Original Research Article

Study on morphological variations of cadaveric vermiform appendix and caecum in Narayan Medical College and Hospital

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Abstract

Vermiform appendix is one of the most variable organs inside the abdomen. Unusual positions pose diagnostic and surgical challenges. The present study was conducted on 38 cadavers in Narayan Medical College and Hospital to find the morphological variations of vermiform appendix and caecum. It was seen that the most common position of appendix was retrocaecal (61%) while second most common position was pelvic (21%). Mean length of appendix was found to be 5.98 ± 1.67 cm. Mean outer girth was 2.87 ± 0.36 cm. Mean distance of Vermiform Appendix from ileocaecal junction was found to be 2.58 ± 0.46 cm. Adult type is the most common shape (71%) followed by exaggerated one (18%). Mean length of caecum was 7.61 ± 0.80 cm. and mean width being 8.49 ± 0.88 cm. Knowledge about morphological pattern of appendix and caecum is helpful in proper clinical management.

Key words

Vermiform appendix, Caecum, Morphological variation, Anatomy.

Introduction

Caecum is the large blind pouch projecting downwards from the commencement of ascending colon below the ileocecal junction. Caecum is conical in shape in infants and appendix extends downwards from its apex. During growth, the lateral wall outgrows medial wall, so that the base of the appendix comes to lie in the posteromedial wall of caecum in adults [1].

Along with the return of midgut to the abdominal cavity, caecum rotates by 270 degrees around the axis of the superior mesenteric artery. Parts of the intestine reach their definitive position by this time. Position of appendix is variable but is usually retrocaecal. The base of the appendix is deep inside McBurney's point [2, 3].

Appendicitis is one of the common causes of acute abdomen in young adults. Its early diagnosis and timely management assists in reduction of morbidity and mortality. Uncommon appendicular sites lead to delay in diagnosis, diagnostic errors as well as difficulties in surgical approach to the infection site [4].

Studies conducted in various parts of the country have found that position of appendix is variable in a particular area. Its pattern also varies from place to place. Rate of retrocaecal appendix varies from 15.8% - 68% [4-11].

Demarcating morphological pattern of appendix in different places is helpful to the clinicians and surgeons for proper management of appendicular condition. No study has been conducted in this part regarding morphological features of appendix and caecum. Hence, this study was conducted.

Objectives

The present study was conducted to find the morphological variations of cadaveric vermiform appendix and caecum in Narayan Medical College and Hospital of Bihar.

Materials and methods

The present study was observational in nature conducted at the department of Anatomy, Narayan Medical College and Hospital, Sasaram during June 2010 to October 2016. Data analysis and scientific writing were done later. A total of 38 cadavers were included in this study including 26 males and 12 females. Cadavers in which anatomical features of appendix and caecum could not be elaborated were excluded from the study.

During routine dissection of cadavers in the anatomy practical classes at Narayan Medical College and Hospital, assessment of anatomical features of appendix along with caecum was done. Abdomen was opened by midline incision and flaps were reflected. Anterior taenia coli were followed to locate the vermiform appendix. Based on its position, it was classified as retrocaecal, subcaecal, paracaecal, preileal, postileal, pelvic and paracolic. Length of appendix was measured using nylon thread and further by measuring the nylon thread using measuring scale. Distance between the lower border of the terminal part of ileum and the base of the appendix was measured using thread to find the distance of appendix from ileocaecal junction. Thread was used to measure outer girth of appendix at its midpoint. Position of caecum was noted and categorized as adult, fetal, infantile and exaggerated. Length of caecum was measured from a horizontal line at the level of the ileocaecal orifice to its lowest point using the thread. Width of caecum was measured at its midpoint using the thread.

Data was entered in MS Excel 2010 and analyzed using SPSS 16.0.

Results and Discussion

The present study included 38 cadavers of which 26 were males and 12 females. Various morphological features of vermiform appendix and caecum were studied.

Table - 1 and **Figure – 1** showed that most common position of appendix was retrocaecal (61%) while second most common position was pelvic (21%). The pattern was similar in males (58% retrocaecal, 23% pelvic) and females (67% retrocaecal, 17% pelvic) and the difference was not significant statistically (X^2= 0.74, p= 0.95). Kadam, et al. found that pelvic position was the most common variety (36.8%) followed by retrocaecal (15.8%) [5]. Naik, et al. also found the similar pattern with pelvic (48%) being most common and retrocaecal the second most common (28%) [6]. However, findings of Sinha, et al. in another part of Bihar was similar to this study (retrocaecal, 58 % and pelvic, 25%). They did not find significant difference among male and female cadavers (p>0.05) [7].

Table – 1: Position of appendix in male and female cadavers.

Position	No. of Males	(%)	No. of Females	(%)	Total	(%)	Significance
Retrocaecal	15	58	8	67	23	61	X^2= 0.74 p= 0.95
Pelvic	6	23	2	17	8	21	
Pre-ileal	2	8	1	8	3	8	
Subcaecal	2	8	1	8	3	8	
Post-ileal	1	3	0	0	1	2	
	26	100	12	100	38	100	

Table – 2: Morphology of appendix in male and female cadavers.

Morphological feature	Male	Female	Total	Significance
Length (cm.)	6.22 ± 1.78	5.47 ± 1.32	5.98 ± 1.67	t=1.3, p = 0.20
Outer girth (cm.)	2.91 ± 0.38	2.77 ± 0.31	2.87 ± 0.36	t= 1.11, p = 0.27
Distance of Vermiform Appendix from ileocaecal junction (cm.)	2.72 ± 0.46	2.29 ± 0.32	2.58 ± 0.46	t= 2.92, p = 0.01

Table – 3: Shape of caecum in male and female cadavers.

Shape	No. of Males	(%)	No. of Females	(%)	Total	(%)	Significance
Adult	18	69	9	75	27	71	X^2= 0.54 p= 0.91
Exaggerated	5	19	2	17	7	18	
Fetal	2	8	1	8	3	8	
Infantile	1	4	0	0	1	3	
	26	100	12	100	38	100	

Table – 4: Morphology of caecum in male and female cadavers.

Morphological feature	Male	Female	Total	Significance
Length	7.96 ± 0.62	6.82 ± 0.57	7.61 ± 0.80	t=5.39, p = 0.00
Width	8.89 ± 0.68	7.61 ± 0.57	8.49 ± 0.88	t= 5.66, p = 0.27

Table - 2 shows morphological measurements of appendix. Mean length of appendix was found to be 5.98 ± 1.67 cm. In males, it was 6.22 ± 1.78 cm and among females, it was 5.47 ± 1.32 cm. This difference was not significant statistically (t=1.3, p = 0.20). Mean outer girth was 2.87 ± 0.36 cm. Among males, it was 2.91 ± 0.38 cm. and among females, it was 2.77 ± 0.31 cm. This difference was not significant statistically (t= 1.11, p = 0.27). Mean distance of Vermiform

Appendix from ileocaecal junction was found to be 2.58 ± 0.46 cm. In males, it was 2.72 ± 0.46 cm. and among females, it was 2.29 ± 0.32 cm. It was observed that this difference was statistically significant (t= 2.92, p = 0.01). Kadam, et al. found that mean length of appendix was 5.13 cm. in males and 5.71 cm. in females and the difference was statistically significant (t=0.749, p=0.464). They also found that the mean outer girth of appendix was 2.26 cm. in males and 2.06 cm. in females and this was also not significant (t=0.118, p=0.907) [5]. Naik, et al. in their study conducted in Maharashtra found that mean length of appendix was 5.3 ± 1.06 cm. Mean outer girth was 0.6 cm. Distance between appendicular orifice to lower end of caecum was 1.41 ± 0.14 cm [6]. Sinha, et al. found average length of appendix to be 5.46 cm. in males and 4.02 cm. in females [7]. Thus, it was observed that the findings of the present study were similar to other studies. It is more similar to the pattern seen in another area of Bihar.

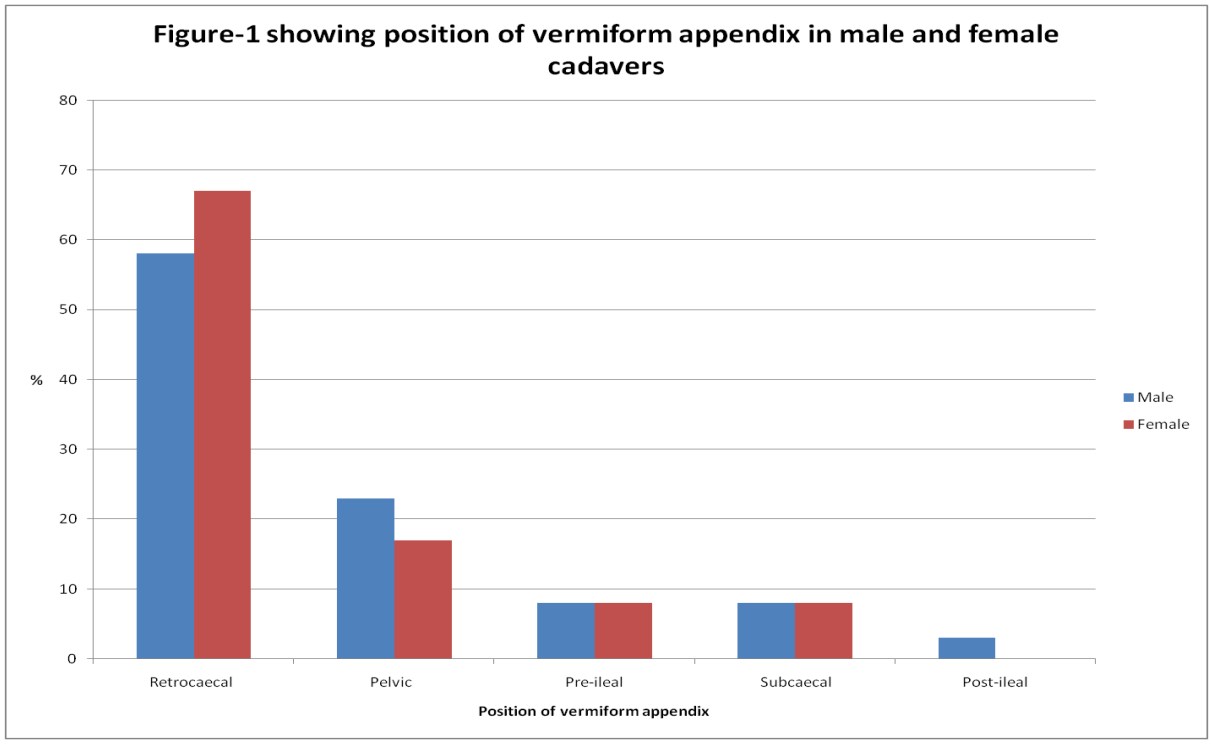

Table - 3 shows shape of caecum in male and female cadavers. Adult type was the most common shape (71%) followed by exaggerated one (18%). In males, adult type was seen in 68% cadavers and exaggerated type in 19%. In females, adult type was seen in 75% cadavers and exaggerated type in 17%. The distribution of various caecal shapes among male and female cadavers did not differ significantly (X^2= 0.54, p=0.91). Kadam, et al. found that most common shape of caecum was adult (68.4%) followed by exaggerated (15.8%), fetal (10.5%) and infantile (5.3%). In males, most common shape was adult (66.7%) followed by exaggerated (16.7%), fetal (8.3%), infantile (8.3%) and also in females, it was adult (71.4%) followed by exaggerated (14.3%), fetal (14.3%) [5]. Naik, et al. found 76% caecum of adult type, 16% of exaggerated type and 8% of foetal type [6]. Banerjee, et al. found that 88% caecum were of adult type, 8% exaggerated type and 4% infantile type [8]. Thus, shape of caecum is almost similar in all the studies.

Table - 4 shows morphological features of caecum in male and female cadavers. It was seen that mean length of caecum was 7.61 ± 0.80 cm. and mean width being 8.49 ± 0.88 cm. In male cadavers, mean length was 7.96 ± 0.62 cm. and mean width was 8.89 ± 0.68 cm. In female cadavers, mean length was 6.82 ± 0.57 cm. and mean width was 7.61 ± 0.57 cm. The difference

regarding length was significant (t=5.39, p = 0.00) while for width, it was not significant (t= 5.66, p = 0.27). Banerjee et al found average length of caecum to be 63 mm. and average width to be 68 mm. [8].

Conclusion

It was clear from the above discussion that the morphological pattern of vermiform appendix and caecum is similar to observations of studies conducted in this region. Proper knowledge about position and length of appendix will help clinicians in diagnosis of acute abdomen conditions and will assist surgeons in anticipating peculiarities and planning for surgical approach.

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