The Position and Morphology of the Vermiform Appendix in Sri Lankans: A Study on Autopsies

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ABSTRACT

Introduction: The vermiform appendix is a vestigial structure showing extreme variability in its position. Varying symptoms of acute appendicitis reflect this variability making the clinical presentation of appendicitis highly inconsistent.

Objective: To observe the anatomical variations of the position of the tip of the appendix and its base, length, details of meso-appendix and appendicular artery in adult medico-legal autopsies.

Methods: A sample of medico legal autopsies carried out on those over 18 years by forensic pathologists at the Teaching Hospital Peradeniya was included in this study.

Results: Of the 60 autopsies, 39 were male, with an age range of 19-88 years. Fifty eight appendixes were healthy, 1 appendicular mass and 1 absent appendix. Positions of the appendices were: 29 (50%) post-ileal, 20 (34.48%) retro-caecal, 7 (12.07%) pelvic and 2 (3.45%) para-caecal. The base was at the postero-medial wall in 36 (62.07%), lower pole in 18 (31.03%) and postero-lateral wall of the ceacum in 4 (6.0%) subjects. The length was 3cm - 14 cm (mean 8.2 cm). The distance between ileo-caecal valve and base of the appendix was 1 cm - 6 cm (mean 2.8 cm). The distance between the edge of the meso-appendix and the tip was 0 cm - 7 cm (mean 1.23 cm). In 51.7 % of cases meso-appendix continued to the tip. The appendicular artery continued to the tip in 37 (63.8%) cases.

Conclusions: Post ileal position is the commonest position of the appendix, with the base situated commonly on the postero-medial wall of the caecum. In the majority of cases meso-appendix and the appendicular artery continued to the tip.

INTRODUCTION

The Vermiform appendix is a vestigial structure in humans and is represented by a blind ended muscular tube, situated at the confluence of the three Taenia coli of the caecum. The appendicular base is described to have a relatively constant position in the postero-medial wall of the caecum (1), although it can sometimes be found on the postero-lateral wall and the lower pole of the caecum (1). The appendix is described to be of variable length but usually ranges from 7.5–10 cm in adults (1). The appendix is known to show extreme variability in its position and morphology. The classical positions described in the text books include retrocaecal, pelvic, pre-ileal, post-ileal, para-caecal, sub-caecal, and promonteric (2, 3).

Even though it's a vestigial structure with no proven function, it still qualifies attention due to the fact that it gets inflamed rather commonly, resulting in acute appendicitis, one of the most common cause for an acute abdomen in surgical casualties. Though a classical

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sequence of symptoms is described for acute appendicitis may vary making the clinical presentation of appendicitis highly inconsistent (4,5). The reason for this inconsistency could be due to the variability of its relationship with the surrounding structures. Notwithstanding the advances in modern radiographic imaging and laboratory investigations, the diagnosis of appendicitis remains essentially clinical, requiring adequate knowledge of the anatomical variations (6,7). Furthermore appendicitis may result in surgical removal of the appendix which requires a clear knowledge about the anatomy and relationships to other structures (8). Even though many studies have reported different positions of the appendix, racial differences may exist.

The appendicular position in the Sri Lankan population has not been documented to date. Therefore it was the aim of our study to observe the anatomical variations, position of the tip of the appendix & its base, length, extent of the meso-appendix and the distribution of the appendicular artery, during medico-legal autopsies.

METHODS

A random sample of autopsies done by Forensic Pathologists from November 2011- November 2012 at the Teaching Hospital Peradeniya was included in the study. Putrefied bodies, bodies with abdominal pathologies and abdominal trauma, surgical interventions or procedures necessitated to interfere with the position of the appendix, deformities which may affect the anatomy of the appendix (lower spinal abnormalities), microscopically abnormal appendices and any condition which could have affected length were excluded. Subjects whose age was below 18 years were excluded from the study. Ethical clearance was obtained from the ethical review committee of the Faculty of Medicine, University of Peradeniya.

The anatomical details of the appendix were observed immediately after opening the abdominal cavity; before any manipulation the position of the tip of the appendix was noted. When the appendix was not visible the ceacum was mobilized and shifted carefully to observe the appendix. Next, the ilioceacal valve and the base of the appendix were identified. The exact position of the base on the wall of the caecum was noted. Then the length between the ileoceacal valve and the base of the appendix was measured using a calibrated metal Vernier caliper. The appendix was carefully unfolded and held straight. The length from the base to the tip was measured using the Vernier caliper. The mesoappendix was then studied carefully and the edge of the structure was located. Then the length between the edge of the mesoappendix and the tip of the appendix was measured with the Vernier caliper. All details were recorded in two diagrams specially designed for the purpose (figure 1 and 2).

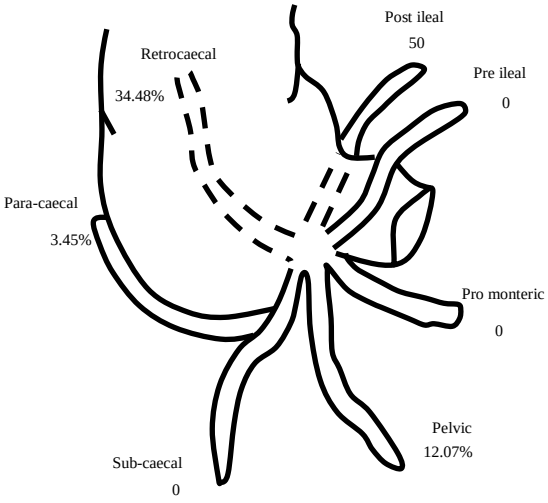

Figure 1: positions of the tip of the appendix

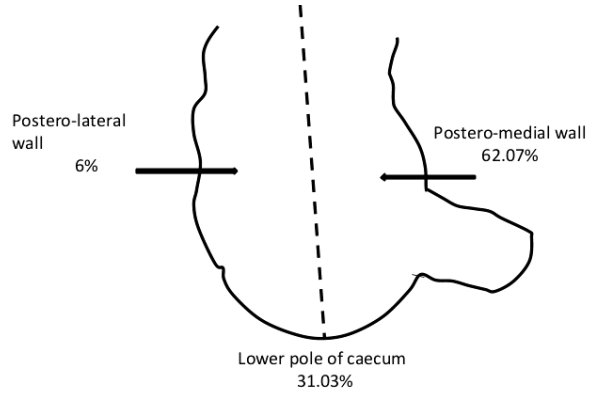

Figure 2: Position of the base of the appendix

RESULTS

Of the 60 autopsies, 39 were males and 21 were females. Age of these subjects varied from 19-88 years. Mobile healthy appendices were noted in 58 cases, and one appendicular mass was found. The appendix was absent in one case with no history of appendisectomy. Of the appendices, 29 (50%) were post-ileal, 20 (34.48%) retro-caecal, 7 pelvic (12.07%), and 2 (3.45%) were para-caecal (Figure 1). No pre-ileal, sub-caecal or promonteric appendices were noted. The base of the appendix was found on the postero-medial wall of the caecum in 36 (62.07%), on the lower pole of the caecum in 18 (31.03%) and on the postero-lateral wall in 4 (6.0%) of the cases (Figure 2). The length of the appendix varied from 3cm to 14 cm with a mean value of 8.2 cm. The distance between the ileo-caecal valve and the base of the appendix varied from 1 cm to 6 cm with a mean value of 2.8 cm. The distance between the edge of the meso-appendix and the tip of the appendix varied from 0 cm (meso appendix continues to the tip of the appendix) to 7 cm with the average being 1.23 cm. In 30 cases, (51.7 %) the meso-appendix continued to the tip of the appendix. All appendicular arteries studied were end arteries. The appendicular artery continued to the tip of the appendix in 37 (63.8%) cases while the continuation was not observed in 21 (36.2%). In all cases where the mesoappendix continued to the tip, the appendicular artery continued to the tip as well. In 7 of the cases the appendicular artery continued to the tip even though the mesoappendix ended before reaching the tip.

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DISCUSSION

Human vermiform appendix shows extreme anatomical variations and this has implications on the diagnosis and management of appendicitis (1). The post-ileal position was the commonest position seen among this group of Sri Lankan adults with the retroceacal position being the next commonest position. Most studies report the retrocaecal and retrocolic position as the commonest, while the post ileal position is reported as the second commonest (9-13). However some studies report the pelvic appendix as the second commonest position (10). In studies done on appendectomy patients the retrocaecal position is described as being the commonest (11). In the current study the base of the appendix was commonly situated on the postero-medial wall of the caecum. This is the classical position of the base described in books and do not give details about the other positions of the base. We found that 30% of the cases had the base at the lower pole of the ceacum. Some studies report the lower pole as the commonest position of the base of the appendix (9). The distance between the ileocaecal valve and the base of the appendix was 2.8 cm and is consistent with published data (3,9,10,12). The length of the appendix is reported as being between 2- 25 cm with the average being around 9 cm (2,13). Similar results were

obtained by us, with the average length being slightly less at 8.2 cm. In about 50% of the cases meso-appendix and the appendicular artery continued to the tip of the appendix. However in the rest the mesoappendix ended at an average of 1cm before reaching the tip. In 7 of the cases the artery traveled over the wall to reach the tip. Similar findings have been reported by other researches (13,14). Appendices that have an appendicular artery that does not reach the tip maybe at a higher risk of ischaemic necrosis during inflammatory processes.

It is apparent that the appendicular position and its morphology and blood supply is highly variable. Therefore a good knowledge about the appendix and its morphology is necessary for the clinicians to make a clear diagnosis and to perform a surgery with least complications.

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