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Case Report

CORONA MORTIS –A CASE REPORT

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Abstract : "Corona mortis" means "crown of death". During routine dissection of an82-year-old male cadaver with no medical history, we observed an abnormal obturator artery arising from the inferior epigastric artery. The obturator artery is usually described as a branch of the anterior division of the internal iliac, although this variant has been reported only in 25% of cases.It is considered aberrant when it originates from the inferior epigastric artery and is closely related to Gimbernat's ligament. The aberrant obturatorartery crosses medial to, lateral to, or directly over the femoral ring and over Cooper's ligament. Infrequently, both an aberrant and a normal obturator artery are present, with rich anastomoses at the obturator canal. Such a vascular arrangement is also called the "circle of death" because of the profuse bleeding that can occur when either vessel is severed.

Key words : Obturator vessels, inferior epigastric artery,anatomical variation,complications

Introduction : There are many variations in theorigin and course of the internal iliac artery. An accessory obturator artery is sometimes present in addition to the normal one. When both the normal obturator artery, a branch of theanterior division of theinternal iliac, and an accessory obturator artery arising fromthe inferior epigastric artery, a branch of external iliac, are present with rich anastomoses at the obturator canal, the arrangement is known as the "corona mortis" or "crown of death"or "circle of death"[1,2,3,] as injury here would lead to injury of both theexternal and internal iliac systems of vessels. This variant is important for surgeons who are operating for direct,indirect, femoral,and obturator hernias,and for orthopedic surgeons who are planning an anterior approach to the acetabulumsuch as theilioinguinal or intrapelvicapproach,in order to avoid massive hemorrhage.

Case Report : During routine dissection of an 82-year-oldmale cadaver with no known medical history at PGIMER, Chandigarh, we observed an abnormal obturator artery arising from theinferior epigastric. The peritoneum was dissected from thebladder andlateral pelvic wall. The common iliac artery was cleared and its divisions, the external and internal iliac, were traced and all thebranches were identified. The origin of the obturator artery was followed to the obturator foramen,where we encountered an accessory artery entering the foramen. Thisaccessory artery was traced proximally and was identified as a branch of theinferior epigastricartery, which is a branch of theexternal iliac.

On dissection, the diameter and length of theaccessory obturator artery was found to be less than that of the normal one. The distance of theaccessory obturatorartery from theupper border of thepubic symphysis at the level of thearcuate line was 6.1 cm,and from the point at which the vessel emerged and entered the obturator foramen the distance was 6.3 cm.

The accessory obturator artery was a continuation of thepubic branch of theinferior epigastric artery. It lay onthe lateral wall of thefemoral ring, then crossed Cooper's ligament andthen thearcuate line of

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theilium, and entered the obturator foramen. Just before it entered the foramen it was crossed by the normal obturator artery. These vessels then anastomosed and passed through the foramen as a separate vessel (Figure 1).An accessory obturatorvein

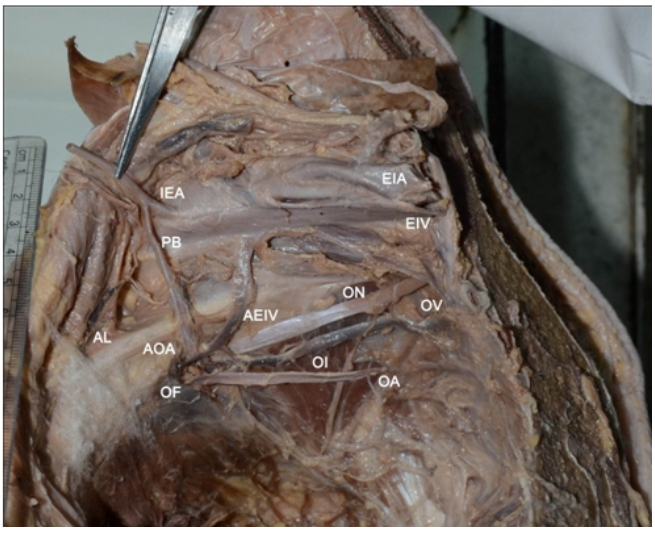

Fig 1:Dissection of accessory obturator vessels on the right half of the pelvis showing the IEA(inferior epigastric artery), EIA(external iliac artery),PB(pubic branch),AL(Arcuate line),AOV(Accessory obturator vein), AOA(Accessory obturator artery),OF(Obturator foramen),ON(Obturator nerve),OV(obturator vein), and EIV(external iliac vein).

arose from theexternal iliac vein and entered the obturator foramen with the accessory obturator artery.

Discussion : Bergman et al.4 documented that the obturator arteryarises from the common iliac in 41.4% of cases, the inferior epigastric in 25%, the superior gluteal in 10%, the inferior gluteal/internal pudendal trunk in 10%, the inferior gluteal in 4.7%, and the internal pudendal in 3.8%. In our case the aberrantobturator artery arose from the inferior epigastric artery, a branch of external iliac; the normal obturator artery is a branch of theanterior division of theinternal iliac. If both vessels are present,as in our case, it is important forsurgeons to be aware of the risk of injury to this variant in orderto avoid massive hemorrhage.

The currently-acceptedembryological explanations for anomalies in the arterial patterns of the limbs are based on an unusual selection of channels from a primary capillary plexus. Normally, the most appropriate channels enlarge while others retract and disappear, thereby establishing the final arterial pattern classified as “normal”.The obturator artery arises comparatively late in development from a plexus, which in turn is joined by the axial artery of thelower limb, which accompanies the sciatic nerve. In our case, thepersistence of vascular channels related to the external iliac artery could have given rise to the obturator artery, whilethe vascular channels related to the anterior division of the internal iliac artery destined for the obturator artery were obliterated. The dual origin of the obturator artery could be ascribed to the two source channels for blood flow, one from the internal iliac and the other from the inferior epigastric artery[5,6].

In hernia repair, to anchor meshes securely in place, surgeons take tissues that are exposed at laproscopic surgery. The iliopubic tract, Cooper’s ligament and the region around the anterior superior iliac spine are the main anchoring sites for prostheses. Cooper’s ligament is often the initial point of mesh fixation in TAPP(Transabdominalpreperitoneal) repair of hernia. It has been noted that the pubic branch of the inferior epigastric artery crosses this structure and anastomoses with the pubic branch of the obturator artery.Dissection in this area canbe complicated by an aberrant anatomy. Alarge pubic branch canreplace the obturator artery and cause massive bleeding that mightforce conversion to open surgery. In femoral hernia repair the accessory obturatorcan be injured when a surgeon looks to enlarge the femoral ring by opening the lacunar ligament.If the aberrant obturator artery is accessory to the normal obturatorthen injury can lead to external as well as internal pelvic bleeding as the two obturator arteries anastomose[7].

During ligation of the internal iliac arteries and their branches, in women undergoing pelvic surgeryand in cases of obstruction of the internal iliac artery irrespective of cause,there will be massive bleedingif anaberrant accessory artery is present[8].

The ilioinguinal approach is appropriate for all fractures including the anterior wall, anterior column, and anterior column with posterior hemitransverse extension. The vessels that form the corona mortis canbe disrupted as a result of superior pubic ramus

fracture and during the ilioinguinal approach for acetabulum fractures. The surgeon should exercise caution but not alter the approach for fear of excessive hemorrhage. If corona mortis presents, it should be ligated to prevent bleeding, which is difficult to control if it retracts into the pelvis..Inpelvic fracture cases, massive extraperitoneal hemorrhage canarise because of the corona mortis. Therefore,endovascular specialists managing pelvic injury should keep corona mortis in mind as a potential source of prolonged and dangerous hemorrhage[9,10]

When it is present, the aberrant accessory obturator artery is important. If the patient develops an infarct or embolism in the normal obturator artery and its branches then the aberrant accessory artery and its branches will be spared, especially the branch to the head of femur when the obturator artery arises from the external iliac artery[8].

Awareness of this variation should make surgeons cautious in their approach for fear of excessive hemorrhage. Tracing along the aberrant vessel can easily identify the obturator foramen, an anatomical landmark that indicates adequate inferior dissection of the preperitoneal space. The need to map these vessels is becoming more crucial as surgeons choose various approaches to the space of Bogros and insert a synthetic mesh that requires anchoring during herniorrhaphies[11,12].

Anatomical knowledge of the corona mortis is of great clinical significance forsurgeons,gynecologists and orthopedic surgeons who are planning an anterior approach to the acetabulum,such as the ilioinguinal or the intrapelvic approach, to avoid undue hemorrhage.

No conflict of interest

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