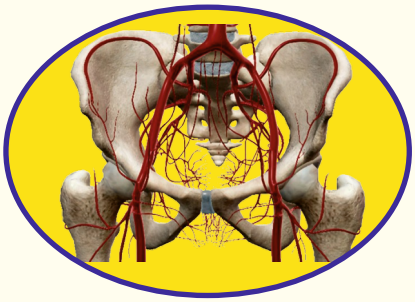
MATERIALS & METHOD



CHAPTER

4

MATERIALS & METHOD

4.1. DATA COLLECTION PROCEDURE:

4.1.1 STUDY DESIGN

This study was as a descriptive cross-sectional analysis conducted at the Department of Anatomy.

4.1.2 STUDY MATERIAL

Donated dead bodies to the Department of Anatomy of medical college Baroda, Gujarat were used as study material.

4.1.3 INCLUSION CRITERIA

All embalmed cadavers at the Department of Anatomy of Medical College Baroda available during the period of study. All the specimens included in the study were free of any surgical scar or visible external abnormalities in their pelvic & gluteal region and having a well- preserved vascular pattern.

4.1.4 EXCLUSION CRITERIA

Any cadavers with previously operated in pelvic region which may prevent the morphometric analysis were excluded from the study.

Damaged bodies during embalming, storage or dissection not having a well- preserved vascular pattern in the pelvic region were also excluded.

4.1.5 SAMPLE SIZE

After fulfilling the inclusion and exclusion criteria total 50 samples were procured. The study was performed on 50 adult human pelvic halves from 25 embalmed cadavers belonging to the Indian population of Gujarat region. The specimens included were

twenty two male pelvic halves (11 right and 11 left sides) and twenty eight female pelvic halves (14 right and 14 left sides).

4.1.6 ETHICAL APPROVAL

The present study was conducted after seeking the permission from the Institutional Ethics Committee for Human Research (IECHR) of Medical College & SSG Hospital, Baroda. EC Reg No: ECR/85/Inst/GJ/2013/RR-16 dated 24/08/2017.

4.2 DATA COLLECTION METHODOLOGY:-

4.2.1 MATERIALS

Instruments used during the study for dissection & data collection procedures are Forceps (Plain), Forceps (toothed), pointed forceps, Scalpel, Scissors straight & curved, Metallic Scale, Digital Vernier caliper, Digital camera.

Figure 4.1: Instruments used during the study for dissection

4.2.2 METHODS

- A horizontal incision through the abdomen at the fourth lumbar vertebral level was made. The whole pelvic was dissected to expose the common iliac arteries. After evisceration the Common Iliac artery (CIA) was traced down to their point of bifurcation into the external & internal iliac arteries. The external iliac artery (EIA) extending in line with CIA towards the inguinal ligament and internal iliac artery (IIA) directed towards the pelvic cavity.
- Then, the peritoneum was removed from the bladder, uterus (in female), rectum and the lateral pelvic wall from each side of the pelvis.
- The vertebral level of bifurcation of CIA into EIA and IIA was noted, as the level of origin of the internal iliac artery.

Figure 4.2: Left pelvic half shows vertebral level of bifurcation of Common iliac artery (CIA) into External iliac artery (EIA) & internal iliac artery (IIA) which corresponds with origin of internal iliac artery.

- The horizontal distance from the point of origin of internal iliac artery to the midsagittal plane of the pelvis was recorded.
- Midsagittal plane was represented by the line connecting the middle of the pubic symphysis with the middle of the lumbosacral promontorium (Fatu C et al., 2006).

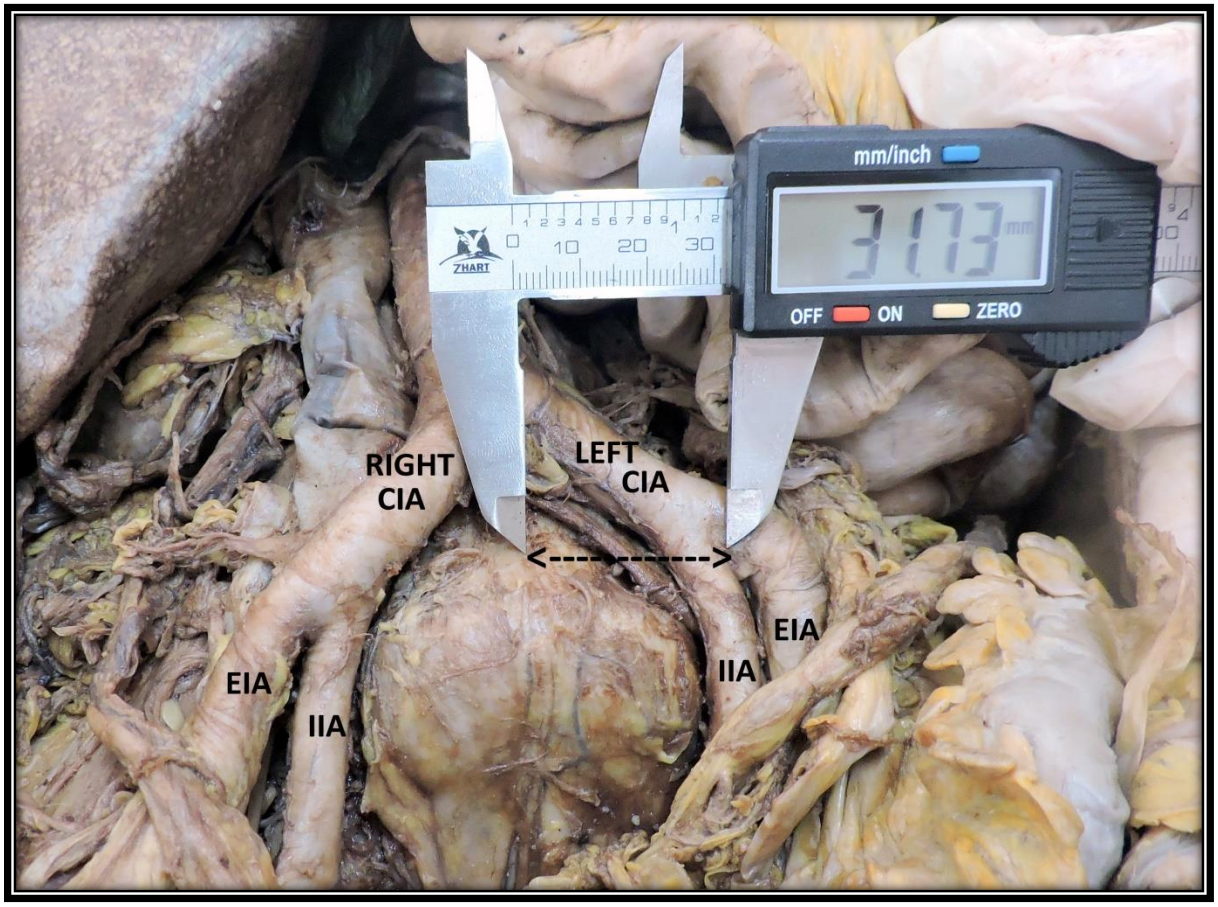


Figure 4.3: Distance from the origin of left internal iliac artery i.e. bifurcation of left common iliac artery (CIA) into left external iliac artery (EIA) & left internal iliac artery (IIA) to the midsagittal plane.

- Careful dissection was done to trace the internal iliac artery to its point of terminal branching into anterior and posterior divisions or branches.
- The relation of the internal iliac artery with the sacroiliac joint was observed as either being medial, anterior or lateral. The other relations of the artery with the surrounding structures mainly ureter and the internal iliac veins were also noticed.

- The length of the artery was measured from the point of origin at the bifurcation of the common iliac artery till the terminal branching point of internal iliac artery where it divides into anterior and posterior divisions. (Figure 4.4)
- In cases where the internal iliac artery divides into various branches instead of two divisions, the termination was considered at the point where the superior gluteal artery arises, according to Adachi classification.

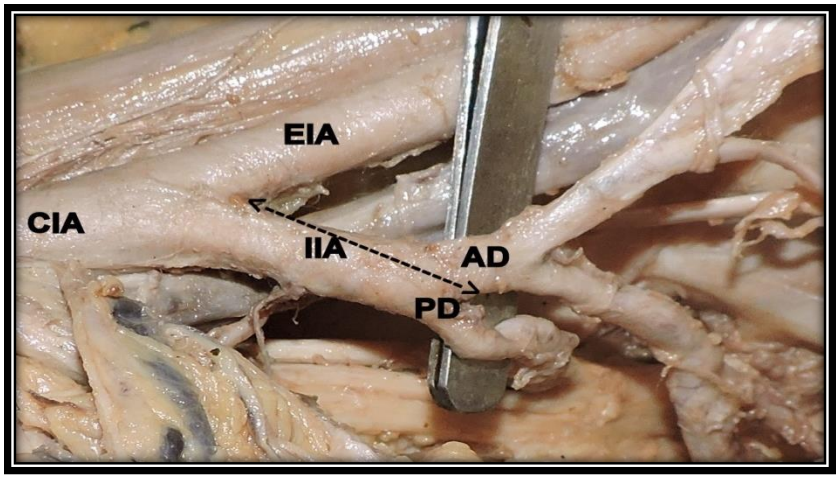


Figure 4.4: Length of the left internal iliac artery (IIA) was measured from its point of origin to its point of termination into Anterior Division (AD) & Posterior Division (PD). CIA: Common iliac artery; EIA: External iliac artery;

Figure 4.5: Measurement of length of the left internal iliac artery (IIA); CIA: Common iliac artery; EIA: External iliac artery;

- External diameter of the artery was measured at the middle segment between the origin and termination of the artery (Fatu C et al., 2006).

Figure 4.6: Measurement of external diameter of the right internal iliac artery

- The mode of termination of internal iliac artery was identified and noted. It usually terminates by bifurcating into anterior and posterior division but sometimes other patterns of termination like trifurcation or ramification into multiple branches were also seen.
- The occasional branches that are arising from the common trunk before division into anterior and posterior division were dissected, traced & noted.

- The level of termination of internal iliac artery was determined by measuring the distance from the superior margin of the greater sciatic foramen to the point of division of artery into anterior and posterior trunk or branches (Havaldar PP et al., 2014).

Figure 4.7 shows the measurements of distance from point of division of internal iliac artery to upper border of Greater Sciatic Foramen (GSF) in left pelvic half. EIA: External iliac artery; IIA: internal iliac artery; AD: Anterior Division; PD: Posterior Division.

- All measurements were made using a well-calibrated digital Vernier caliper and documented.
- For accuracy measurements was taken twice and then the average of both values were considered.
- The individual branches (parietal, visceral) arising from the anterior and posterior divisions was dissected, parietal branch were traced up to their exit from the pelvic cavity and visceral branch were traced till they reach their destination organ.

- The large-caliber parietal branches of the artery, i.e., the superior gluteal artery, inferior gluteal artery, and pudendal artery were identified.
- The branching pattern of internal iliac artery was identified and classified according to Adachi's classification into 5 types in which Type I, Type II & Type IV were further sub divided into two type a & b :

Type I: The superior gluteal artery arises independently from the internal iliac artery whereas the inferior gluteal and internal pudendal vessels arise from a common trunk into two forms above and below the pelvic floor which are Type Ia and Type lb. respectively.

Type II: The superior and inferior gluteal arteries arise from a common trunk whereas the internal pudendal artery arose independently. The gluteal common trunk divides into two forms above and below pelvic floor which are Type IIa and Type IIb respectively.

Type III: The superior and inferior gluteal arteries and the internal pudendal artery arise from the internal iliac artery independently.

Type IV: The superior and inferior gluteal arteries and the internal pudendal artery arise from a common trunk of the internal iliac artery. The subtyping in this group is based on the sites of origin of the superior gluteal and the internal pudendal arteries from the parent stem. In Type IVa the trunk first gives rise to the superior gluteal artery before bifurcating into the other two branches; in Type IVb the internal pudendal is the first vessel to spring from the common trunk, which then divides into superior and inferior gluteal arteries.

Type V: The internal iliac artery trunk gives the internal pudendal and superior gluteal arteries from a common trunk whereas the inferior gluteal has a separate origin
(Adachi B, 1928).

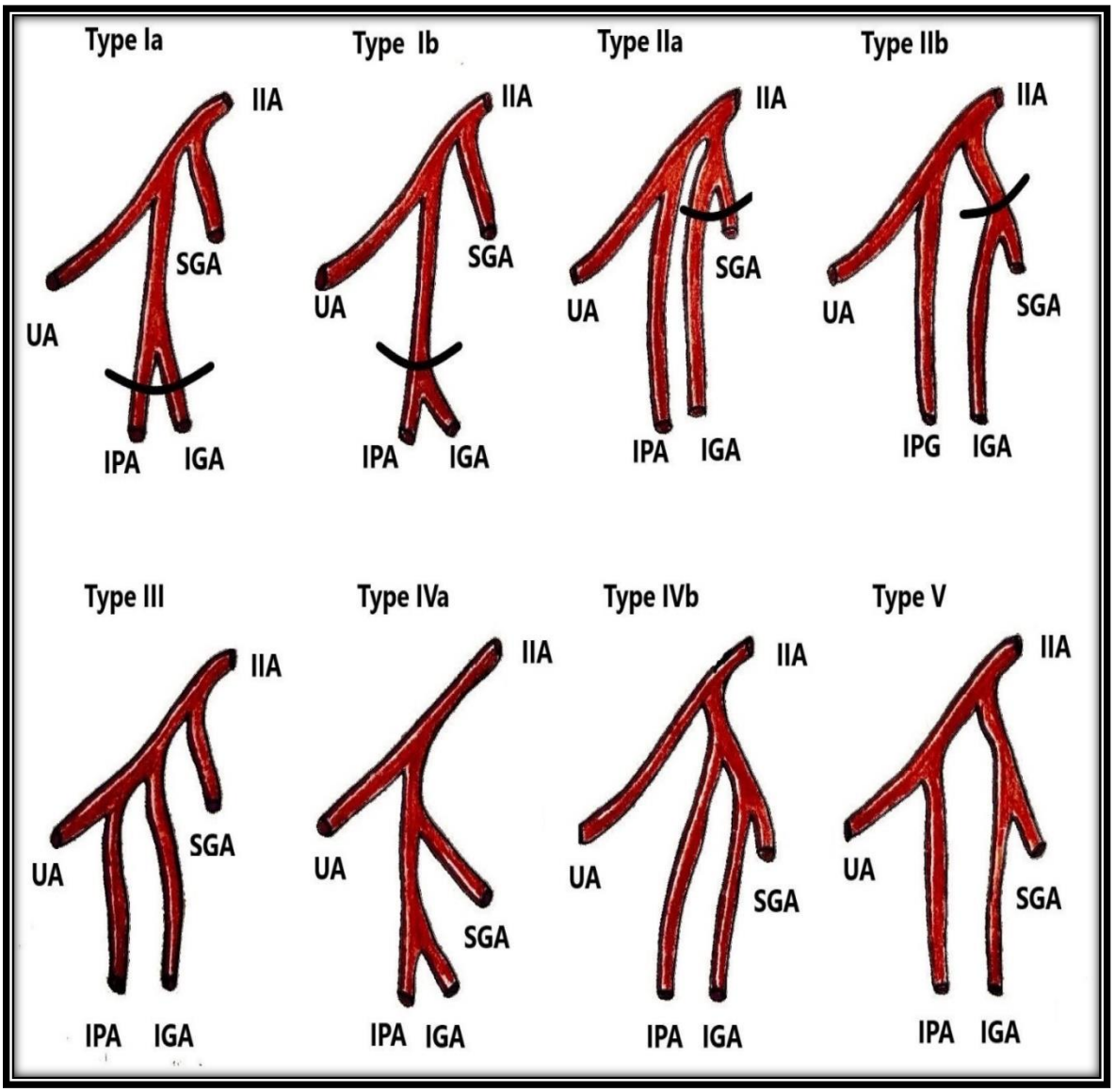


Figure 4.8: Adachi's Classification IIA- internal iliac artery; IGA- Inferior gluteal artery; IPA- Internal pudendal artery; SGA- Superior gluteal artery; UA - Umbilical artery

- Origin of individual branches of internal iliac artery like obturator artery, superior vesical artery, iliolumbar artery, inferior gluteal artery, internal pudendal artery & middle rectal artery were identified & recorded.
- Relevant photographs of the dissected specimen were taken using a 16-megapixel digital camera for record.
- A pattern of variation that have occurred at the level of origin and division of the main trunk, anomalous branches that have aroused from both anterior and posterior divisions, any absence of definitive branches from the anterior and posterior division was noted.

4.3 DATA ANALYSIS: -

- The parameter was measured by using digital Vernier caliper in millimeters (mm) & relevant photographs of the dissected specimen were taken using a 16-megapixel digital camera.
- The data obtained was recorded in a standardized data collection sheet.
- Data was exported to Microsoft Excel (Version 2021), descriptive statistics was used to determine the frequencies of the nominal variables and range, mean, standard deviation of the numerical data.