

MORPHOLOGICAL STUDY OF OBTURATOR ARTERY

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ABSTRACT

Background: The obturator artery normally arises from the anterior trunk of internal iliac artery. High frequency of variations in its origin and course has drawn attention of pelvic surgeons, anatomists and radiologists. Normally, artery inclines anteroinferiorly on the lateral pelvic wall to the upper part of obturator foramen. The obturator artery may origin individually or with the iliolumbar or the superior gluteal branch of the posterior division of the internal iliac artery. However, the literature contains many articles that report variable origins. Interesting variations in the origin and course of the principal arteries have long attracted the attention of anatomists and surgeons.

Methods: 50 adult human pelvic halves were procured from embalmed cadavers of J.J.M. Medical College and S.S.I.M.S & R.C, Davangere, Karnataka, India for the study.

Results: The obturator artery presents considerable variation in its origin. It took origin most frequently from the anterior division of internal iliac artery in 36 specimens (72%). Out of which, directly from anterior division in 20 specimens (40%), with ilio-lumbar artery in 5 specimens (10%), with inferior gluteal artery in 3 specimens (6%), with inferior vesical artery in 2 specimens (4%), with middle rectal artery in 1 specimen (2%), with internal pudendal artery in 4 specimens (8%) and with uterine artery in 1 specimen (2%). The obturator artery took origin from the posterior division of internal iliac artery in 9 specimens (18%), from external iliac artery in 1 specimen (2%), from inferior epigastric artery in 3 specimens (6%) and was found to be absent in 1 specimen (2%).

KEYWORDS: Internal iliac artery, Obturator artery, Variations.

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INTRODUCTION

Arteries are essentially conducting channels through which blood is conveyed from the heart to the capillary bed. The blood vascular tree has at all times been a particularly interesting phase of anatomical study. Its influence on the development of the individual, its practical importance in medicine and the necessity for the surgeon to thoroughly orient himself with it, gives additional stimuli to further our knowledge concerning it. In general, arteries pursue the shortest and the most direct

course in order to reach their objective and that this course is partly determined by mechanical convenience. The angle at which branches leave a main arterial stem certainly depends to a considerable extent on haemodynamic factors[1,2].

The obturator artery runs anteroinferiorly from the anterior trunk on the lateral pelvic wall to the upper part of the obturator foramen. It leaves the pelvis via the obturator canal and divides into anterior and posterior branches.

In the pelvis, it is related laterally to the fascia over obturator internus and is crossed on its medial aspect by the ureter and in the male, by the vas deferens. In the nulliparous female, the ovary lies medial to it. The obturator nerve is above the artery, the obturator vein below it. In the pelvis, the obturator artery provides iliac branches to the iliac fossa which supply the bone and iliacus and anastomose with the iliolumbar artery. A vesical branch runs medially to the bladder and sometimes replaces the inferior vesical branch of the internal iliac artery. A pubic branch usually arises just before the obturator artery leaves the pelvis and ascends over the pubis to anastomose with the contralateral artery and the pubic branch of the inferior epigastric artery. The obturator artery is more variable and arises as a direct branch from the anterior division of internal iliac artery in 41.4% of instances, from the inferior epigastric artery in 19.5%, from the superior gluteal artery in 10%, from the inferior gluteal-internal pudendal trunk in 10% and by a double origin in 6.4%. In only 23% of instances is a similar origin noted on both sides[3]. Probably no artery in the human body of proportionate size has so voluminous a literature as the obturator artery. It has been the subject of repeated anatomical research. The obturator artery gives off a small branch to the periosteum on the back of the pubic bone, which anastomoses with the pubic branch of the inferior epigastric artery. In over a third of cases this anastomotic connection opens up and no obturator artery arises from the internal iliac artery. Such replacement by the branch from the inferior epigastric artery is named the "abnormal obturator artery". Obturator artery variable in origin. It may arise from the common iliac, anterior division of the internal iliac (41.4%), inferior epigastric (25%) based on observations in 4044 bodies), superior gluteal (10%), inferior gluteal-internal pudendal trunk (10%), inferior gluteal (4.7%), internal pudendal (3.8%) or external iliac (1.1%). The obturator has also been found arising from the femoral artery adjacent to its profunda branch. In only 23% of cases is a similar origin found on both sides of the body. Origination of the obturator artery directly from the external iliac artery was reported at 1.1% by Bergman et al, 25% by Missankov et al, 1.3% by

Jakubowicz and Czerniawska-Grzesinska. The same author studied the variability in origin and topography of the inferior epigastric and obturator arteries and found that in 4% of cases there was a common trunk for inferior epigastric and obturator arteries. Additionally, they described that obturator artery originated from the inferior epigastric artery in 2.6% of their cases and from the external iliac artery in 1.3% of their cases[4].

Missankov et al, studied the variations of the arterial and venous pubic anastomoses and found that forty-four percent of the arterial pubic anastomoses were replaced by an obturator artery arising from the inferior epigastric and 25% by an obturator artery arising from the external iliac artery[5].

MATERIALS AND METHODS

50 formalin fixed adult human pelvic halves were procured from the Department of Anatomy, J.J.M. Medical College and S.S.Institute of Medical Sciences and Research Centre, Davangere. Specimens were collected during routine dissection practicals conducted by the Department of Anatomy, J.J.M. Medical College and S.S.Institute of Medical Sciences and Research Centre, Davangere. Through dissection method traced obturator artery, observed the origin, course and its variations.

Fig. 1: Showing obturator artery from anterior division of internal iliac artery.

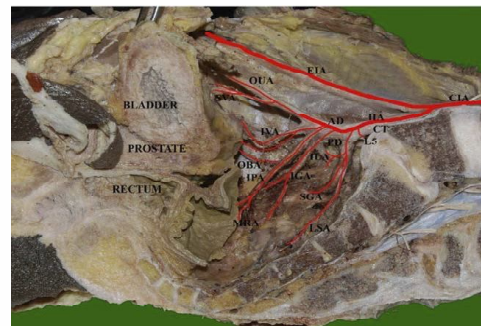
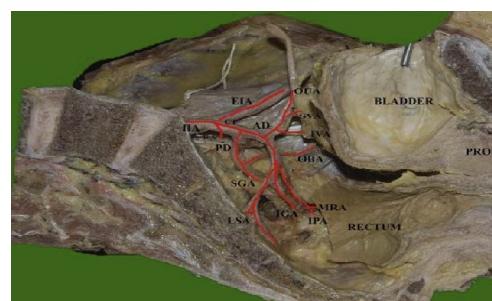


Fig. 2: Showing obturator artery from posterior division of internal iliac artery.



RESULTS

The obturator artery presents considerable variation in its origin. It took origin most frequently from the anterior division of internal iliac artery in 36 specimens (72%). Out of which, directly from anterior division in 20 specimens (40%), with ilio-lumbar artery in 5 specimens (10%), with inferior gluteal artery in 3 specimens (6%), with inferior vesical artery in 2 specimens (4%), with middle rectal artery in 1 specimen (2%), with internal pudendal artery in 4 specimens (8%) and with uterine artery in 1 specimen (2%). The obturator artery took origin from the posterior division of internal iliac artery in 9 specimens (18%), from external iliac artery in 1 specimen (2%), from inferior epigastric artery in 3 specimens (6%) and was found to be absent in 1 specimen (2%) (Table no 1).

Table No. 1: Various sources of origin of obturator artery as observed in 50 specimens.

Division	Origin	Specimen	Percentage
AD	+/N	20	40
	with ILA	5	10
	with IGA	3	6
	with IVA	2	4
	with MRA	1	2
	with IPA	4	8
	with UA	1	2
PD	Direct	2	4
	with ILA	5	10
	with SGA	2	4
	f EIA	1	2
	f IEA	3	6
	Absent	1	2
	Total	50	100

(AD = Anterior division, PD = Posterior division, +/N= Present and Normal, ILA = Ilio-lumbar Artery, IGA = Inferior Gluteal Artery, IVA = Inferior Vesical Artery, MRA = Middle Rectal Artery, IPA = Internal Pudendal Artery, UA = Uterine artery, SGA = Superior Gluteal Artery, EIA = External Iliac Artery, IEA = Internal Iliac Artery f EIA = from external iliac artery, f IEA = from inferior epigastric artery)

DISCUSSION

Arteries are essentially conducting channels through which blood is conveyed from the heart to the capillary bed. The blood vascular tree has at all times been a particularly interesting phase of anatomical study. Its influence on the development of the individual, its practical importance in medicine and the necessity for the

surgeon to thoroughly orient himself with it, give additional stimuli to further our knowledge concerning it.

In the present study, obturator artery presented considerable variations in its origin, it was observed that the obturator artery took origin from the anterior division of internal iliac artery in 36 specimens (72%). Out of which, as a direct branch in 20 specimens (40%) and with other named branches in 16 specimens (32%). These observations correlate with the observations of Bergman[6], where it was observed that obturator artery took origin as a direct branch from anterior division (41.4%) and with other named branches (28.5%).

It also correlate with the observations of Braithwaite JL[3], where obturator artery took origin as a direct branch from anterior division (41.4%) and with other named branches (32%). Pai MM[7], in which obturator artery took origin from anterior division (60%).

In the present study, obturator artery took origin from posterior division of internal iliac artery in 9 specimens (18%). It correlate with the observations of Pai MM (18%)[7]. This is a slightly higher incidence when compared to the observations of Pick (3.28%)[8] and Kumar D (0.5%)[9].

In the present study, obturator artery took origin directly from external iliac artery in 1 specimen (2%). It correlate with the observations of Bergman (1.1%)[6], Braithwaite JL(1.1%)[3], Jakubowicz and Czerniaws, Grzesinska (1.3%)[4]. This is a low incidence when compared to the observations of Missankov (25%)[5].

In the present study, obturator artery took origin from inferior epigastric artery in 3 specimens (6%). This is a low incidence when compared with the observations of Bergman (25%)[6], Braithwaite JL(19.5%)[3], Jakubowicz and Czerniawska - Grzesinska(26%)[4]. Pai MM observed the origin of obturator artery from external iliac artery and inferior epigastric artery in 19%[7].

CONCLUSION

The obturator artery took origin most frequently from the anterior division of

Internal iliac artery in 36 specimens (72%), from posterior division in 9 specimens (18%), from external iliac artery in 1 specimen (2%) and from inferior epigastric artery in 3 specimens (6%).

Conflicts of Interests: None

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