits, palms and soles. They are important in medical genetics chiefly because of their diagnostic usefulness in some dysmorphic syndromes. The commonest indicator of male infertility is 'semen analysis'. When the spermatozoa concentration is less than 20million/ml the condition is referred to as 'oligozoospermia'. Azospermia is a condition where the semen sample has no spermatozoa. Oligozoospermia & Azoospermia cause infertility.

The aim of our study is to compare the frequencies of different fingerprint patterns of infertile patient with that of the control group.

Materials and Methods: The infertile men attending the IVF centre of Rana Hospital pvt.ltd., Gorakhpur, UP were investigated for semen analysis. On its basis they were categorized into two groups. Their fingerprint patterns of both hands

were taken by standard ink-pad method,on A4 size plain paper. Dermatoglyphic analysis was done.

Result: The most frequent type of finger print in both case groups was "loop". Frequencies of different types among two groups of cases were statistically different (P<0.005). Also they were statistically different with general population (P<0.005). Identical patterns of both hands were found in cases.

Conclusion: It can be concluded that qualitative features of the finger prints of men with oligospermia and azoospermia were different with each other and with general population.

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HISTOPATHOLOGICAL CORRELATION OF CHRONIC DIARRHOEA WITH RECTAL BIOPSY IN A NORTH INDIAN POPULATION

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ABSTRACT

BACKGROUND: The prevalence of chronic diarrhea in children worldwide ranges from 3% to 20%. The reliable data for adults are lacking as well as there are controversies regarding the importance of biopsy of large intestinal mucosa in the investigation of these patients.

AIM: To evaluate chronic diarrhoea histopathologically by means of rectal biopsy.

MATERIAL AND METHODS: It is an open randomised study carried out on 100 adult patients presenting with diarrhea of > 4 weeks duration. They underwent flexible sigmoidoscopy and biopsies were taken from the rectum by means of biopsy forceps.

RESULTS: Histopathologically, 89% cases were abnormal of which 39% had non-specific chronic colitis (branching intestinal crypts and increased inflammatory cells both in surface epithelium and lamina propria), 20% cases were microscopic colitis [19% lymphocytic (accumulation of lymphocytes in colonic epithelium and connective tissue) and 1% collagenous (a thickened subepithelial collagen layer)] and 9% were Inflammatory Bowel Disease (IBD), 33.33% of which were Ulcerative Colitis (mucosa inflamed and ulcerated, cryptitis, crypt abscesses, submucosal fibrosis). 11% had normal sigmoidoscopy as well as rectal biopsy, more than half of which presented with symptoms compatible with Irritable Bowel Syndrome. 1% had mucin-secreting adenocarcinoma and 1% solitary rectal ulcer syndrome.

CONCLUSIONS: Thus, we conclude that inspite of normal sigmoidoscopic appearance, histopathological lesions can exist in significant percentage of cases which may be missed out without biopsy. In our study, out of the 42 normal sigmoidoscopies, 31 were having abnormal rectal biopsy. The above facts indicate that histological examination by biopsy should be taken in all patients of chronic diarrhoea irrespective of normal/abnormal sigmoidoscopic/colonoscopic findings.

KEYWORDS: *Chronic diarrhoea, Sigmoidoscopy, Rectal biopsy.*

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A HISTOPATHOLOGICAL STUDY OF PROTECTIVE ROLE OF A-TOCOPHEROL IN CHROMIUM INDUCED TOXICITY IN ALBINO RAT LIVER

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Objective: To study the effect of chromium on liver and investigate whether a-tocopherol could protect the liver from the histological changes induced by hexavalent -Chromium (CrVI).

Method: The study was conducted in the Department of Anatomy, Subharti Medical College, Meerut, U.P. The study was done on 36 male adult albino Rats, aged about 60 days with an average body weight of 140+20gm. The chemicals used were Chromium (Cr) as Potassium Dichromate ($K_2Cr_2O_7$) which was dissolved in distilled water to form a stock solution of 10 mg/ kg body weight. a-tocopherol (Vitamin E) was given in concentration of 125 mg/kg body weight.

Result: Under light microscopy, the Haematoxylin and Eosin (H&E) stained section of liver of all the groups were seen. 30 non-overlapping fields per slides were examined to observe the histopathological changes in each group. Statistical analysis was done by SPSS 21 software version. The levels of significance of all the changes were calculated by Z-proportion test. The p<0.05 was considered as statistically significant.

Key Words-Potassium-dichromate, a-tocopherol, Hepatocytes, Sinusoids, Toxicity.

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ANATOMICAL VARIATIONS IN BRANCHING PATTERN OF HUMAN AORTIC ARCH: A CADAVERIC & RADIOLOGICAL STUDY

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Aim of study: To determine variations in branching pattern of aortic arch..

Materials and methods: 30 dissected cadaveric hearts and 50 patients who underwent CECT thorax were included in this study.

Results: Out of 30 heart specimens, 20 cases (66.7%) showed classical pattern and variations were reported in 10 cases (33.3%). Radiologically, classical and variant pattern were observed in 37 patients (74%) and 13 patients (26%) respectively. Two vessels with presence of Common trunk of BT & LCCA and LSA emerged as the most common variant pattern [7 out of 30 heart specimens (23.3%) and 9 out of 50 patients (18%)]. 4 vessels with LVA emerging directly from arch between origins of LCCA & LSA was the second common variant pattern and was found in 2 heart specimens & 4 patients. One heart specimen showed atypical three vessel pattern (BT, LCCA, VST).

Conclusion: A classical three vessel pattern of arch is found in 66.7% to 74.0 % of population. Awareness and determination of variations prior to medical intervention is vitally important in treating patients.

[Abbv: BT- Brachiocephalic trunk, LCCA- Left Common carotid artery, LSA- Left Subclavian artery, LVA - Left Vertebral artery, VST- Vertebrosubclavian trunk]

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CLINICAL ANATOMY OF HUMAN OVARY: A SONOGRAPHIC STUDY

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Background: The ovaries, or female gonads, are paired glands measuring 3 cm x 2 cm x 1 cm. They are positioned in the upper pelvic cavity, one on each side of the uterus. The ovary has two functions: the production of ova; and the production of hormone. High-resolution ultrasonographic evaluation of the anatomy of the ovary results in documentation of capsule, stroma, primary ovarian follicle and graffian follicle. It is highly useful tool to monitor the growth of follicle upto ovulation. The present study was planned to study the ultrasonographic anatomy of human ovary.

Materials and Methods: Eighty one were studied for a period of one and half year. Consent was taken prior to ultrasonographic examination. Trans abdominal ultrasound performed on full bladder while transvaginal ultrasound performed on empty bladder.

Results: Ultrasonographic study of ovary reveals capsule, stroma presence of primordial follicles. Primary follicles were clearly seen and the Cortico-medullary differentiation was clearly visible.

Conclusion: The ultrasound is extremely usefull tool to study the detail anatomy of ovary including capsule, stroma, Cortico-medullary differentiation. It provides useful functional and endocrinal information about the ovary. It is found highly valuable in monitoring of follicular growth and other ovarian pathology. Trans vaginal Ultrasound found superior to Trans vaginal Ultrasound

KEY WORDS: Ovary, Ovarian follicles, Trans abdominal ultrasound and Trans vaginal ultrasound

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DOUBLE GALL BLADDER- A CASE REPORT

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ABSTRACT

Gall Bladder duplication is a very rare congenital anomaly with a reported prevalence of 1 in 4000 births. Causey et. al. (2010) noted that this anomaly is seen in 0.026% of autopsy cases. This condition may remain asymptomatic and undetected. We report here a case of double gall bladder incidentally observed in a 32 year old female patient who underwent MRCP for right upper quadrant abdominal pain. There were two gall bladders, one main and one accessory, both related to inferior surface of right hepatic lobe. Each gall bladder was drained by a separate cystic duct which later unites to form a common cystic duct draining into bile duct presenting a Y- shaped configuration. The smaller accessory gall bladder was seen more deeply embedded in the gall bladder fossa. Our case resembles "Y-shaped" double gall bladder of Boyden's classification.

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EVALUATION OF VARIATIONS IN CIRCLE OF WILLIS - A CT ANGIOGRAPHIC STUDY

Nishat Parveen* , Archana Sharma , G.L.Nigam , Ketu Chauhan , Antima Gupta , Anuj Malik , Arvind Yadav , Vishnu Datt Pandey.

AIM: Circle of Willis is a polygonal anastomotic channel at the base of brain which unites the internal carotid artery and vertebro-basilar system. The aim of present study is to find out the percentage of normal pattern, frequency of variation of circle of Willis and to study the morphological aspect of all components.

MATERIAL AND METHOD: The angiographs were obtained from CT Optima 128 slice CT machine of GE Company. A total number of 50 cases who underwent CT Angiography were observed to assess the variation in the circle of Willis.

RESULT: Out of 50 patients, 34 patients showed complete circle of willis, 7 patients showed origin of posterior cerebellar artery from ICA (foetal origin) and 9 patients had absence of Posterior communicating artery. Out of 50, 13 patients showed intracranial aneurysm.

CONCLUSION: CT Angio is a non-invasive, quick and accurate modality for evaluation of anatomical variation of circle of willis and intracranial aneurysm. Awareness of these variations is important in neurovascular procedures, further discussion will be done on paper presentation.

KEY: Circle of Willis, CT Angio, Aneurysm, Variation.

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IMMUNOHISTOLOGICAL STUDY OF SERTOLI CELLS IN DIABETIC CONDITIONS

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Background: Diabetes mellitus is a metabolic disorder which induces structural and functional alterations in the cells and tissues. The function of any organ is the consequence of metabolic activities of the cells of that organ. The Sertoli cells of the testis provide structural and nutritional support to germ cells. So, the male fertility and the process of spermatogenesis are dependent upon the somatic Sertoli cells. Spermatogenesis is a complex process that is dependent on transport of glucose from blood to germ cell. The Sertoli cells metabolizes glucose to lactate which is chief substrate for the developing germ cells. Since millions of sperms are produced at a time, adequate amount of glucose should be uptake by a Sertoli cells. Any alteration in the metabolism of glucose due to diabetes mellitus in the Sertoli cells leads to the improper functioning of the Sertoli cells which affects the developing germ cells.

Objectives: To study the Sertoli cells of diabetic testis of rats.

Materials and methods: This study was conducted on sixteen adult male Wistar rats. The rats were categorized into control and test group. The test groups were injected streptozotocin intraperitoneallly to induce diabetes mellitus. Both the groups were sacrificed after six months and orchiectomy was done. The testes were processed for immunohistochemical study following standard methods.

Results: In control group, round seminiferous tubules with long Sertoli cells were observed. In diabetic group, the seminiferous tubules were collapsed. The Sertoli cells were short, poorly expressed or absent. No spermatogenic cells were found in absence of Sertoli cells.

Conclusion: The Sertoli cells of diabetic testes were highly affected due to chronic diabetes mellitus. Presence of Sertoli cells is mandatory for the process of spermatogenesis.

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THE UTILITY OF IMMUNOHISTOCHEMISTRY FOR IDENTIFICATION OF MYOEPITHELIAL CELL LAYER IN BREAST LESIONS- THE INDIAN SCENARIO

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Introduction: Many of the benign breast lesions mimic breast cancer. It is also critical to distinguish invasive carcinomas (IC) from noninvasive lesions. An intact myoepithelial cell (MEC) layer is seen in both benign and in situ lesions. Loss of the MEC layer is considered the gold standard for the diagnosis of invasive cancer. However, micro-invasion is often associated with an altered, desmoplastic stroma or a dense lymphocytic infiltrate. In these cases, recognition of myoepithelial cells based only on routine hematoxylin-eosin (H&E) sections may be very difficult. The immune-histochemical method is very helpful to detect myoepithelial cells, confirming or not the suspected areas of invasion.

Materials & Methods: 186 female and 8 male patients were studied. After a thorough clinical history and examination the patients underwent surgery and surgical specimens which included mastectomy, quadrantectomy, excisional biopsies, and incisional biopsies were received in histopathology laboratory of department of pathology.The specimens were grossed and 0.5 cm thick sections were taken from representative areas of the lesion, excision margins and normal appearing breast tissue. H&E staining and subsequent immunohistochemistry were done.

Results: None of the invasive carcinomas stained positive for myoepithelial cells or luminal cells. However variable degree of stromal cell staining was seen in invasive carcinomas. In our study no case of pure DCIS was seen. However foci of DCIS were seen in association with 34 cases of infiltrating ductal carcinomas and one was associated with Paget's disease of nipple.

Type of lesion	No of cases analyzed	H&E stained sections	Immuno-stained sections
DCIS	10	complete in 10	circumferential in 10
DCIS	13	discontinuous in 13	circumferential in 13
DCIS with	07	discontinuous in 04	circumferential in 04
Micro-invasion		absent in 03	discontinuous in 03
DCIS	05	absent in 5	circumferential in 03
			absent in 02
Total	35	35	35

Conclusion: It is not always possible to detect ME cells on routine H&E and in such cases immunohistochemistry for detection of ME cell can be of immense help especially when it is essential to rule out or confirm invasion. The usefulness will be further recognized in near future when we will come across more and more cases of in situ carcinomas due to patient awareness and routine use of mammographic screening for early detection of breast malignancies.

Keywords: breast cancer, immunohistochemistry, myoepithelial cell.

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RADIOLOGICAL EVALUATION OF FEMALE PELVIC MASSES AND ITS CLINICO-PATHOLOGICAL CORRELATION- A PROSPECTIVE STUDY

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CO-AUTHORS: Dr. Prashant K. Gupta, Dr. Sonal Saran, Dr. Rani Bansal.

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Aim of the study: Evaluation of female pelvic masses by ultrasound, computed tomography and magnetic resolution imaging presented to our department.

Materials and Methods: A total of 52 patients of both sex and different age group, meeting the inclusion criteria, were the part of the present cohort study.

Results: Our cases were in the age group of 15-76 years. In our study, leiomyomas (n=18) was the most common lesion followed by ovarian mucinous cystadenoma (n=5) and ovarian cystadenocarcinoma (n=5) and ovarian Dermoid cyst (n=4). Most common presenting complaint was seen as pain in abdomen noted in 41% patients. Majority of patients found to have symptoms of less than 3 months duration 61% (n=32). 44% (n=23) lesions were uterine in origin, 52% (n=27) lesions had an ovarian origin, and the remaining 4% (n=2) lesions were extrauterine/ovarian in origin.

Conclusion: MRI is highly sensitive adjunctive diagnostic imaging tool for the soft tissue characterization and determination of the site of origin of pelvic masses and CT can be also a good diagnostic tool especially for staging malignant pathologies. Ultrasonography is always the first modality of choice, and most of the time it gives a confirmatory diagnosis, but MRI or CT can be complimentary for indeterminate pelvic masses.

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COMMON HEPATIC ARTERY VARIATIONS: A CADAVERIC STUDY

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Preamble: Common Hepatic Artery, one of the branches of the Coeliac trunk, is prone to variations, thus challenging the Surgeons during operative procedures of the Gastric, Hepatic and Biliary Apparatus.

Aims: The aim of this study was to attempt a study of such variations of the Common Hepatic Artery.

Material and Methods: The Common Hepatic Artery was studied in 20 cadavers; 15 males and 5 females; at Department of Anatomy, Subharti Medical College, Meerut, India, after routine MBBS dissection, as per protocol.

Results: Variation in blood supply to the liver was noted in one female cadaver. Two Hepatic arteries were found to arise from the Celiac Trunk. One coursed to the right and gave the Gastroduodenal Artery and Right Gastric Artery and continued towards the porta hepatis. The other artery after giving the Left Gastric Artery coursed through the lesser omentum away from the common bile duct and was deposited in the fissure for ligamentum venosum and thus into the left lobe, thereby supplying it. The portal vein was found to travel between these two arteries.

Keywords: Common Hepatic Artery, Variations, Coeliac Trunk.

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STUDY OF ANATOMICAL VARIATIONS IN THE DRY ADULT HUMAN MANDIBLE

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Introduction: The surgeons should be aware of various anatomical features & variations in the mandible to avoid the difficulties and complications during their surgical work.

Method: 80 dry adult human mandibles were examined for the number of retromolar foramen & fossae, mandibular notch and sockets for teeth, condylar defects, accessory mandibular foramen.

Results: Retromolar foramen was found in 12 on right sides and 8 on left sides. Retromolar fossae were found bilaterally in 16 mandibles. Condylar defects were observed in 4 mandibles. Accessory mandibular foramen was found in 6 on right & 2 on left sides. The curved length of the mandibular notch ranged from 30- 60 mm with a mean of 41.4 ± 6.75mm on the right side and on the left side ranged from 28 - 54 mm with a mean of 38.6± 3.65 mm. The anteroposterior length of the mandibular ramus ranged from 32 -60mm with a mean of 36.8 ± 4.38 mm on the right side and on the left side ranged from 27- 52 mm with a mean of 39.6 ± 4.64 mm. The mandibular notch was wider and shallow in 3 mandibles. An additional socket of teeth was noted unilaterally in 2 mandibles.

Conclusions: Morphologic variations of the dry adult mandible are clinically important for Surgeons and anesthetists.

Keywords: Retromolar foramina, Condylar defects, Accessory mandibular foramen, Torus mandibularis, Additional incisor teeth.

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INFRACLAVICULAR VARIATIONS OF BRACHIAL PLEXUS- A CADAVERIC STUDY

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Objectives: The objective of the present study was to study anomalies in the infraclavicular part of brachial plexus.

Methods: Total 50 upper extremities (25 adult cadavers) were dissected to observe the variations in the infraclavicular part of the lateral cord of brachial plexus. The variations were observed, and photographed in situ.

Results: In the first specimen, we observed formation of median nerve takes place by three roots out of which two lateral roots coming from lateral cord and one medial root was coming from medial cord of the brachial plexus. In specimen number 2 there was a communication between musculocutaneous nerve and median nerve. In specimen no 3, there was absence of medial root, so the median nerve was formed by continuation of lateral cord. In specimen no 4, the axillary artery was present anterior to the roots of median nerve. In specimen no 5, the musculo-cutaneous nerve originated at much higher level at first part of axillary

artery and pierced corachobrachialis at much lower level than the usual one. In specimen no 6, one tributary of axillary vein was present anterior to the brachial plexus. During the study, we found two cases where medial root and lateral root met at much lower level to form the median nerve than the usual level. Both were present in the left axilla.

Conclusion: These variations should be kept in mind during nerve block or entrapment syndromes or operations on the upper limb.

Keywords: Brachial Plexus, Spinal Nerves, Ventral and Dorsal Divisions, Cords.

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ANALYSIS OF VARIOUS FACTORS AFFECTING INTERNET USAGE FOR STUDY RELATED ACTIVITIES AMONG FIRST YEAR MBBS STUDENTS

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Abstract

Among many usage of internet, e- learning is rapidly becoming popular in medical field. In the face of severe faculty shortages in resource constrained countries, medical schools look to e-learning for improved access to medical education. Most colleges, in India are lacking with self developed e- learning modules, leaving students in the vast ocean of knowledge, unchecked apart from technical issues and various demographic parameters. Data regarding factors which could affects the usage of internet as an e-learning tool among our medical graduates is lacking. The present study is done to understand several of these factors prevailing currently.

This descriptive, questionnaire based cross sectional study was conducted in year 2016 on 144 randomly selected first year MBBS students. Participants were grouped into users and non users of e-learning. Information regarding gender, background, schooling, medium of education before selection, prior knowledge of operating computers, device used for internet access, network technology, operating system, connectivity, search engine, database, problems associated with networking, good points regarding e- learning, reliability of data and preferred mode of learning was sought on given choices. Responses were converted into percentages for statistical comparison.

To date only **7.6%** students preferred internet for learning as compared to **75%** who still are fond of books. Availability of study material has been accepted by only 30.55% students whereas problem like slow speed of internet (61.8%) is a major issue which kills lot of time in surfing. Reliability on data available (10%) and satisfaction (23%) among users also raises doubt on current scenario of e-learning among medicos.

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VARIATION IN FORMATION AND DISTRIBUTION OF MEDIAN NERVE - A CASE REPORT

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ABSTRACT

Variation in origin and distribution of median nerve has been observed bilaterally in a male cadaver aged 55 years, in department of anatomy, IMS, Banaras Hindu University, Varanasi during routine dissection.

The anatomical variations in the formation, course and termination of brachial plexus are well documented and have clinical significance to surgeons, neurologists and anatomists. The present case report describes the unusual origin of median nerve, arising as direct continuation of lateral cord and receiving a small additional branch from medial cord. In the upper part of forearm median nerve divides in to two equally thick branches which go deep to flexor retinaculum. Details will be presented and discussed during presentation.

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ON THE JOB TEACHING- A TOOL FOR PROFESSIONALISM IN MEDICINE

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Jamia Millia Islamia, New Delhi.

"On The Job Teaching" can be an effective tool to inculcate the desired qualities of best clinician, leader, lifelong learner and professionalism in the medical aspirants. On the job clinical teaching (OJT) is real, reveals learning needs , is without much effort from the side of teacher or student and follows the "situational learning principles". To create an "Indian Medical Graduate" (IMG) possessing requisite knowledge, skills, attitudes, values, responsiveness and medical ethics, on the job teaching not only can serve the purpose unconditionally, it helps in ideal faculty development simultaneously. At the time when unfair medical practices are rampant, there is need to reinforce such qualities to prevent malpractice. We, the anatomists, can contribute significantly in foundation year so that the future doctors may function appropriately and effectively as a physician of first contact of the community while being globally relevant.

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RETROESOPHAGEAL RIGHT SUBCLAVIAN ARTERY: A CASE WITH EMBRYOLOGICAL BASIS AND CLINICAL CORRELATION

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2- Professor, Department of Anatomy, G.S. Medical College, Hapur (U.P)

Introduction: Right subclavian artery arises from brachiocephalic artery behind the sternoclavicular joint. It arches laterally across the anterior surface of cervical pleura onto the first rib, posterior to scalenus anterior. It becomes axillary artery at outer border of first rib. The artery is divided into three parts by scalenus anterior muscle, and the second part of artery lies posterior to scalenus anterior.

Case Report: During routine dissection of head & neck region in a 70 year old female cadaver variation in the origin of right subclavian artery was found. The right subclavian artery originated as a direct branch of arch of aorta distal to the origin of left subclavian artery and it was found passing behind esophagus (retroesophageal) and ascending upwards to the right side while the left subclavian artery originated normally from arch of aorta distal to the origin of left common carotid artery.

Conclusion: Anomalous variations in the origin and course of arteries have serious implications in the angiographic and surgical procedures; hence it is of great importance to be aware of such possibilities of variations.

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BILATERAL RENAL ARTERY VARIATIONS: A CASE WITH EMBRYOLOGICAL BASIS AND CLINICAL CORRELATION

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Introduction: Classically, a single renal artery arising from the abdominal aorta supplies the respective kidney on each side. Near the hilum of the kidney each renal artery divides into anterior and posterior divisions, which in turn divide into segmental arteries supplying the different renal segments.

Case Report: During routine dissection for undergraduate teaching in L.N. Medical College Bhopal, we observed an interesting case of bilateral renal artery variations. Right and left renal artery divided much early before reaching to hilum of respective kidney into anterior and posterior division. Anterior division on both the side divided into three segmental branches. From the first segmental branch of anterior division of Right renal artery a superior polar artery originated which showed a vertical trajectory in course to enter the right kidney through its superior pole. On the left side a separate inferior polar artery originated directly from abdominal aorta. Inferior polar artery crossed the anterior division, posterior division and left ureter anteriorly before entering the left kidney through its inferior pole.

Conclusion: Awareness of the above mentioned variations of renal arteries is necessary for adequate surgical management in the exploration and treatment of renal trauma, renal transplantation and urological operations.

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NOVEL APPROACHES TO TEACH ANATOMY IN DISSECTION HALL

Dr Rimpi Gupta, Dr Virendra Budhiraja, Dr Shveta Swami, Dr Swati Bansal, Mrs Neha Gaur, Dr Apoorav Tripathi. Kalpana Chawla Gmc, Karnal.

Anatomy is considered one of the cornerstones of medical curricula. A deep & thorough understanding of human anatomy is the foundation of medical training & safe clinical practice, particularly in the discipline of surgery. Hence, teaching of human anatomy especially in dissection hall requires constant revision and analysis to determine the teaching tools and approaches that best suit the learning process in anatomy. For centuries, cadaveric dissection is considered to be the only method to teach anatomy in dissection hall. With the changing trends in medical curriculum, several studies have explored anatomists and students attitude towards different teaching modalities. Hence, a shift from traditional regional approach towards integrated, system based and multimodal teaching paradigm is the need of the hour. In clinical practice, the human anatomy is encountered through living & surface anatomy on one hand and medical imaging on other. So there is need to add newer methods to teach gross anatomy viz plastinated models, teaching of living anatomy through peer physical examination & life models, medical imaging techniques (Radiological Anatomy) like radiographs , portable ultrasounds, MRI, CT scans etc. To optimize efficient learner time management and maximize future surgical competencies, retention of anatomical knowledge and enhance academic success, abovementioned modalities should be incorporated in addition to traditional cadaveric dissection. Detail of each newer modality will be discussed at the time of presentation.

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ADULT HUMAN TALI CALCANEAL ARTICULAR FACET PATTERNS OF NORTH-WEST UTTAR PRADESH (INDIA) AND ITS CLINICAL IMPLICATION WITH FRACTURE

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Introduction: Aim of the present study is to find out anatomical presence and percentage of incidence of various patterns of calcaneal articular facets in north-west Uttar Pradesh (India). The prior acquaintance with the anatomical set up of talus and its various articulations holds significance not only in delineating the underlying pathology and fracture fixation but also helps in overall treatment of diseases of the talus bone.

Materials and Methods: Forty human tali adult dry were procured from the bone sets of the department of anatomy, forensic medicine and 1 year MBBS students. Tali were examined individually and were observed for the types of calcaneal articular facets. They were classified into groups, their anatomical setup and percentages of incidence were studied.

Results: In the present study, four patterns of calcaneal articular facets of north-west Uttar-Pradesh adult's tali were observed and classified. Their percentages of incidence was type-1 (40%=16), type-2 (30%=12), type- 3 (20%=08), type-4 (10%=04). In our study, a majority of calcaneal articular facets of tali shows the 2-facet configuration (Type-1pattern). These findings were compared with the available literature and we find that different type and different dominance of articular facets of tali for calcaneum were present.

Discussion: The present study has revealed that the various types of facets may be due to racial and individual differences and relation of talus and calcaneum with other tarsal bones. This may also be due to gait somato type of the individual and walking habits in plains/ hilly areas. Bruckner in contrast to view of most researchers, argues that the 2-facet configuration (type-1) is more stable than the others types. Severe fractured talus ends up in disruption of articular congruity and/or loss of talar length, alignment, and rotation. Operative treatment to restore hind foot anatomy and mechanics as well as joint congruity requires a detailed knowledge of talar facets and of the subtalar joint. Even small residual-fracture displacement can result in a significant compromise of subtalar, ankle, or talonavicular joint functions. The prior knowledge of tali calcaneal articular facets may be used to place an inter-fragmentary lag screw down the neck of the talus to avoid the sinus tarsi inferiorly, so that the arterial supply of talus in sinus tarsi may not be compromised.

Keywords: Adult human tali; articulating facets; Fracture talus.

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ABSTRACTS

AWARD SESSION

PROF. O.P. KHANDURI MEMORIAL GOLD MEDAL

HISTOPATHOLOGICAL LESION OF GALL BLADDER MUCOSA ASSOCIATED WITH CHOLELITHIASIS

Dr Vishram Singh, Dr Arvind Yadav, Dr Surendra Pal Sharma, Dr Nidhi Verma

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Aim: To study the mucosal lesions in gall bladder mucosa (inflammation, hyperplasia, metaplasia and carcinoma) associated with cholelithiasis.

Objectives: To find out the important facts asociated with carcinoma of gallbladder and compare and correlate the study findings with similar studies done in the past in different part of india. There is paucity of such study in the available literature, hence the present study was undertaken to evaluate the incidence in the population of Western Uttar Pradesh.

Material and method: It is a cross-sectional hospital based study done in santosh Medical College and Hospital Ghaziabad. The duration of this study is 2 years extending from January 2014 to January 2016. In total 131 open cholesistectomy specimens with complete gallstones. We included male and female patients of all the age group. Patient of cholelithiasis diagnosed by radiology & recommended for cholecystectomy formed the study population. Autolysed cholecystectomy specimen & cholecystectomy specimen without gallstone were excluded from this study.

Result: On the basis of microscopic finding maximum number of specimens had chronic cholecystitis 97.7 %, followed by rokitansky ascoff sinuses 22.9%, muscular hyperplasia 15.3%, epithelial hyperplasia 8.4%, fibrosis & ulceration 3.8%, carcinoma 3.1%, antral metaplasia 2.3%, xanthogranulomatous cholecystitis 2.3% , eosinophilic cholecystitis and intestinal metaplasia each present with 0.8% . In our study carcinoma is always present 100% with pigment type stone with complete lost of mucosal rugosity.

Conclusion: Carcinoma of gallbladder was found in (3.05%) cases which is higher ever reported in india. With the advancement of investigational procedures, more cases related to gallbladder pathologies have come to light, thus making it very much relevant to pursue a research in this field. Moreover this study will bring forth to light the knowledge which will be advantageous to the population, dieticians as well as medical practitioners.

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STATUS OF ANTIOXIDANTS MOLECULES AND LIPID PEROXIDATION IN THE DIABETIC TESTES

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ABSTRACT

According to the epidemiological studies, diabetes mellitus has become a potential cause of male infertility. Knowledge regarding how diabetes mellitus interferes with the process of spermatogenesis and results in infertility needs the molecular study

in the testis in diabetic condition. Enhanced oxidative stress and changes in antioxidant capacity are considered to play an important role in the pathogenesis of chronic diabetes mellitus. So, this study is established to investigate the activity of enzymatic antioxidants and oxidative stress in the testis of diabetic model rats. Diabetes mellitus was induced in the rat by intraperitoneal injection of Streptozotocin. The rats were sacrificed and the dissection was done to take out the testis. The testes were processed for the activity of enzymatic antioxidants. It was found that oxidative stress was increased in the testes of diabetic rats. The sperms were also affected by the chronic hyperglycemia.

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STUDY OF ANOGENITAL INDEX AND 2:4 DIGIT RATIO IN HUMAN FETUSES: AN ANTHROPOMETRIC STUDY FROM NORTHERN INDIA

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Background: Anogenital index (AGI) and 2:4 digit ratio (2D:4D) are sexually dimorphic and found to be markers of androgen and androgen receptor (AR) status. Studies in adults and children have shown both AGI and 2D:4D to be the predictor of external genitalia development, there abnormalities and adult reproductive disorder like infertility. However anthropometric study measuring the two indices in the fetuses, their association with CRL and which marker can act as sexually dimorphic marker was not found.

Aims and Objective: To measure AGD, AGI and 2D:4D in apparently normal fetus, there correlation with CRL and to find out which one can act as better sexually dimorphic marker in fetuses.

Methods: AGI was measured in a total of 72 fetus ranging from 6 cm to 37 cm of CRL. AGI is calculated by dividing AGD with weight (mm/kg). The length of second and fourth digit is measured by fingers in full extension of right and left hand and ratio is obtained. The difference if any between the male and female AGD, AGI, 2D:4D ratio of left and right hand were observed. The Pearson correlation® and p value of AGI and 2D:4D with CRL were calculated to prove statistical association.

Results: The mean AGI in fetuses was 22. The mean AGI in male and female fetuses was 28 and 15 respectively. AGI was more in male fetus in comparison to female fetuses. The ratio of mean male to female AGI was 1.86. The AGI showed linear decrease with increase in CRL in both male and female fetuses. The mean 2D:4D ratios in male and female fetuses were .92 and .93 for left hand respectively. The mean 2D:4D ratios in male and female fetuses were .92 and .98 for right hand respectively. The male to female ratio of 2D:4D for left hand and right hand was 0.99 and 0.94 respectively. The Pearson correlation® and p value showed significant correlation between AGD and CRL in both male and female fetuses while only in female fetuses the 2D:4D ratio of both hand showed significant correlation.

Conclusion: Androgens exposure early in fetal life determines genital development, various congenital anomalies and reproductive disorders. Indirect markers showing sexual dimorphism are essential to observe effect of androgen. This anthropometric study found that AGD and AGI showed statistically significant association with CRL and can act as reliable marker of sexual dimorphism, while 2D:4D ratio cannot be used as sexually dimorphic marker in fetuses.

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DR. VERSHA KATIRA GOLD MEDAL

MUTATIONAL ANALYSIS OF MYBPC3 GENE IN DILATED CARDIOMYOPATHY PATIENTS IN NORTH INDIAN POPULATION

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Keywords: Dilated Cardiomyopathy, Myosin Binding Protein C, sequencing, DNA. Funding Agency: Indian Council of Medical Research, New Delhi.

Introduction: Disorders of the heart leading to heart failure are leading causes of morbidity and mortality. Since the term "cardiomyopathy" was coined 30 years ago to describe a group of myocardial diseases of unknown cause, which was termed as idiopathic cardiomyopathy.[1]

Out of all types of cardiomyopathies, dilated cardiomyopathy (DCM) and hypertrophic cardiomyopathy (HCM) (Fig. 1) are the two major cardiomyopathies. Other clinical cardiomyopathies include restrictive cardiomyopathy, and arrhythmogenic right ventricular cardiomyopathy. [2]

DCM is defined by the presence of: a) fractional shortening (FS) less than 25% (> 2SD) and/or ejection fraction less than 45% (> 2SD); and b) left ventricular end diastolic diameter (LVEDD) greater than 117% (>2SD of the predicted value of 112% corrected for age and body surface area, BSA)[3] excluding any known cause of myocardial disease. In the context of a familial DCM, these criteria are used to diagnose the proband in a family.

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VARIATIONS IN RELATION OF FACIAL NERVE WITH RETROMANDIBULAR VEIN

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Aim:-The facial nerve is the motor nerve of the face, its location and anatomical relationship with the surrounding tissues in the parotid gland, especially the retromandibular vein (RV), are of great importance. Aim of this study was to give a precise description of the anatomic variations of the relations of the facial nerve with the Retromandibular Vein.

Materials & Methods:-30 Cervicofacial halves of adult embalmed cadavers (17 males & 13 females) were dissected. The RV, the facial nerve trunk and its branches have been dissected and described. The relations of the facial nerve with the RMV have been noted in each case.

Results:-Facial nerve was found to be superficial to Retromandibular Vein in 83.33% cases, Temporofacial and Cervicofacial divisions were found deep to vein in 3.33% cases & 6.66% cases respectively. No case was found in which both divisions (TF & CF) lied deep to vein. Only cervical branch of Cervicofacial division was found deep to vein in 6.66% cases.

Conclusion:-The facial nerve is an important nerve that controls different functions. Its relationship to the retromandibular vein and parotid tumours should be pre-operatively estimated to avoid nerve injury or bleeding that may result from a different unknown nerve-vein relationship.

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