

Study of Variations in Position of Appendix in 100 Operated Case of Appendicitis

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ABSTRACT

Introduction:- Appendix is a wormlike structure arises from posteromedial wall of the cecum, about 2 cm below the ileocecal valve. Though a remarkably constant structure, the appendix is occasionally subject to the extremes of variation, Signs and symptoms may show varying degree of discrepancy depending on position of the appendix. The aim of our study is to determine the position of the appendix in a group of patients examined by the authors.

Results:- The positions of the appendix found were as follow :-retrocecal: 66% , pelvic: 27%, post-ileal: 3% , subcecal: 2% , paracecal: 1% , pre-ileal: 1% .

Discussion:- In our study retrocecal is the most common position, followed by pelvic> post-ileal>subcecal>paracecal>pre-ileal. The result of our study is correlating with some study in which retrocecal position is most common and contradicting with some study in which pelvic position is most common (Table 1).symptom and sign is different in various position and mimics other condition which leads to misdiagnosis. In the subcecal position, the appendix is intraperitoneal if inflamed, it can cause diffuse peritonitis. Thus, this position can be regarded as the most susceptible to complications. In pelvic position appendicitis may mimics with cystitis. In pre or post ileal position may irritate intestine and mimics gastroenteritis.

Conclusion:- After the study strong association has been found between hidden locations of the appendix and the development of an advanced appendicitis, which results in longer hospital stay and high incidence of gangrene and perforation.

Key Words: Appendicitis; Cecal migration; Genito-mesenteric fold; position of appendix.

INTRODUCTION

Appendix is a diverticulum of the cecum and marks the beginning of the colon at the confluence of teniae. It has a wormlike structure and arises during embryological life from the posteromedial wall of the cecum, about 2 cm below the ileocecal valve. [1-8] Though a remarkably constant structure in man, the appendix is occasionally subject to the extremes of variation, that is, total suppression and duplicity. Its length varies from 2 to 20 cm

in average 9cm. [2] The base of appendix is connected to the cecum, but its head can be placed in different situations. As stated byMaingot1938, the appendix is the only organ in the body that has no fixed anatomy. [11] Although nowadays this is being questioned, it has its value, by emphasizing the fact that often the appendix is one of the most mobile viscera, although its lack of normal position is not so extraordinary. [12] Taking into account that often the appendix is a mobile structure, the importance of its

relative position has been questioned by some authors. [12] However, some authors describe a significant relationship between its location and acute appendicitis. [13,14] In a retrocecal position, the blood vessels may be compressed and folded by the cecum. Thus, when an inflammation of the appendix occurs in this position, its blood supply may be compromised. [10] A strong association has been found between hidden locations of the appendix (post-ileal, pelvic, retroperitoneal) and the development of an advanced appendicitis, resulting in longer hospital stays and in high incidence of gangrene and perforation. [4,16,17] The knowledge of all these nuances can facilitate the establishment of a diagnosis, allowing an early treatment and minimizing the rate of complications from appendicitis. Therefore, the study of appendix positions has proven useful, even in present days. [14] The aim of our study is to determine the position of the vermiform appendix in a group of patients examined by the authors.

MATERIALS AND METHODS

A total of 100 patients of operated case of appendectomy were recruited in the study over a period of 24 months from September 2013 to September 2015. out of which 62 are male and 38 are female. The ratio of male to female patients was 1.3:1. In this study, patients of all age and sex were included. Patients with pregnancy, appendicular lump formation, patients with burning micturition were excluded. The abdomen was opened by a Mcburney's incision. The vermiform appendix was located by simple exposure of the lower ileocecal recess, in difficult cases, we followed the teniae to their junction at the apex of the cecum and base of the appendix. The positions of appendix were defined as follows. [3,10,14,18]

- **Retrocecal/retrocolic:** the appendix courses upward lying behind the cecum, and may reach the initial portion of the ascending colon.
- **Pelvic:** the appendix is directed downward, over the psoas major, with its tip

surpassing the upper edge of the lower pelvis.

- **Pre-ileal:** the distal portion of the appendix is located in a position anterior-superior to the terminal ileum and directed to the spleen.
- **Post-ileal:** the distal portion of the appendix is in a position posterior-superior to the terminal ileum and directed to the spleen.
- **Subcecal:** the appendix is located under the cecum, resting on the right iliac fossa and separated from the iliac muscle by a local peritoneal lining.
- **Paracecal:** the appendix is situated laterally to the cecum and ascending colon.
- **Other (ectopic):** the appendix does not fit in any of the positions above described.

RESULTS

100 patients of appendectomy were studied. Of the whole group 62% ($N = 62$) were male and 38% ($N = 38$) female. Patients of all the age and both sex were studied. The positions of the appendix found were as follows (In descending order):- retrocecal: 66% ($N=66$), pelvic: 27% ($N=27$), post-ileal: 3% ($N=3$), subcecal: 2% ($N=2$), paracecal: 1% ($N=1$), pre-ileal: 1% ($N=1$).

DISCUSSION

In the literature, there were numbers of studies on the position of the normal, inflamed or post-mortem appendix. [18-20] For over a century the many contributions of several authors have recorded hundreds of references under their appropriate subdivisions. No useful purpose has been achieved by repeating this huge amount of data. [21] Therefore, the references reviewed in the current study were purposely limited, and are summarized in Table 1. The largest series documented in the literature studied were 4680, [21] 10,000, [3] and 40,000 [15] appendices. In the study by Wakeley (10,000 cases), the appendix was in retrocecal (65.28%), pelvic (31.01%), subcecal (2.26%), pre-ileal (1%) and post-ileal (0.4%) position [3] which is correlating

with our study. The result of our study is also correlating with study by Baily 1969, Buschard 1973, Ajmani & Ajmani 1983, Shah & Shah 1945, Bakheit & Warille 1996, Delic 2002 (Table 1). Subsequent anatomical and surgical studies in the literature and data obtained by our group (Table 1) show considerable contradiction with respect to this study. Probably the authors have used different definitions and data collection methodology, or demographic variations occurred. Thus, comparisons between reports may be challenging or even impossible. Given these disagreements, currently we are not sure yet about the defined percentages.^[7,19] However, in most reports the values of the most common positions (retrocecal and pelvic) provide reasonable approximations.^[14] In these studies, the position most commonly found has been the retrocecal one, with an occurrence ranging from 18 to 65% of specimens.^[3,9,15-18,21] Consistent with these findings, in our study, we observed more often appendices in a retrocecal position (66%), and this finding was correlating the range reported by other researchers (18–65%). The position of the appendix is closely related to the development of the cecum. Although initially with its location under the liver, after the 10th week of intrauterine life the foetal intestine returns to the abdominal cavity, causing the cecum to gradually descend into the right iliac fossa, with a counter-clockwise twisting motion around its longitudinal axis. Simultaneously, the anterolateral wall of the cecum stretches and grows faster than the other parts, and this results in displacement of the appendix from its original position at the apex of the cecum, to an antero-medial position. During this process of cecal descent, the appendix can bend behind the cecum, and if at that time the development of peritoneal lining is occurring, the appendix will remain fixed in this retrocecal position. On the other hand, if the appendix remains free and directed downward during the descent of the cecum, then the appendix will remain permanently

as an organ with free mobility after its fixation to the colon.^[3,4,12,17,18] In adults, the appendix may be fixed in a retrocecal position by the fibrosis resulting from previous episodes of acute appendicitis.^[16,17] Therefore, in view of the extreme mobility of the appendix, and taking into account the fast and extensive changes in the surrounding parts, and also considering the position changes suffered by the appendix when following the cecal migration, it may be concluded that the appendix is subject to more or less intense accidental circumstances that will modify its final positioning and that are responsible for the various positions in which this organ is described.^[3,19] Gender, age, body posture changes, and varying degrees of cecal contraction have not been described as determinants of the position of the appendix.^[14,19] Signs and symptoms may show varying degree of discrepancy with the expected symptomatology, depending on the position of the appendix. For example, a pelvic appendicitis can reach the wall of the ureter and bladder, resulting in urinary symptoms. On the other hand, retrocecal appendicitis can promote inflammation of the psoas major muscle and cause low back pain, lameness and pain with hip extension. A periileal appendicitis, in turn, can trigger a diarrheal picture indistinguishable of that from gastroenteritis. Occasionally, the picture is so atypical that one can make a mistake with non-surgical intra-abdominal disorders.^[13,14] and taking into account the great anatomical variability of the appendix, in the face of episode of acute abdominal pain the doctor must regard appendicitis at least as a second suspicion.^[13] In the subcecal position, the appendix is in a fully intraperitoneal condition. If inflamed, it can cause diffuse peritonitis. Thus, this position can be regarded as the most susceptible to complications.^[10] During embryonic development, further growth of the right wall of the cecum or a stronger torsion of the cecum and ascending colon can shift the base of appendix towards the ileocecal

junction area, resulting in pre-ileal and, in extreme cases, post-ileal appendices. [3,12,19] However, in most of the reviewed studies (Table 1) the pelvic position appears in the second place, and several authors describe this position as the most prevalent, especially in non-surgical cases and in older individuals. [14] The high frequency of pelvic appendices has been associated with the presence of the genito-mesenteric fold, which is a fold of peritoneum coursing vertically from the posterior face of the

terminal ileum to the deep right inguinal ring or, in women, to the right ovary. The appendix, as it follows the cecum and turns up and to the left, must come into close proximity with this fold, and tends to be deflected downward, toward the pelvic cavity. [3,7,19] The result of our study is contradicting with study by Wass1960, Peterson1934, Liertz 1909, Smith 1911 in which retrocecal position is less common (Table 1).

Table 1 – Frequency of positions of the vermiform appendix by several authors.

Reference	N	Retro-cecal	pelvic	Pre ileal	Post ileal	Para cecal	Sub cecal	Ectopic
Bailey, 1959	-	74%	21%	1%	5%	2%	1.5%	-
Collins, 1963	40000	25.95%	Appendices anterior to cecum: 74.05%					-
Buschard, 1973	141	56.7%	33.4%	7.8%	-	-	2.1%	-
Ojeifo, 1989 (Nigeria)	548	45.07%	25%	1.82%	14.78%	6.39%	2.37%	4.74%
Liertz, 1909(Germany)	2,092	35%	42.1%	13.9%	-	-	9%	-
Collins, 1932	4,680	20.21%	7.9%	Appendices with anterior location: 70.72%			1.24%	-
Wakeley, 1933(UK)	10000	65.28%	31.01%	1.00%	0.4%	-	2.26%	0.05%
Smith 1911(USA)	882	24.2%	19.4%	50.9%	-	2.9%	-	-
Ajmani& Ajmani 1983(India)	100	58%	23%	2%	10%	7%	-	-
Shah & Shah 1945(India)	405	61.2%	3.7%	26.9%	-	5.4%	-	-
Waas 1960(south Africa)	103	26.7%	58%	28%	-	5%	-	-
Bakheit & Warille 1996(Sudan)	60	58.3%	21.7%	11.7%	-	11.7%	-	-
Peterson 1934(Finland)	373	31.0%	42.2%	26.8%	-	0.0%	-	-
Delic2002 (Croatica)	50	52.0%	32.0%	10.0%	-	8.0%	-	-
IN OUR STUDY	100	66%	27%	1%	3%	1%	2%	-

CONCLUSION

In our study most common position found is retrocecal one. Signs and symptoms show degree of discrepancy depending upon the position of the appendix. This will leads to misdiagnosis appendicitis with other medical or surgical conditions and diagnosis will be delayed. This will leads to development of an advanced appendicitis, high incidence of gangrene, perforation, peritonitis, which results in longer hospital stay. so knowledge of various positions of appendix is helpful even in present days.

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How to cite this article: Parmar PD, Dave J, Vekariya M et al. Study of variations in position of appendix in 100 operated case of appendicitis. *Int J Health Sci Res.* 2017; 7(5):42-46.
