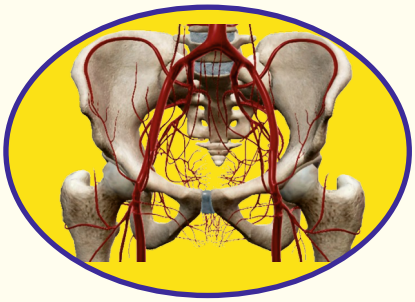
SUMMARY & CONCLUSION



CHAPTER 7

SUMMARY & CONCLUSION

The present study was conducted on 50 adult human pelvic halves from 25 embalmed cadavers belonging to the Indian population of Gujarat region.
The internal iliac arteries were exposed and traced from its origin to termination by dissecting the whole pelvic region.

The vertebral level of origin of the internal iliac artery was found varying from level of intervertebral disc of L4 & L5 to S1 level. The origin level of the internal iliac arteries determines both their path and direction, and especially their length, being particularly important when practicing a ligature on the artery. Bilateral asymmetry was also observed in vertebral level of origin of internal iliac artery.

The site of origin of internal iliac artery was also determined by the measuring the horizontal distance from the origin of the internal iliac artery to the mid-sagittal plane which varies from 23.65 mm to 43.26 mm with average of 33.42 $\pm$4.83 mm.

The morphometry of internal iliac artery was studied, measurements of length & diameter was done, length of the internal iliac artery was found varying extremely: shortest being 11.21 mm and longest being 66.37 mm with average value of 38.16 $\pm$11.22 mm and diameter varies from 3.63mm to 8.45mm, with mean 6.83 $\pm$1.24 mm. The diameter and length of the internal iliac artery can predict the outcomes of endovascular procedures.
The application of a ligature to artery may be needed in cases of aneurysms or hemorrhage affecting one of its branches, which significantly related to length of internal iliac artery. If the vessel is short, as found in our study (Figure 5.3), then it is deeply seated in the pelvis. On the contrary, if artery is longer it is found partly above the cavity. If artery is short, it would be preferable to apply a ligature to the common iliac or upon EIA and IIA at their origin (H. Gray, 1901)

The present study highlighted the variation seen in the level of termination; in 72% (36) specimens the division of internal iliac artery took place above the Greater Sciatic Foramen in our study, 2 cases (4%) were found in which level of division took place below the upper border of greater sciatic foramen & 24% (12) cases were found terminating at the level of superior border of greater sciatic foramen.

The relation of the internal iliac artery with the sacroiliac joint was observed as being either medial, anterior or lateral. The immediate relation of the internal iliac artery and its branches with the sacroiliac joint make it susceptible to injury during trauma like pelvic fractures etc. or in surgical procedures leading to iatrogenic injury of the joint. Surgeons operating on the pelvis and sacrum should be acquainted with these distinctive relations of the artery with the sacroiliac joint.

Close proximity of sciatic nerve with the internal iliac artery and its branches was always kept in mind as aneurysm of the internal iliac artery may lead to sciatic pain (Soimakallio and Oksala 1982) as a result of compression of the nerve roots by the aneurysm itself (Clarke and McCollum 1983).

The inferior gluteal artery a branch of internal iliac artery could be used as a landmark for the sciatic nerve identification in ultrasound (Reus et al 2008).

For a successful ligation of the internal iliac artery, the operating surgeon should be aware of the level of origin, the level of division of the artery; unilateral or bilateral ligation of the internal iliac artery can be lifesaving in patients with massive postpartum hemorrhage, after vaginal and abdominal hysterectomy. In massive broad ligament hematoma, cervical carcinoma, and retroperitoneal bleeding after pelvic fractures, bilateral IIA ligation was done.

In the present study, termination of the internal iliac artery by bifurcating into the anterior and posterior division was the most frequent finding (80%). Other patterns such as trifurcation of two different types & multiple ramification of internal iliac artery were

also observed in the rest cases (20%). The occurrence of such patterns could be explained by differential patterning during embryological development. The variant patterns can influence vascular interventions done to control bleeding in intractable pelvic hemorrhage and also provide rough estimates for the planning of procedures such as selective anterior division ligation or embolization of branches of the artery. Such procedures are useful in controlling intractable pelvic organ hemorrhage, especially in cases where maintenance of blood flow to the limbs by the posterior division is desired.

Hence surgeons attempting to ligate the anterior division of the internal iliac artery selectively should be aware of these variant branching patterns.

The most common type of branching pattern in the present study according to classification by Adachi was Type Ia. The order of incidence of types in Indian population in the present study was I > III > II >V as against the most other studies.

Type V pattern was found in 2% of specimens which was very rare & in other studies.

The branches arising from anterior and posterior trunks vary considerably in our study Understanding its anatomy is very essential to minimize intraoperative blood loss and other complications. Thus origin of individual branches of internal iliac artery was also studied in detail & a wide range of variation was observed.

Among the variable source of origin of obturator artery there was an increased incidence percentage of the artery arising from inferior epigastric artery.

Origin of obturator artery in combination with iliolumbar artery is a rare type of origin reported in the present study. During surgical repair of hernia and fracture of superior ramus of pubis, the obturator artery may be injured due to anomalous origin from the external iliac artery which might lead to profuse bleeding.

Surgeons must be conscious of unexpected sources of hemorrhage, such as an aberrant obturator artery or vein, and unexpected ilio-pubic vessels and take appropriate precautions to avoid injury to these structures.

The Inferior gluteal artery is susceptible to blunt trauma when traversing the lower part of the greater sciatic foramen.

Variant origin of superior vesical artery should kept in mind because laceration of the artery may lead to pelvic haemorrhage (retroperitoneal) or hematoma as a postoperative complication which was first described by Araco et al (2008)

A higher origin of the iliolumbar artery from trunk was found in our study corresponds to a more transverse course of it. Surgical interventions in the lumbar, sacral, and pelvic regions must take into account the variable origins of the ILA from the iliac system that can modify the expected topographical relations and may lead to undesired hemorrhagic accidents.

Our study concludes that the internal iliac arteries show considerable variation in its morphology and morphometry. Unique termination via trifurcation and ramification may be present. These variations of the internal iliac artery could have resulted from genetic, structural or mechanical causes. The clinical implications of these findings are manifold especially in the context of diagnostic and interventional radiology and pelvic surgery. Surgeons and interventional radiologists performing procedures on the internal iliac artery, or its branches, or related structures should be mindful of these variations.

Our study reveals the variations in internal iliac artery anatomy as against the standard depiction of the artery.