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A CLINICO-ANATOMICAL APPRAISAL OF VERMIFORM APPENDIX

Anatomy

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ABSTRACT

Till today appendix holds the same surgical importance, which it had previously. The vermiform appendix is a narrow diverticulum arising from the posteromedial wall of caecum about 2 cm below ileoceacal junction. It does not have a constant position. Variation in anatomical position can result in different clinical presentations. Appendicitis is one of the most common clinical conditions which require emergency surgery. This study was conducted on 30 human cadavers irrespective of age and sex in dissection hall of Anatomy, Govt . Medical College Amritsar. The position of various appendixes were observed and classified accordingly. Also, the various morphometric parameters were measured along with its blood supply. In this study, the positions of appendix was retroceacal in 14 (46.7%) cases, pelvic in 7 (23.3%) cases, splenic in 6 (20%) cases, subceacal in 2 (6.7%) cases & promonteric in 1(3.3%) cases. So the most common position observed was retroceacal or 12O' clock. Vermiform appendix shows variations in the position and length. Surgeon should know about the different positions of appendix during appendectomy. The position and various morphometric parameters of the vermiform appendix are important in influencing the differential diagnosis of acute abdomen.

KEYWORDS

Vermiform Appendix, Appendicular artery, Retroceacal, Paracolic, Pelvic, Postileal, Preileal, Subceacal.

INTRODUCTION :

The vermiform appendix was first described by Leonardo da Vinci in 1492 [1]. Vermiform Appendix as the name implies is a worm like tubular vestigial structure situated in right iliac fossa of human. The appendix which is the apex of embryonic caecum, in adult arise from posteromedial aspect of caecum about 2-3 cm below the ileo caecal junction [2]. Appendix is highly diverse in position, shape and size [3,4]. Anatomically, the position of the appendix can vary with respect to the caecum and can be retrocaecal, paracolic, preileal, postileal, pelvic or subcaecal [5]. In primates appendix is a part of digestive tract which breaks down cellulose, but in human beings it is a component of mucosal immune system [6]. Human appendix is a safe house for beneficial bacteria which save when illness flushes those bacteria from rest of the intestines[7].

Vermiform appendix has greater clinical significance as it is involved in different disease processes such as appendicitis, carcinoma and gangrene. Inflammation of appendix is one of the most common cause of emergency laparotomy. Variations in the anatomical position of appendix can result in different clinical presentations which mimic other diseases [8]. The variable anatomy may pose challenge to surgeon during appendicectomy because it may necessitate extension of incision or additional muscle splitting. So the knowledge of these positions is essential for accurate diagnosis and treatment of condition. Keeping this view in mind, this study has been undertaken to know various anatomical & morphological variations of vermiform appendix in cadavers.

MATERIALS AND METHODS

1) Cadavers allotted to MBBS students of Govt Medical College Amritsar, Punjab were selected. Both male and female cadavers irrespective of age were included in the study. The abdomen of the embalmed human cadaver was dissected by making a right paramedian incision. The skin, subcutaneous tissue, underlying muscle & peritoneum were incised.
2) The vermiform appendix was located by following the anterior taenia coli and its position was noted in situ. Based on position, the appendix was categorized into retrocaecal, pelvic, preileal, postileal, paracolic, subcaecal and paracaecal groups.
3) The diameter of appendix was measured at the base with the help of thread & thread's length was measured by measuring scale and the values were recorded.
4) The length of the appendix from the base to the tip was measured with the help of thread. Thread's length was measured by measuring scale and the values were recorded.
5) Shape of the mesoappendix was noted and it was also seen whether it was present up to the tip of appendix or not
6) Origin, course & termination of appendicular artery was noted. The single or double arterial supply or any other variation was also noted down.

RESULTS :-

The 30 specimens taken from the cadavers. No case of congenitally absent or surgically removed vermiform appendix was seen. In this study, the variation in the position, length and diameter of vermiform appendix was as follows.

Position :

The position of vermiform appendix were retroceacal in 14 (46.7%) cases, pelvic in 7 (23.3%) cases, splenic in 6 (20%) cases, subceacal in 2 (6.7%) cases & promonteric in 1(3.3%) cases. So the most common position observed was retroceacal or 12O' clock.

Diameter:

The diameter at the base of vermiform appendix was noted in all the 30 cases. It was observed that 3 specimens were in range of 3-4 mm of diameter, 23 specimens (72%) showed 5-6 mm of diameter, 3 specimens were under the range of 7-8 mm, and only 1 specimen show 9 mm of diameter.

Length :

The length of vermiform appendix varies from 3cm to 15cm in 30 specimens. 14 specimens (46.7%) showed 7-9cm length.

Shape of mesoappendix:

The shape of mesoappendix was triangular & reaching up to the tip of appendix in all the 30 specimens.

Arterial supply :

Appendicular artery observed in all the 30 specimens. It was found in all specimens. Appendicular artery was a branch of ileocolic artery, which was a branch of superior mesenteric artery. The artery run in mesoappendix. The main appendicular artery pursued an arcuate course in the crescentic fold of the mesoappendix, approaching the appendix as it extended to the tip. The artery terminated at the tip in all the 30 cadavers. It was also observed that out of 30 specimens one apppendicular artery was present in 28 (93.3%) cases while we found 2 appendicular arteries in 2 (6.7%) specimen.

DISSCUSSION :-

There are various studies done on positions and dimensions of vermiform appendix over the world. **Morgagni** [9] was the first to

describe congenital absence of vermiform appendix. **Vohnhaller** [10] recorded 3 cases of congenital absence of vermiform appendix. **Andrew** [11] stated that in 3000 consecutive postmortum examinations performed at the Hollywood Presbyteon hospital had never encountered absence of vermiform appendix. **Rains et al** [12] found1:100000 persons the vermiform appendix was absent. **In the present study** out of 30 cadaveric specimens, the vermiform appendix was not absent in any.

TABLE 1: Showing Comparative Study Of Presence / Absence Of Vermiform Appendix

Name of author	Total no of cases	Present	Absent	Percentage
Morgagni (1719)	Not given	-	+	-
Vohnhaller (1765)	Not given	-	3	-
Andrew (1926)	3000	3000	-	100%
Rains et al (1965)	100000	99999	1	99.9%
Present study	30	30	-	100%

The vermiform appendix has base, body and tip. Base of appendix has constant relationship with caecum, i.e on posteromedial aspect of caecum 2cm below ileocaecal opening but the tip can point in various directions and depending on the position of tip appendix [5].

Wakely[13], Shah and Shah[14], Solanke[15], Ajmani ML Ajmani K[16], Ojeifo Jo et al[17], Liu CD et al[18] and R J Last[19] described retrocaecal/retrocolic as commonest position with frequency ranging from 58 to 65%. In the present study the retrocaecal/retrocolic is the commonest position with 46.7 % frequency.

TABLE 2: Showing Comparison Of Different Positions Of The Vermiform Appendix Of Present Study With Other Studies

Name of authors	No. of specimens	Position						
		Retrocaecal	Splenic		Promontoneric	Pelvic	Subcecal	Paraceacal
			Post Ileal	Pre ileal				
Wakeley (1933)	10000	62%	0.4%	1%	-	31%	2%	-
Shah and Shah (1945)	405 Autopsies & operations	45.6%			-	21.5 %	4.4%	27.5
Maisel (1960)	103	23.3%	-	-	-	56.3 %	4.9%	8.8%
Solanke (1970)	125	38.40 %	4%	12%	-	31.2 %	11%	2.4%
Golalipur (2003)	117	32.40 %	2.6%	18.8 %	--	33.3 %	18.8%	12.8%
Present study	30	46.7%	3.3%	16.7 %	3.3%	23.3 %	6.7%	-

Katzurskj M.M et al [20] and **Golalipour M et al [5]** mentioned pelvic as common position of appendix. In the present study pelvic position is second common position with 23.3 % frequency. In the present study subcaeal position was 6.7% was comparable with **Shah and Shah 4.4% [14] and Maisel 4.95% [21].**

Wakeley [13] mentioned ectopic position in 0.05%, in the present study no such position noted.

Kelly and Hurdon [22] 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. **Shah and Shah [23]** 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. **Solanke[15]** studied appendicular blood supply to its minute detail by injecting barium sulphate into the arteries and taking radiographs. His study in Nigerians showed 80% cases with accessory appendicular arteries, a reason behind immunity of Nigerians to appendicitis. Contrary to this, the studies by **Bruce et al. [24] and Koster et al.[25]** showed that appendix is supplied by single artery only. **In present study** it was observed that 93.3 % cases have one appendicular artery while in 6.7% cases we found two appendicular arteries.

Accessory arteries are important because they can provide some immunity towards appendicitis. 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. Variations in course of artery can completely misguide the surgeon in ligating the artery especially in laparoscopic surgeries and can lead to alarming hemorrhage.

CONCLUSION :-

Although the vermiform appendix is considered as a vestigial organ in human body, but it may pose challenging diagnostic & therapeutic problems to surgeons. The position of appendix bears a significant role in occurrence of appendicitis, presentation of sign & symptoms and surgical approach apart from prognosis. The most common retroceacal position is the safest position. The organ which are likely to come in contact of vermiform appendix especially when it is inflamed or ruptured depends on the length of appendix. So its detailed study about morphology and anatomy will help out surgeons for performing various abdominal surgeries. Knowledge of accessory appendicular artery & variations in its blood supply will be important for surgeons to make optimal decision while performing laproscopic surgeries to avoid haemorrhage.

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