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Original Research Article

A CADAVERIC STUDY OF ANATOMICAL VARIATIONS IN THE ARTERIAL SUPPLY OF VERMIFORM APPENDIX

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ABSTRACT

Acute appendicitis is the most common cause of acute abdomen in young adolescents and appendectomy is often the first major surgical procedure performed by a surgeon. Precise knowledge of vascular variation and planning of conducting surgical and radiological procedures is important during appendectomy. The appendicular artery is considered to be a branch from posterior caecal artery or ileocolic artery entering the mesoappendix from behind the ileum and supplying it. There is no general agreement in the literature about the arterial blood supply of the vermiform appendix. Little information is available in the literature about the distribution and pattern of branching of the appendicular arteries. In view of the discrepancies in the literature about the anatomy of the vascular supply of the appendix and to add further knowledge of surgical anatomy this study was carried out. Accessory arteries are important because they can provide some immunity toward appendicitis. Detailed analysis of the arterial vascularization of the appendix is necessary before its removal for reconstructive microsurgery.

KEY WORDS: Vermiform Appendix, Appendectomy, Appendicular Artery, Accessory Appendicular Artery.

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INTRODUCTION

Kelly and Hurdon first drew attention towards accessory appendicular arteries in 1905[1]. Bruce et al. and Koster et al. stated that appendix is supplied by only one artery [2, 3]. The Appendix is a narrow worm like structure present in the right iliac fossa, arising from the posteromedial wall of the caecum about 2 cms below the ileo-caecal junction and has no constant anatomical position. The length of appendix varies from 2 to 20 cms with an average of 9cm.microscopically the vermiform appendix is a muscular tube containing a large amount of lymphoid tissue. The appendix is suspended by a peritoneal fold called mesoappendix covering its variable length and carrying the blood supply to the organ, by appendicular artery, a branch derived from ileocolic artery. It is the terminal branch derived from the right side of the superior mesenteric.The artery passes retro-

peritoneally downwards and to the right, and on reaching the right iliac fossa it divides into ascending and descending branches, the former anastamoses with the right colic artery, and the latter with the termination of the superior mesenteric artery.The descending branch of the ileocolic artery divides into four sets of branches anterior and posterior caecal, appendicular and ileal. The appendicular artery is an end artery; hence in inflammation of the appendix the vascular thrombosis may produce gangrene of its tip. Accessory arteries supplying the tip of appendix reduce the possibility of gangrene formation in appendicitis.Lymphatics travelling along with the accessory arteries assume great importance in oncological treatment of appendix tumors.

MATERIALS AND METHODS

The sample size taken is 50 adult human cadavers irrespective of age and sex from dissection hall of anatomy department. All specimens were taken during routine dissection after completing the dissection of anterior abdominal wall, peritoneum and various viscera. Mesentery of small intestine was exposed in the infra colic compartment by turning the transverse colon and its mesocolon upwards. The oblique attachment of the mesentery of the small intestine was traced on the posterior abdominal wall, loops of jejunum and ileum turned to left side then cut through the right layer of peritoneum of the mesentery along the line of its attachments to posterior abdominal wall and stripped it from the mesentery, removed fat from mesentery to expose superior mesenteric vessels in its root and their branches. Branches to caecum, appendix and terminal ileum traced after tracing ileocolic artery course. Appendix was identified by tracing the taeniae on the external surface of colon and caecum. All the specimens were photographed and documented.

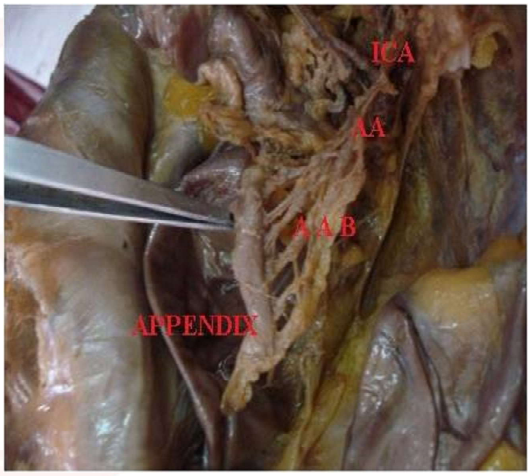
RESULTS

The main appendicular artery is defined as one which runs in the crescentic fold of the mesoappendix to the tip of the appendix; and the accessory appendicular artery is the one which supplies other parts of the appendix except the tip. In this study main appendicular artery arose from the trunk of ileocolic artery in 46 (92%) specimens and from descending branch of ileocolic artery in 4 (8%) specimens.

Branches of main appendicular artery: The main appendicular artery while in the free edge of the mesoappendix gave off a number of branches (Fig.1), which were parallel to and approximately equidistant from one another. No of branches were 4, 5 and 6 in 6(12%), 16(32%) and 28(56%) specimens respectively.

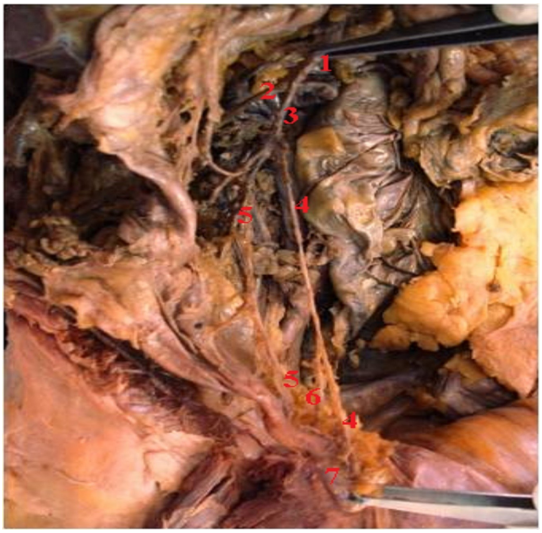
Accessory appendicular artery: 1 out of 50 cadavers received an additional supply from accessory artery which was derived from descending branch of ileocolic artery. (Fig.2).

Fig .1: Photograph shows main appendicular artery & its branches.



ICA- ileocolic artery, AA- Appendicular artery, AAB- Appendicular arterial branches

Fig. 2: Photograph shows main appendicular artery& accessory appendicular artery.



1. Ileocolic artery, 2.ascending ileocolic artery, 3.descending colic artery, 4.main appendicular artery, 5.accessory appendicular artery, 6. Appendicular arterial branches, 7.appendix

Appendix is supplied by appendicular artery. The main appendicular artery passes behind terminal ileum first near to base and then in the free margin of mesoappendix. The terminal part lies directly on the wall of appendix and get thrombosed in inflammatory process. Kelly and Hurdon in 1905 showed that in 66% of appendices studied, the main appendicular artery supplied the distal three quarters of the appendix, while an accessory appendicular artery supplied the proximal fourth [1]. Some workers claimed that it arises solely from the ileocolic artery (Koster & Weintrob, 1928; Bruce et al. 1964; Robinson, 1965); others claimed that it comes off one of the branches of the ileocolic artery (Smith, 1911; Hollinshead, 1956; Davies & Davies, 1962). Beaton, Anson, Swigart & Johnson (1953) in their study of 200 specimens noted that the main appendicular artery arose in 48.5 % of cases from the ileocolic artery, in 35. 0 % from the ileal branch and in 5.0 % from the posterior caecal branch of the ileocolic artery. Shah and Shah (1946) proved that in 30% of cases the appendix received two branches from either the anterior or posterior caecal artery or one branch from each of these [4].

Solanke (1968) studied appendicular blood supply in Nigerians showed 80% cases with accessory appendicular arteries, a reason behind immunity of Nigerians to appendicitis [5]. Contrary to this, the studies by Bruce et al., and Koster et al. showed that appendix is supplied by single artery only. Ranganathan (2002) and Shenoy (2009) found that the appendicular artery takes its origin from the posterior caecal branch of ileocolic artery [6, 7] .In the present study main appendicular artery arose from the trunk of ileocolic artery in 46(92%) specimens and from descending branch of ileocolic artery in 4(8%) specimens.The main appendicular artery while in the free edge of the mesoappendix gave off a number of branches,which were parallel to and approximately equidistant from one another. The findings in the present study relating to the origin of the main appendicular artery are basically in agreement with the study of Beaton et al. Accessory appendicular arteries may arise from the superior division of ileocolic artery or posterior caecal branch or directly from the ileocolic artery [8, 9].

In the present study 1 out of 50 cadavers received an additional supply from accessory vessels which were derived from descending branch of ileocolic artery.

In this study, accessory arteries were encountered very less frequently (2 %) than had been previously reported.

CONCLUSION

Variations in course of artery can completely misguide the surgeon in ligating the artery especially in laparoscopic surgeries and can lead to alarming hemorrhage.Failure of the mesoappendix to reach the tip reduces the vascularization to the tip of the organ making it more liable to become gangrenous. Surgeons should keep in mind the possibility of accessory appendicular arteries as well as variations in the course of main and accessory appendicular artery during laparoscopic surgeries in this region.

Conflicts of Interests: None

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