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Research article

## A STUDY OF MORPHOLOGY OF VERMIFORM APPENDIX IN 200 CASES

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### ABSTRACT

**Aims:** To study the various positions of vermiform appendix, and its relation to various diseases of the vermiform appendix, and average length and external diameter of the vermiform appendix.

**Materials & Methods:** This study was conducted on 200 cases – 100 cadavers from the dissection laboratory with an age range of 50 – 90 years. The dissection was performed in the dissection hall of Smt. N.H.L. Municipal Medical College, Ahmedabad, B. J. Medical College, Ahmedabad, A.M.C.M.E.T. Medical College, Ahmedabad, and 100 cases from postmortum room of V. S. Hospital from August 2009 to December 2012.

**Result and Observation:** classic coeliac trunk with emission of the left gastric, splenic and hepatic arteries was found in 76(76 %) cadavers. Haller's tripod, in which the three arteries originated at the same level and in the terminal portion of the coeliac trunk was observed in 18(18%) cadavers. In 16 cadavers inferior phrenic arteries originated from coeliac trunk was observed. In 8 cadaver's variations regarding disposition of the left gastric, splenic and hepatic arteries also regarding the number of emitted arteries observed. **Conclusion:** Appendix is only organ in our body which has not constant anatomical position. From various positions of vermiform appendix we can understand the possible outcome of the appendicitis specifically location of site of pain.

**Key words:** Appendix, Position, Length, Diameter

### INTRODUCTION

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 2 of 9 cms. A variation in the position of the appendix, along with the degree of

inflammation makes the Clinical presentation of appendicitis notoriously inconsistent. Misdiagnosis in different age groups is from 10 to 33%<sup>1</sup>. The attachment of the base of appendix remains fairly constant, but the tip can be found anywhere in Retrocaecal, Pelvic, Subcaecal, Paracaecal, Post ileal and Preileal positions. Appendicitis in different positions may mimic other diseases in retrocolic – colitis, Post ileal – ureteric colic, Pelvic inflammatory disease<sup>2</sup>, Torsion of ovarian cyst & Ruptured tubal gestation, Sub hepatic – hepatitis, biliary colic<sup>3</sup>. The only invariable feature is its origin from the caecum at the site of coalescence of all three taenia coli<sup>4</sup>. Though considered by most to be a vestigial organ, its importance in surgery is mainly due to its propensity for inflammation that results in the clinical syndrome known as acute appendicitis, and is the most common cause of “acute abdomen” in young adolescents<sup>3</sup>.

#### MATERIALS AND METHOD

**Material:** This study was conducted on total 200 cases, 100 cases taken from dissection laboratory of the anatomy department, Smt. N.H.L. Municipal Medical College, Ahmedabad, B. J. Medical College, Ahmedabad, and A.M.C.M.E.T. Medical College, Ahmedabad with an age range of 50-90 years of both sexes. The cadavers were embalmed through the carotid and femoral arterial perfusion of formaldehyde solution, spirit, water and glycerine and preserved in a weak formalin solution before dissection, and remaining 100 cases are taken

from postmortem room of Sheth V. S. Hospital from August 2009 to December 2012.

**Method:** Length of vermiform appendix was measured by nylon thread from root to tip of appendix. Thread’s length was measured by vernier caliper. External diameter was measured by vernier caliper at a maximum external diameter of the appendix. Dissection done according to cunningham’s manual of practical anatomy.

#### RESULTS

Keeping in view the aim of the study mentioned earlier, following observations were recorded: In the present study the total number of cases was 200 (136 Males and 64 Females). Table.1 shows the position of vermiform appendix in present study (Figure.1 Retrocaecal position, Figure.2 Pelvic position, Figure.3 Post ileal position, Figure.4 – Subcaecal position, Figure.5 – Paracaecal position, Figure.6 – Subhepatic position). In present study most common position in male and female was retrocaecal founded in 75 cases (55.14%) and 36 cases (56.25%) respectively; and least common position in male was subhepatic founded in 01 case (0.007 %) and in female was paracaecal founded in 03 cases (0.04%). No case of preileal and promontory position was found.

Table.2 shows the calculation of external diameter and length of vermiform appendix in present study. In present study the average length of vermiform appendix was 5.436 cm in 200 cases and average external diameter was 7.0450cm in 200 cases.

**Table 1: Position of vermiform appendix**

| Serial number | Position    | Male | Female | Total | Percentage |
|---------------|-------------|------|--------|-------|------------|
| 1             | Retrocaecal | 75   | 36     | 111   | 55.5 %     |
| 2             | Pelvic      | 32   | 15     | 047   | 23.5 %     |
| 3             | Postileal   | 14   | 04     | 018   | 9 %        |
| 4             | Subcaecal   | 07   | 06     | 013   | 6.5 %      |
| 5             | Paracaecal  | 07   | 03     | 010   | 5 %        |
| 6             | Subhepatic  | 01   | 00     | 001   | 0.5 %      |
| Total         |             | 136  | 64     | 200   | 100 %      |

**Table 2: Calculation of external diameter and length of vermiform appendix**

|         | MALE                   |             | FEMALE                 |             |
|---------|------------------------|-------------|------------------------|-------------|
|         | External Diameter (mm) | Length (Cm) | External Diameter (mm) | Length (Cm) |
| Maximum | 15                     | 9           | 14                     | 7           |
| Minimum | 3                      | 2           | 4                      | 2.4         |
| Mean    | 7.3014                 | 5.5647      | 6.5000                 | 5.1625      |
| Median  | 7                      | 5.6         | 6                      | 5.4         |
| SD      | 2.8029                 | 1.3348      | 2.2253                 | 1.1086      |

**Table 3: Comparison of different positions of the vermiform appendix of present study with other studies**

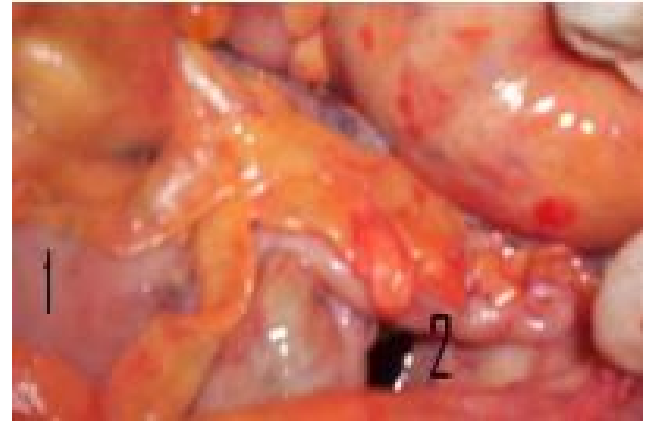
| Author                                | No.of specimen | Retro-caecal | Pelvic | Postileal | Preileal | Sub-caecal | Para-caecal | Sub-hepatic |
|---------------------------------------|----------------|--------------|--------|-----------|----------|------------|-------------|-------------|
| Solanke TF <sup>8</sup>               | 125            | 38.4%        | 31.2%  | 12%       | 4%       | 11.2%      | 2.4%        | -           |
| Varshney S et al. <sup>9</sup>        | 600            | 19%          | 53%    | 1%        | 2%       | 7%         | 18%         | -           |
| Golalipour MJ <sup>2</sup>            | 117            | 32.4%        | 33.3%  | 2.6%      | 18.8%    | 12.8%      | -           | -           |
| Cecil P G <sup>10</sup>               | 10,000         | 65.28%       | 31.1%  | 0.40%     | 1.00%    | 2.26%      |             | 0.5%        |
| Clegg Lamptey JNA et al <sup>11</sup> | 1358           | 67.3%        | 21.6%  | 3.8%      | 4.9%     | -          | 2.4%        | -           |
| Shah& Shah <sup>12</sup>              | 591            | 62%          | 31%    | 0.4%      | 11%      | 2%         | -           | -           |
| Bailey Love <sup>13</sup>             | -              | 74%          | 21%    | 0.5%      | 1%       | 1.5%       | 2%          | -           |
| In Present Study                      | 200            | 55.5%        | 23.5%  | 9%        | -        | 6.5%       | 5.0%        | 0.5%        |

**Table 4: Comparison of length of the vermiform appendix of present study with other studies**

| Year | Author                          | Shortest Centimeters | Longest Centimeters | Mean Length (cm) | Mean External Diameter (mm) |
|------|---------------------------------|----------------------|---------------------|------------------|-----------------------------|
| 1891 | Ferguson <sup>14</sup>          | 2.2                  | -                   | 10.13            | 8                           |
| 1895 | Berry <sup>15</sup>             | 3.1                  | 13.3                | 8.3              | -                           |
| 1913 | Deaver <sup>16</sup>            | 1.0                  | 23                  | 8-9              | 3-5                         |
| 1918 | Lewis <sup>17</sup>             | 2.0                  | 20                  | 8.3              |                             |
| 1923 | Arthur Robinson <sup>18</sup>   | 1.8                  | 23                  | 9.2              | 6                           |
| 1927 | Royster <sup>19</sup>           | 2.5                  | 29.4                | 7.5              | -                           |
| 1932 | Donald C. Collins <sup>20</sup> | -                    | 24.5                | 8.2              | 2                           |
| 2012 | Present Study                   | 2                    | 9                   | 5.436            | 7.035                       |



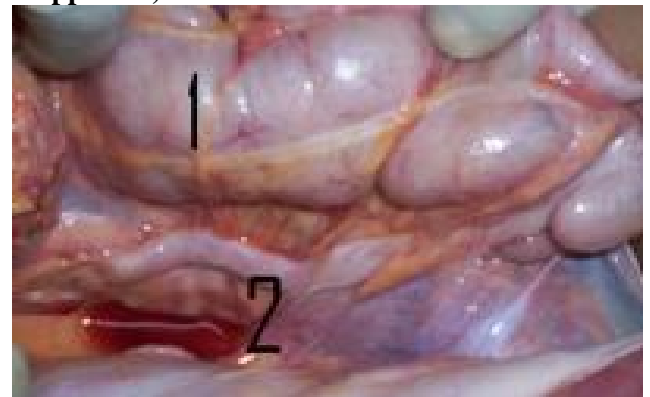
**Fig 1: Retrocaecal Position of Appendix (1-appendix, 2-caecum, 3-ileum)**



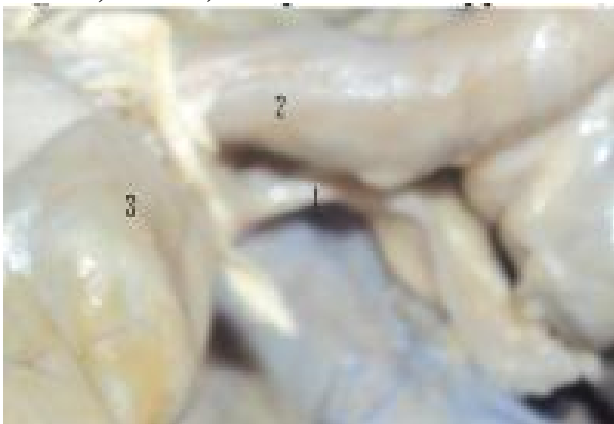
**Fig 4: Subcaecal position of appendix (1-caecum, 2-appendix)**



**Fig 2: Pelvic position of appendix (1-appendix, 2-caecum, 3-ileum)**



**Fig 5: Paracaecal position of appendix (1-caecum, 2-appendix)**



**Fig 3: Post-ileal position of appendix (1-appendix, 2-ileum, 3-caecum)**



**Fig 6: Subhepatic position of appendix (1-liver, 2-bile, 3-appendix, 4-caecum )**

## DISCUSSION

The ultimate position of the appendix is profoundly influenced by the changes in the position and shape which the caecum undergoes during development and growth. The primordium of cecum and vermiform appendix i.e. caecal diverticulum appears in the 6th week as a swelling on the antimesenteric border of the

caudal limb of the midgut loop. After the completion of the gut rotation, the caecal diverticulum occupies a position on the right side of the abdominal cavity<sup>5</sup>.

Table.3 shows the comparison of different positions of the vermiform appendix of present study with other studies

Retrocaecal and retrocolic positions of the appendix were by far the commonest<sup>6</sup> (58%). Incidence of postileal position was also fairly common (10%)<sup>6</sup>. Probably the common position of the appendix (retrocaecal) is its resting position. It might rest in this position if there is no infection in the abdomen. A surgeon or an anatomist can see the position of the appendix only during the surgery or dissection. There are no studies on various positions of the appendix in the same individual on different days/weeks/months/years. Studies of the positions of appendix every month in an individual using a scanner might confirm the hypothesis that vermiform appendix keeps changing its position according to the presence of infection<sup>7</sup>.

Table.4 shows the comparison of length of the vermiform appendix of present study with other studies.

## CONCLUSION

Appendix is the only organ in our body which has not constant anatomical position. Various positions of vermiform appendix are useful to understand the location of site of occurrence of pain during appendicitis. Retrocaecal appendix has symptoms of upper urinary tract infection, due to irritation of the adjacent ureter. In pelvic position pain may be felt when the thigh is flexed and medially rotated, because the obturator internus is stretched. Pelvic appendix may irritate the bladder or rectum causing suprapubic pain, pain with urination, or feeling the need to defecate. Postileal position in some males, can irritate the ureter and cause testicular pain. In sub-hepatic position, the patient have pain in the right hypochondriac region. From various positions of vermiform appendix we can understand the possible outcome of the appendicitis specifically location of site of pain. Appendix is supplied by end artery which is one of cause of occurrence of appendicitis. Appendicular artery which is branch of inferior

division of iliocolic artery goes through appendix along mesoappendix.

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