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OBSERVATION ON ANATOMICAL VARIATIONS OF VERMIFORM APPENDIX IN KOSI REGION OF BIHAR – A CADAVERIC STUDY

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ABSTRACT: Anatomical and topographical variations in positions of the vermiform appendix are known to occur. Appendicitis is one of the most common clinical conditions that requires immediate surgical intervention and is globally prevalent. Variations in anatomical position may cause different clinical presentations. The operating surgeons require a sound knowledge of positions of the appendix to minimize complications encountered during appendicectomy.

KEYWORDS: Variations, Positions, Vermiform Appendix.

INTRODUCTION: The caecum and its diverticulum the vermiform appendix appear in the sixth week of intrauterine life as an elevation on the antimesenteric border of the caudal limb of the midgut loop. The caecal apex does not grow as rapidly as the remaining portion hence the vermiform appendix initially appears to be a small diverticulum of the caecum. The appendix increases in length so that at birth it is a relatively long tube arising from the distal end of the caecum.^[1] After birth due to differential growth of the caecal wall the appendix now comes to lie on the medial aspect. Developmentally the appendix varies considerably in position. The vermiform appendix is the most variable organ in terms of position, extent, peritoneal and organ relations.^[2,3,4&5] As the ascending colon elongates the appendix may pass posterior to the caecum or colon and may also descend over the brim of the pelvis. In approximately 64% of the people the appendix is located retrocaecally.^[1] The appendix is located in the right lower quadrant of the abdomen.^[6] It usually arises as a diverticulum from the posteromedial wall of the caecum. Its opening is occasionally guarded by a semicircular fold of mucous membrane known as the valve of Gerlach.^[7] The appendix is usually located at the junction of the taeniae found on the surface of the caecum.^[8 & 9] Length of the appendix varies from 2-20 cms with an average length of 9 cms.^[10] Unique 28 cms long vermiform appendix has been reported.^[11] Base of the appendix is attached to the caecum and this attachment is fairly constant whereas the tip can be found in a retrocaecal, pelvic, subcaecal, pre-ileal and post-ileal positions. A short triangular mesoappendix extends along the whole length almost up to the appendicular tip. The mesoappendix has a free border which carries the blood supply to the organ by the appendicular artery a branch from the ileocolic artery.^[12] Appendicitis is the most common cause of acute abdomen in young people.^[13] Identification of the normal position of appendix is important because in appendicitis variable positions may produce symptoms and signs related to their position and hence can mimic other diseases.^[14] This study has been conducted on cadavers in Kosi region of Bihar to observe the length and positions of the vermiform appendix along with the extent of mesoappendix.

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MATERIALS AND METHODS: During routine cadaveric dissections performed in the Department of Anatomy, Katihar Medical College, Katihar, fifty specimens of composite viscera of caecum, appendix, last two inches of ileum and first two inches of ascending colon were dissected and removed from adult cadavers with intact mesoappendix. The specimens were washed under running tap water and were fixed in 10% formalin overnight. The specimens were measured using measuring tape and observations on length and positions were recorded. Extent of mesoappendix was also observed.

OBSERVATIONS: The findings are presented in tabular form.

Position	No. of Males (38)	Percentage (%)	No. of Females (12)	Percentage (%)
Retrocaecal	24/38	63	07/12	58
Pelvic	08/38	21	03/12	25
Paracolic	03/38	07	01/12	08
Promontoric	02/38	05	01/12	08
Splenic	00/38	00	00/12	00
Subcaecal	01/38	02	00/12	00

Table 1: No. of cases and their percentage in each position

Position	Avg. Length (cm) Males	Avg. Length (cm) Females
Retrocaecal	7.4	6.9
Pelvic	6.9	6.1
Paracolic	6.6	5.7
Promontoric	6.3	5.4
Splenic	0.0	0.0
Subcaecal	5.6	0.0

Table 2: Average length of appendix in each position

Males	Females
A = 36 (95%)	A = 11 (92%)
B = 02 (05%)	B = 01 (08%)

Table 3: Extent of meso-appendix

A = Mesoappendix extending up to the tip

B = Mesoappendix failing to reach the tip

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Group	Males	Percentage (%)	Females	Percentage (%)
1	32/38	84	09/12	75
2	05/38	14	01/12	08
3	01/38	02	02/12	17

Table 4: Arterial supply of appendix

1. Single AA branching from inferior division of ileocolic artery
2. Single AA branching directly from ileocolic artery
3. Accessory AA present

AA = Appendicular Artery

DISCUSSION: In this study we observed the following. With reference to variations in position the findings in males were as follows: retrocaecal (63%), pelvic (21%), paracolic (07%), promontoric (05%), splenic (00%) and subcaecal (02%) while in females the findings were retrocaecal (58%), pelvic (25%), paracolic (08%), promontoric (08%), splenic (00%) and subcaecal (00%). In this study retrocaecal position was commonest and has been previously reported by Ajmani & Ajmani (1983).^[15] The average length of the appendix was calculated to be 5.46 cm in males and 4.02 cm in females and was within normal limits.^[10] Mesoappendix in males extended up to the appendicular tip in 95% while in females the extent was recorded to be 92%. Failure of the mesoappendix to reach the tip can make the appendix vulnerable to gangrenous changes as there is reduced vascularity.^[17] In males 84% of cases showed a single appendicular artery branching from inferior division of ileocolic artery while in females it was 75%. Appendicular artery branching directly from the ileocolic artery was observed to be 14% in males and 08% in females. Accessory appendicular arteries were found in 2% of males and 17% in females. With reference to positions of appendix our results are not similar to another study in Zambia (Katzurskj et al, 1979) in which pelvic position was commonest (43%). But in other studies retrocaecal position was commonest position (Bahkeit and Warille, 1999; Collins, 1932; Ajmani & Ajmani, 1983). Common incidence of retrocaecal position have been reported in England 65% (Wakely, 1932), Nijeria 38% (Solanki, 1970), India 68% (Ajmani & Ajmani, 1983). The average length of appendix was 5.46 cm in males and 4.02 cm in females. This was less than that seen in other studies (Williams et al, 1995, Schwartz et al, 1999; Bakheit and Warille, 1999; Katzurskj et al, 1979; Collins, 1932; Ajmani & Ajmani, 1983). In 5% of males and 8% in females the mesoappendix failed to reach the appendicular tip which was lower, compared with 46.7% in Sudan (Bahkeit and Warille, 1999). Due to failure of mesoappendix to reach the tip of the organ makes it more susceptible to perforation during inflammation (Anderson) et al, 1992). The classical teaching in medical colleges of India emphasizes on the fact the appendix lies deep at the junction between lateral 1/3 and medial 2/3 of the right spino umbilical line, the so called Mc Burney's point. It is not mandatory for the appendicular base to lie at this definite site. In India where open appendicectomies form the significant majority surgeons need to be aware of the variations for preoperative planning and surgical outcomes. Trainee surgeons should not be surprised if the appendix is not visualized when a transverse incision is made at the Mc Burney's point.

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CONCLUSION: The vermiform appendix is the most variable organ in the abdomen and appendicitis should always be considered as a differential diagnosis in acute abdomen even when pain and tenderness do not originate from right iliac fossa. The location of the appendix is important when it comes to clinical presentation of patients with appendicitis. The area of tenderness in appendicitis will depend upon the length, position, part, inflammation and direction of appendix.

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