

Anatomical Variations Of Vermiform Appendix In South-East Caspian Sea (Gorgan-IRAN)

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Abstract. — Appendicitis is one of the most common diseases that needs emergency surgery. Variations in anatomical position cause different clinical presentations. The aim of this study is to determine the anatomical variations of the position, length and mesoappendix in operative specimens.

This cross sectional study was carried out in Gorgan teaching hospital on 117 patients who had undergone appendectomy (South- East of Caspian Sea) due to clinical suspicions of appendicitis. Following parameters were ascertained : 1) appendix position, 2) length and 3) variations of mesoappendix.

The average length of appendix was 6.61cms in males and 6.06 cms in females. Pelvic position was the predominant position (in 33.3%) followed by retrocaecal in 32.4%, preileal in 18.8% and subcaecal in 12.8% respectively. In 65.8% of cases, the mesoappendix failed to reach appendicular tip. Retrocaecal and pelvic positions were the most common position in Turkman and native Fars races, respectively. Vermiform appendix was longer in males as compared with females, but in general appendicular length was estimated to be shorter than the other reports. Pelvic position is the most common location in our patients. According to our observations, probably, racial factor can influence the appendicular position.

Key words : Vermiform appendix, Mesoappendix, Appendicitis.

Introduction :

The vermiform appendix is located in the right lower quadrant of abdomen (*Williams et al, 1995, Sabiston et al, 2001*). It is a narrow, worm shaped tube, arising from the posteromedial caecal wall, 2cms or less below the end of the ileum (*Williams et al, 1995; Zinner et al, 1997*). Its opening is occasionally guarded by a semicircular fold of mucous membrane known as the valve of Gerlach (*Singh, 1999*).

The appendix is usually located at the junction of the taeniae, found on the surface of the caecum (*Williams et al, 1995; Sabiston et al, 2001 and Schwartz et al, 1999*).

Its length varies from 2-20 cms, with an average length of 9cms (*Williams et al, 1995, Buschard & Kjaeldgaard, 1973*).

The attachment of the base of the appendix to the caecum remains constant, whereas the tip can be found in a retrocaecal, pelvic, subcaecal, preileal and post-ileal positions (*Williams et al, 1995; Sabiston et al, 2001; Schwartz et al, 1999*). It is connected by a short mesoappendix to the lower part of the ileal mesentery. This fold is usually triangular, extending almost to the appendicular tip along the whole tube (*Williams et al, 1995*).

The mesoappendix has a free border which carries the blood supply to the organ, by the appendicular artery, a branch from the ileocolic artery (*Williams et al, 1995, Zinner et al, 1997*).

The appendix contains lymph follicles. Lymphoid tissue first appears in the appendix about 2 weeks after birth (*Schwartz et al, 1999; Fawcett, 1994*). Its epithelial lining has a surface coat of immunoglobulins which may be involved in the control of lymphatic surveillance (*Williams et al, 1995; Schwartz et al, 1999; Williams and Gilmoor, 1989*).

The appendix develops from the midgut loop together with the caecum, ascending colon and the proximal two thirds of the transverse colon (*Sadler, 1990, Moore and Persaud, 1998*). Appendicitis is the most common cause of acute abdomen in young people (*Schwartz et al, 1999, Addiss et al, 1990*). 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 (*Sabiston et al, 2001; Bakheti and Warille, 1999*).

This study has been undertaken to investigate certain anatomical features such as the extent of the mesoappendix, the average length, and different positions of the vermiform appendix with regard to age, sex and race in people in the South-East of Caspian sea (North of IRAN).

Patients and Methods :

This research was done in teaching hospital in Gorgan in South-East of Caspian sea in North of IRAN, because this hospital receives a large number of cases from their suburbs in South-East of Caspian sea (Gorgan-IRAN).

These patients belonged to two racial groups : 1) Native Fars group including 93 patients who live in this area. 2) Turkaman group including 24 patients who immigrated 2 centuries ago from Central Asia. Also on the basis of age, the patients were grouped into : 1) Adult group (age > 18 years), 2) Child group (age < 18 years). The observations and measurements were made during the September 1998 to March 1999 period with cooperation of the general surgery department.

The results were kept in the medical records in hospital. Immediately following incision of the anterior abdominal wall and exposure of appendix, its general features were studied. These included mainly its position and the extent of the mesoappendix. Following excision, the length of the appendix was measured with a tape. The excised appendices were kept in small bottles containing 10% formalin solution. After a short period of time (approximately 4 hours) the length of the excised appendix was re-measured and the standard error was recorded. All the data was analyzed and compared with statistical student -t-test and Chi-Square test ($\alpha = 0.05$).

Results :

Position : The percentages of different positions of the appendix were as follows : pelvic 33.3%; retrocaecal 32.4%; preileal 18.8%; subcaecal 12.8%; and postileal 2.6%. When different positions were compared among males and females, there were marked variations in subcaecal position (table 1).

Table 1 : Positions of appendix

Sex	Retrocaecal	Subcaecal	Pelvic	Preileal	Postileal
Male	20	5	20	12	2
Female	18	10	19	10	1
Total	38	15	39	22	3

The most common anatomical position of appendix in native Fars race was pelvic (34.3%) but in Turkaman race it was retrocaecal (45.9%) (Table 2).

Table 2 : Positions of appendix in two racial groups (native Fars and Turkaman group)

Race/ethnic group	Retrocaecal	Subcaecal	Pelvic	Preileal	Postileal	Total
Native Fars	27	13	32	20	1	93
Turkaman	11	2	7	2	2	24
Total	38	15	39	2	3	

Length : Average lengths of differently located appendices were as follows : postileal 6.66cms, pelvic 6.56cms, subcaecal 6.33 cms, retrocaecal 6.30cms and preileal 5.96cms.

In males, the average length was 6.61cms whereas in females it was 6.06 cms. This difference was meaningful ($P \leq 0.05$). In children (age group 0-18 years), the average length was 6.22cms. In Turkman group the average length was 6.68cms whereas in native Fars group it was 6.24cms.

Variations of the Mesoappendix : In 34.2% of the patients, the mesoappendix extended to the tip of the appendix, whereas in 65.8% of patients it failed to reach the tip. The mesoappendix failed to reach the tip in 69% of children (0-18 years) & in 64% of adults (19-73 years).

On the basis of racial group in 70.8% of Turkaman patients, and 64.5% of native Fars group the mesoappendix failed to reach the tip.

Discussion :

In this study the incidence of pelvic position of appendix (33.3%) was the highest accounting for 33.9% in males and 32.8% in females. These results are similar to another study in Zambia (*Katzurskj et al, 1979*) in which the pelvic position was the commonest (43%).

But in other studies retrocaecal position was the commonest position (*Bakheit and Warille, 1999; Collins, 1932; Ajmani and Ajmani, 1983*). In this study, retrocaecal position was seen in 32.5% of patients and was less common compared with other studies including : England 65% (*Wakely, 1932*), Nijeria 38% (*Solanki, 1970*); India 68% (*Ajmani and Ajmani, 1983*). But this incidence of retrocaecal position was higher than that of America (20.2% by *Addiss et al, 1990*) and Zambia (20% by *Katzurskj et al, 1979*).

The average length of appendix was 6.61cms in male, 6.06cms in females and 6.22cms in children. 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 and Ajmani, 1983*). Average length of appendix in children (0-18 years) was less than in adult group (19-73 years). The above findings are opposite to the other studies (*Williams et al, 1995; Bakheit and Warille, 1999 and Collins, 1932*).

In 65.8% of the patients, the mesoappendix failed to reach the tip of the appendix, which was higher, compared with 46.7% in Sudan (*Bakheit and Warille, 1999*). This condition in children (0-18 years) was 69% in our study however in another study (*Bakheit and Warille, 1999*) it was 87.7%.

Failure of the mesoappendix to reach the tip probably reduces the vascularization of the tip of the organ making it more liable to become gangrenous and hence early perforation during inflammation (*Anderson et al, 1992*). This accounts for seriousness of the disease in children (*Sabiston et al, 2001, Schwartz et al, 1999, Bakheit and Warille, 1999*). The observed differences noticed in the length, mesoextension and the variety of position in the appendix vermiform in native Fars and Turkaman races may be related to the racial factor, which needs further investigation to be proved.

In conclusion, this study determined the most common variety, length and mesentry of the appendix in this area. Therefore, it can help the surgeons to make optimal diagnosis and treatment of appendicitis.

However, interesting findings of shortness of mesoappendix and smaller length of appendix in adults are unexplained and more investigations are recommended.

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The anatomy of the vermiform appendix shows variations in its macroscopic dimensions and microscopic features, some of which have potentials of influencing the clinical aspects of the appendix. Aim. The aim of this study was to find out some microscopic features of appendix and evaluate the correlation between the microscopic features of the appendix and the age of the subjects and to determine whether these findings should influence the clinical implications of appendix. Methods.Â Gopalipour MJ, Arya B, Azarhoosh R et al (2003) Anatomical variations of vermiform appendix in south-east Caspian sea (Gorgan-Iran). J Anatom Soc India 52(2):141â€“143Google Scholar. 11.