

Sub-hepatic Caecum with Extra-pelvic Looped Sigmoid Colon: An Embryological and Clinical Perspective

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ABSTRACT

Introduction: We encountered variation in the placement of large intestine in abdominal cavity of a 76-years-old male cadaver during dissection of abdominal cavity. The work was performed in Department of Anatomy during routine MBBS teaching sessions. The aim of this paper is to report co-existence of error of mid-gut development and along with variant topo-morphology of sigmoid colon in the same cadaver.

Case Report: Sub-hepatic caecum with high riding vermiform appendix with absent ascending colon was seen on the right side of abdominal cavity. Concomitantly on the left side of the abdominal cavity dilated, looped sigmoid colon occupied the left hypochondrium, left lumbar region and left iliac fossa. We report these findings along with the embryological basis and clinical significance.

Conclusion: An insight about the errors in development of mid-gut resulting into the variant topography of caecum will facilitate surgeons and radiologists in prompt diagnosis and quick modification of the protocol during invasive procedures.

Keyword: Sub-hepatic Caecum; Dilated Sigmoid Colon; Looped Sigmoid Colon; Malrotation; Intestinal Obstruction.

INTRODUCTION

Caecum and vermiform appendix are blind-ending viscera which are normally located in the right iliac fossa. Caecum is covered by peritoneum throughout which gets reflected posteriorly to the floor of right iliac fossa. The root of appendix is attached to the postero-medial wall of caecum below the ileocolic junction. According to the standard textbook literature, in adults length of caecum is approximately 6 centimeters and length of vermiform appendix ranges between 6-10 centimeters.¹ During intra-uterine life superior mesenteric artery divides the primitive gut into pre-axial and post-axial parts. Further development of the primitive gut involves following sequence of steps-physiological herniation, rotation, retraction, descend of caecum and fixation. Hindrance in any of these steps may result in abnormal placement of the primitive gut derivatives in the abdominal cavity. As a result patient presents with unusual presentation during abdominal catastrophe. Foresaid conditions include sub-hepatic caecum with high riding appendix and extra-pelvic sigmoid colon.²

Along with caecum, post-axial part of the primitive gut gives rise to sigmoid colon. Sigmoid colon commences from the brim of lesser pelvis and extends till the beginning of rectum at the level of third sacral vertebrae. It is located inside the pelvic cavity and hence also called as “pelvic colon”.¹ The

length of sigmoid colon is variable which ranges between 16 to 80 centimeters and caliber 4 to 6 centimeters. Elongated sigmoid colon predisposes to constipation, frequent abdominal pain and volvulus. In addition, it may generate intricacy during sigmoidoscopy.³ Hence must be ruled out in a patient with frequent abdominal pain and constipation.

The sub-hepatic caecum is a rare anomaly seen in 6% of the fetuses with male predilection.² In existing literature the incidence of sub-hepatic caecum in adults is varied. The adult incidence is 0.00009% in south-east Asian countries; however it varies from 0.09-4% in Indian population.⁴⁻⁶

Discrete existence of sub-hepatic caecum and dilated with looped sigmoid colon has been described by many authors.³⁻⁶ The aim of this report is to highlight co-existence of sub-hepatic caecum and dilated with looped sigmoid colon at variant position in abdominal cavity.

CASE REPORT

We observed a rare combination of anomalous position of caecum on the right side and sigmoid colon on the left side of the abdominal cavity of a 76 years old male cadaver in Department of Anatomy. In this case, caecum and appendix were located in right hypochondrium in relation with the inferior surface of right lobe of liver. Caecum was intra-peritoneal and the peritoneum was fixed to the posterior abdominal wall in the right hypochondrium. Right iliac fossa was occupied by coils of ileum. Ileo-caecal junction was located in right hypochondrium on the postero-medial wall of caecum. Caecum continued on the left as transverse colon, thus no ascending colon was seen. Caecum was “adult” type measuring 17×11 centimeters. Base of appendix was on postero-medial wall of caecum, 3.0 centimeters away from the ilio-caecal orifice. The appendix was “pelvic” in position and measured 7.0 centimeters long (Figure 1). Rest of the small intestinal loop, root of mesentery, transverse and descending colon were normal. No fibrous band of Ladd’s was found between caecum and liver.

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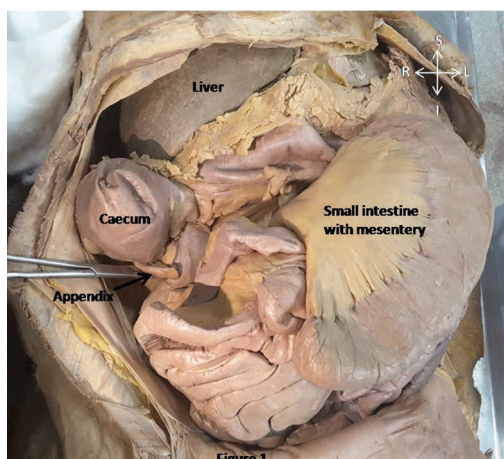


Figure-1: Show the caecum located in right hypochondria inferior to the right lobe of liver, anterior to right kidney and right suprarenal gland. Appendix was “Pelvic type” root of which was attached to the posteromedial wall of caecum.

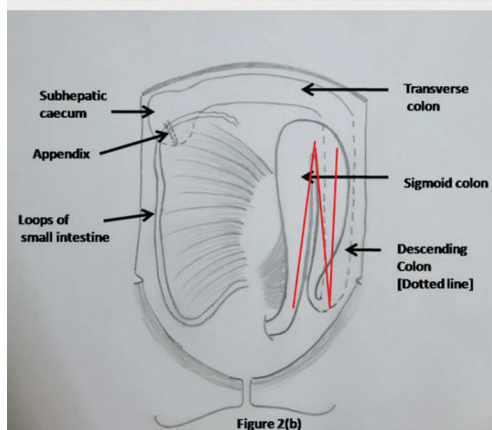
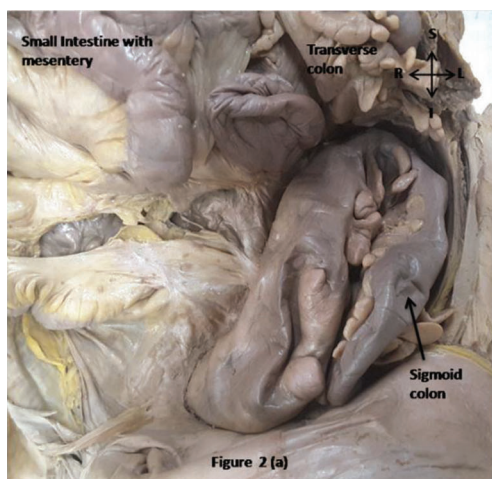


Figure-2: Show sigmoid colon located outside the pelvic cavity and occupied left iliac fossa, left lumbar region and left hypochondria.

Sigmoid colon was located outside pelvic cavity. It occupied left hypochondrium, left lumbar region and left iliac fossa. It started from left iliac fossa then ascended towards the left hypochondrium, turned medially to descend parallel to the ascending segment to reach the pelvic cavity where it continued as rectum. This placement of sigmoid colon in abdominal cavity resembled inverted-U loop arrangement. The summit of the loop was in relation with left kidney

posteriorly and transverse colon cranially (Figure 2). Sigmoid colon was elongated measured 42cm in length along the anti-mesenteric border and dilated with external diameter equal to 13cm. The arrangement of sigmoid colon and retroperitoneal descending colon resembled the alphabet 'N'.

To confirm the cause of dilated caliber of sigmoid colon, full-thickness wall specimen was taken from the distal end of sigmoid colon for histological staining. Histological examination revealed the presence of sub-mucosal and myenteric plexus. Thus the cause of dilated lumen was not congenital but acquired condition.

DISCUSSION

During 11th week of gestation, caecum descends from right hypochondria to right iliac fossa. This descend is attributed to reduction in the size of liver, increase in size of abdominal cavity and disappearance of mesonephric duct. Any hindrance in descend of caecum results in sub-hepatic position of caecum and appendix. The standard textbook explains the cause of sub-hepatic caecum by stating that during embryogenesis if caecum adheres to the inferior surface of liver by a fibrous band of Ladd's, it will ascend rather descend during reduction in the size of liver.^{2,7} In the present case the probable cause of variant position of caecum is early fixation of peritoneum covering the caecal bud which prevented descend of caecum.

The cases of gut malrotation have been reported sporadically.^{3-6,8-10} The cases with sub-hepatic caecum are often asymptomatic throughout life hence remain undiagnosed. This condition becomes clinically significant during appendicitis referred to as sub-hepatic appendicitis, as these cases present with atypical symptom of pain radiating from umbilical region to right hypochondria.⁷ Also due to the close proximity of appendix with the gall bladder, during ultrasound scans sub-hepatic appendicitis may mimic cholecystitis and neglected cases with ruptured appendix may resemble liver abscess.⁸ Prompt diagnosis of sub-hepatic caecum with appendix is essential as in these cases infection from appendix may rapidly invade right kidney and suprarenal gland.⁹ Hence early diagnosis and treatment is crucial to prevent life threatening complications.

On exploring the previous reports, we found only few reports highlighting dilated-looped sigmoid colon outside pelvic cavity referred as 'Dolichocolon'.¹⁰ According to Lopes et al, length and caliber of sigmoid colon depends upon race, altitude, age, dietary habits and incidence of Chagas disease.¹¹ The mean length of sigmoid colon in Negroid population has been reported to range between 10.4-41.5cm and width as 7.4-8cm.¹²

We report a case with length of sigmoid colon towards the higher spectrum of range positioned outside the pelvic cavity and dilated lumen. The sigmoid colon was not sigmoid shaped and greater part was outside pelvic cavity. The sites of attachment of sigmoid mesocolon showed no variation. The sigmoid colon with such a variant anatomy is predisposed to volvulus and hence intra-abdominal hypertension and abdominal compartment syndrome.¹¹

CONCLUSION

We report coexistence of sub-hepatic caecum and appendix with dilated, looped sigmoid colon outside the pelvic cavity. Similar combination had been seldom reported in the past making our study unique. The variations in the anatomical position of abdominal viscera are the pitfalls in the road to patient management. Awareness regarding the probability of encountering cases with these anomalies acts as a diagnostic pearls for the radiologist. The variant anatomy of sigmoid colon must also be acknowledged by gastroenterologist performing colonoscopy. In conjunction with clinicians, this report will enhance the knowledge of anatomists training undergraduates the difference between normal and variant anatomy due to mid-gut developmental defect.

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