

Variation in Appendix Position in Bundelkhand Region of India.

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ABSTRACT

Background: The aim of present study is to note the prevalence of various positions of appendix along with its length and extent of meso-appendix in two genders and different age groups in patients of acute appendicitis from Bundelkhand region. **Method:** This observational study was carried out on 100 patients belonging from Bundelkhand region of India, suffering from Acute Appendicitis. Position of appendix and extent of meso-appendix observed carefully followed by measurement of length of appendix from base to tip. All the findings were tabulated and inferences were drawn followed by statistical comparison using chi-square test and t-test with p value <0.05 considered as significant. **Result:** Highest prevalence of acute appendicitis was found in the age group of 11-19 years age group. Highest prevalent position amongst all appendix position was retrocaecal in both genders and in all age groups followed by pelvic position. The length of appendix ranged from 37 mm to 120 mm in males with an average of 78.9 ± 18.1 mm, while its length ranged from 38 mm to 96 mm in females with an average of 65.5 ± 17.5 mm. Average length of the appendix was found 13.4 mm higher in males as compared to females. In 90% of cases in this study, mesoappendix extended to its full extent, whereas in 10% cases it failed to reach its tip. **Conclusion:** Findings in this study show subtle differences in length, position and extent of mesoappendix from other studies from other regions. Such studies are needed to be conducted in all geographical regions with as much possible number of observations.

Keywords: appendix, appendix length, appendix position, mesoappendix.

INTRODUCTION

The vermiform appendix is a vestigial organ not active in the functioning of the large intestine. It is a worm-like intraperitoneal process extending from the cecum usually in a posteromedial direction. Since it is derived from the developing colon, the appendix can be located by tracing the teniae coli to the base of the appendix where the teniae coli form a completely smooth muscle layer of the appendix.^[1] The vermiform appendix is a caecal diverticulum, which appears in the sixth week of embryonic life as a swelling on the anti-mesenteric border of the mid-gut loop. The position and length are attained by rapid helicoidal differential growth of the lateral and anterior position of the caecum with displacement of the appendix posteriorly and medially.^[2] It is located in the right lower quadrant of the abdomen^[3,4] appearing as a narrow worm like tube arising from the postero-medial aspect of the caecal wall 2cm or less below the end of the ileum.^[3,4] The tip of the appendix can be located anywhere in the right lower quadrant of the abdomen, pelvis, or retroperitoneum.^[5]

The aim of present study is to note prevalence of various positions of appendix along with its length and extent of mesoappendix in two genders and different age groups in patients of acute appendicitis from Bundelkhand region.

MATERIALS AND METHODS

This observational study was carried out on patients in the Bundelkhand region of India, suffering from Acute Appendicitis admitted in Department of surgery, Government Medical College, Jalaun, Uttar Pradesh and Siddhi Vinayak Hospital, Jalaun, Uttar Pradesh on 100 patients over a period of evaluation from October 2013 to September 2015 with ethical approval. Patients belonging to other regions were not included in this study.

Measurement of length of the appendix was done using a stout chromic catgut from base to tip before removal of the appendix followed by measurement of that piece using a Vernier caliper accurate up to 0.1 mm.

The position was determined by following the direction of appendix with a finger before caecum was delivered into the wound. [Figure 1] Meso-appendix was also inspected carefully for its extent, whether it is reaching up to tip of appendix. [Figure 2].

Data were stratified in groups formed on the basis of age and gender. All the findings were tabulated and inferences were drawn followed by statistical comparison with the help of "Statistical Calculator v 4.0" using suitable tests viz. chi-square test, one way ANOVA and unpaired t-test with p value <0.05 considered as significant.

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RESULTS

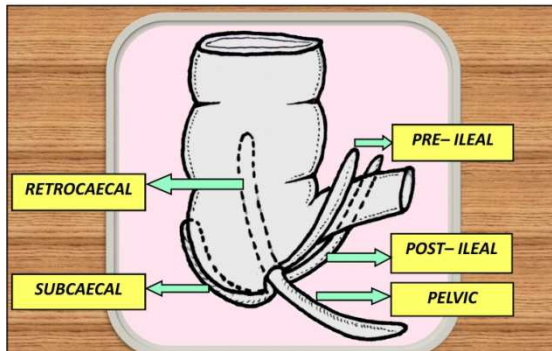


Figure 1: Positions of Vermiform Appendix

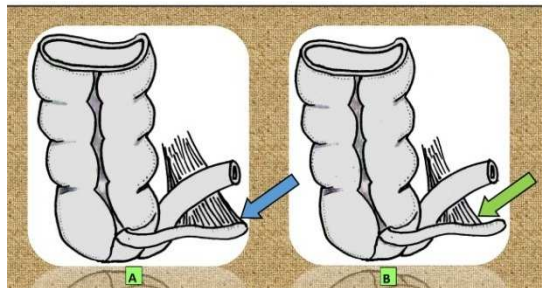


Figure 2: Extent of Mesoappendix; 2 (A) Blue arrow showing Mesoappendix upto the tip of appendix and 2 (B) green arrow showing mesoappendix not reaching to the tip of appendix.

Table 1: Age and gender distribution of patients with acute appendicitis.

Age group in years	Number of patients			Percentage (%)
	Males	Females	Total	
≤10	12	8	20	20
11-19	33	22	55	55
20-39	9	6	15	15
40-54	3	3	6	6
>55	3	1	4	4
Total	60	40	100	

Table 4: Frequency distribution of appendix length according to gender.

	Gender	Length of appendix in mm.			
		<40 mm	40- 79 mm	80- 119 mm	>119 mm
	Male	4	19	36	1
	female	3	24	13	0
	Total	7	43	49	1

Table 2: Frequency distribution of various positions of appendix between two genders

		Appendix positions				
		Retrocaecal	Subcaecal	Pelvic	Pre ileal	Post ileal
Gender	Male	29	10	17	3	1
	Female	18	6	13	1	2
	Total	47	16	30	4	3

Table 3: Frequency distribution of various positions of appendix according to age group.

		Appendix positions				
		Retrocaecal	Subcaecal	Pelvic	Pre-ileal	Post-ileal
Age in years	≤10	12	3	4	1	0
	11-19	22	9	20	2	2
	20-39	8	2	3	1	1
	40-54	3	1	2	0	0
	>55	2	1	1	0	0
	Total	47	16	30	4	3

Table 5: Frequency distribution of appendix length according to age group.

		Appendix length in mm. (Mean± SD)	Length of appendix in mm.			
			<40 mm	40- 79 mm	80- 119 mm	>119 mm
Age in years	≤10	51.6± 12.19	7	13	0	0
	11-19	75.05± 16.06	0	26	29	0
	20-39	81.67± 14.24	0	4	11	0
	40-54	95.17± 13.47	0	0	5	1
	>55	96± 10.17	0	0	4	0
	Total		7	43	49	1

DISCUSSION

In the present study, the highest prevalence of acute appendicitis was found in the age group of 11-19 years age group. [Table 1]. Highest prevalent position amongst all appendix position was retrocaecal in all age groups followed by pelvic position similar to other studies on appendix position.^[7-12] Retrocaecal appendix was also the commonest position in males as well as in females followed by pelvic appendix. [Table 2, 3]. No significant difference between two genders regarding the appendix position was noted. (Chi square test: $X^2= 1.5$ $df=4$ $p=0.83$) [Table 2]. There was not any significant difference between various age groups also regarding appendix positions (Chi square test: $X^2= 6.07$ $df=16$ $p=0.98$) [Table 3]. Though some workers in their studies regarding the appendix position from other geographical regions have found pelvic position of the appendix as commonest position.^[13-15] The reason for such difference can be dietary, regional or racial factors. Therefore, such studies are needed to be conducted in all geographical regions with as much possible number of observations.

The length of appendix ranged from 37 mm to 120 mm in males with an average of 78.9 ± 18.1 mm, while its length ranged from about 38 mm to 96 mm in females with an average of 65.5 ± 17.5 mm. Average length of the appendix was found 13.4 mm higher in males as compared to females similar to studies of other workers from different geological region.^[13,16,17] This difference in appendix length between two genders was found to be statistically significant (Unpaired t test: $t= 3.68$, $df= 98$, $p=0.0004$), however, in some studies females showed a higher length of appendix as compared to males.^[14,18] The majority of the male patients had an appendix length between 80-119 mm, while most of the female patients had an appendix length of 40-79 mm. [Table 4].

Frequency distribution of appendix length according to age group showed that individuals from an older age group had longer appendix length. [Table 5] Differences in appendix length amongst age groups were found highly significant. (one way ANOVA: F-Ratio= 16.91, $p<0.0001$).

In 90% of cases in this study, mesoappendix extended to its full extent, whereas in 10% cases it failed to reach its tip. Incomplete mesoappendix was most prevalent in ≤ 10 years age group followed by 11-19 years age group. There was no significant difference noted between two genders regarding prevalence of incomplete mesoappendix. As mesoappendix serves as a channel for appendicular artery, appendix with incomplete mesoappendix has compromised circulation at tip, which often causes gangrenous changes and even perforation. That's why the appendicitis in

childhood is far more severe than in any other age group.

CONCLUSION

This study showed that retrocaecal position of the appendix is most prevalent in the Bundelkhand region of India amongst males and females with an average length of 78.9 and 65.5 mm respectively. These findings show subtle differences in length, position and extent of mesoappendix from other studies from other regions.

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