



Case Report

Redundant sigmoid colon and its clinical significance

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ABSTRACT

The Sigmoid colon is a 'S'-shaped part of large intestine, connecting descending colon with rectum. It extends from left side of pelvic inlet till third Sacral vertebra. Its mesentery Sigmoid mesocolon, an inverted 'V' shaped fold of peritoneum suspends Sigmoid colon from posterior pelvic wall. Sigmoid colon is the most variable part of large intestine and its variations may often present with serious clinical manifestations. An unusual case of redundant loop of Sigmoid colon was observed in a male cadaver during routine dissection. The loop of Sigmoid colon was found to be extending in the abdominal cavity proper. It first ascended upwards from left iliac fossa as a continuation of descending colon till the level of duodeno-jejunal flexure and then descended downwards in the median plane to become continuous with the rectum opposite third sacral vertebra.

Redundant loop of Sigmoid colon may remain unnoticed or may lead to intestinal or vascular complications. So, knowledge of variations of Sigmoid colon are of great clinical significance for Surgeons, Obstetricians and Radiologists.

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1. Introduction

The Sigmoid [Pelvic] colon extends from lower end of descending colon at the left side of pelvic inlet to third sacral vertebra, to become continuous with rectum. It is 37.5 cm long, 'S' shaped loop, hangs freely in the lesser pelvis, in front of bladder and uterus, below the loops of ileum. The loop of Sigmoid colon consists of three parts- first part runs downward along the left pelvic wall, second part traverses the pelvic cavity horizontally between bladder and rectum in male and uterus and rectum in female and third part runs backwards in the midline to third sacral vertebra to continue as rectum.¹

The Sigmoid colon is suspended from posterior pelvic wall by a peritoneal fold called Sigmoid mesocolon, which

has an inverted 'V' shaped attachment on the posterior pelvic wall, with its left limb attached along the upper half of external iliac artery and its right limb directed downwards and to the right to third sacral vertebra. A pocket-like extension of peritoneal cavity called inter-Sigmoidal recess is present posterior to the root of mesocolon with the left ureter lying posterior to this recess. The inferior mesenteric artery divides near the apex with its superior rectal branch entering the right limb and Sigmoidal branches entering the left limb.²

Sigmoid colon the most variable part of large intestine shows variations in its length and position, which can be attributed to its anomalous development and fixation during rotation of gut. These variations are of great clinical significance owing to be having both functional and pathological implications.³⁻⁵ Netter has described four different types of disposition of Sigmoid colon.⁶ Type A

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normal type, found in majority of individuals, presents as a loop downwards and to the left. Type B shortest type, extends obliquely downwards towards the median plain. Type C is deviated horizontally towards the right. Type D is curled in upward direction.

Type B, C and D may develop complications and present with different conditions.⁷ The redundant [increased length] Sigmoid colon with narrow pelvic mesocolon is susceptible to volvulus because of its increased length and thus mobility with development of adhesions of its antimesenteric border with parities or to any other viscera. These rotations may correct spontaneously or may increase to produce obstruction of its lumen and hampering its blood supply. This may present clinically as constipation, discomfort in abdomen, indigestion, loss of weight, insomnia, pain and tenderness in iliac fossa. These clinical features can mimic gastric ulcer, heart disease, chronic bowel obstruction and appendicitis. It may also predispose to development of varicocele owing to greater chances of compression of left testicular vein. These variations of Sigmoid colon may also present challenges for surgeons during endoscopy and for radiologists during various diagnostic techniques.^{3,5,7} Therefore, knowledge of these anomalies is of paramount importance.

2. Case Presentation

An unusual case of redundant Sigmoid colon was observed in a male cadaver during routine dissection. It measured 45 cm in length and its loop was found to be extending in the abdominal cavity proper. It first ascended upwards from left iliac fossa as a continuation of descending colon till the level of duodeno-jejunal flexure posterior to the transverse colon and then descended downwards in the median plane to become continuous with the rectum opposite third sacral vertebra. The descending limb was found attached to the left surface of mesentery of small intestine by a band of peritoneum. The Sigmoid mesocolon was seen as a narrow, elongated 'U' shaped fold of peritoneum. No variation was observed in the blood supply of this part of colon.

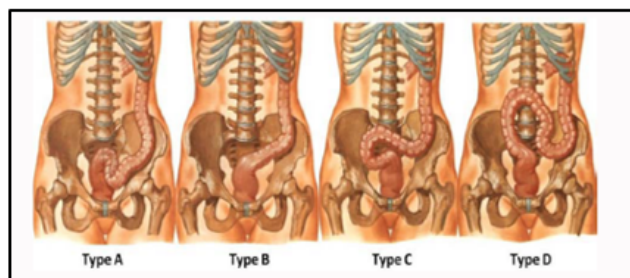


Figure 1: The types of sigmoid colon [type A- normal type, type B-short type, type C - right deviated, type D- superior type].⁶

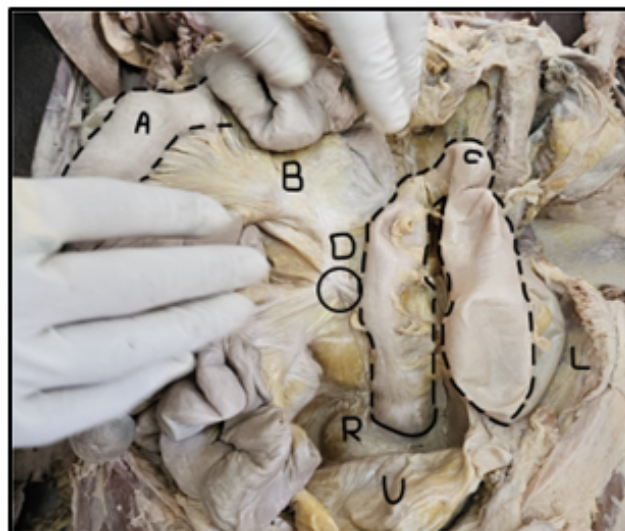


Figure 2: Redundant sigmoid colon in median plane [A: Small intestine, B: Mesentery of small intestine; C: Redundant Sigmoid colon; D: Band of peritoneum connecting descending limb of Sigmoid colon to the left surface of mesentery of small intestine, R- Rectum, U- Urinary bladder, L- Left iliac fossa.]

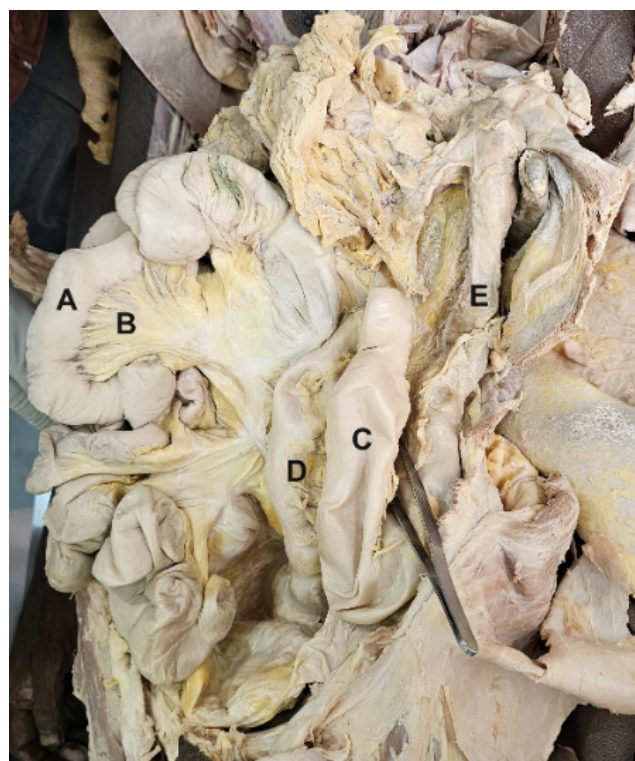


Figure 3: Descending and sigmoid colon after shifting small intestine to right [A: Small intestine; B: Mesentery of small intestine; C: Ascending limb of redundant Sigmoid colon; D: Descending limb of redundant Sigmoid colon; E: Descending colon.]

2.1. Embryological basis

The Sigmoid colon develops from pre-allantoic part of hindgut, which during rotation of midgut, gets pushed to the left side of abdominal cavity and later descend down into the pelvic cavity. The dorsal mesentery of Sigmoid colon persists as Sigmoid mesocolon.⁸ Variations found in the position of Sigmoid colon could occur because of defects in intestinal fixation⁹ and redundancy may result from abnormal elongation of hindgut during development.¹⁰

3. Discussion

Variations of Sigmoid colon, especially its redundant variety constitute a major risk factor for developing Sigmoid volvulus, as it may rotate around its long, narrow mesocolon to produce intestinal obstruction and lympho-vascular congestion.⁷ It may also pose difficulties during instrumentation and imaging procedures.^{3,5,10} It encumbers Sigmoidoscopy, colonoscopy, barium enema radiography and may be a potential threat for developing varicocele. Sigmoidoscopic decompression is the treatment of choice in such cases, with an efficacy of 40-90%.⁷

Variation of Sigmoid colon similar to ours have been reported in literature by various authors. Nayak SB et al. in 2012 found redundant Sigmoid colon with the apex of inverted loop near left colic flexure.³ Asadi FY et al. in 2020 observed redundant Sigmoid colon in a 55 years old male patient during barium enema radiography.¹¹ Sigmoid colon was seen as inverted 'U' shaped loop having ascending and descending limb before entering into pelvis with its apex lying posterior to the transverse colon. Zekosta M et al.⁷ in 2018 observed a case of redundant Sigmoid colon, in which the ascending loop first passed between mesentery of small intestine and abdominal aorta, and then the descending loop passed between the mesentery and inferior vena cava. Redundant Sigmoid colon with elongated and abnormally placed mesocolon is at high risk for accidental injury during surgery and may hamper the function of adjacent viscera. Davit HW et al in 2017 found an abnormally elongated Sigmoid colon 66 cm in length and 7 cm diameter placed over the spleen, transverse colon and left lobe of liver.¹²

However, Sigmoid colon was found in some other locations in the abdomen by different authors. Dhivyalakshmi et al.¹³ in 2019 observed Sigmoid colon extending towards right iliac fossa. Mandeep S et al.¹⁴ in 2018 observed redundant descending colon and Sigmoid colon directed towards the right side of abdomen in barium enema and CECT abdomen of a 62 years old male patient with abdominal distension, constipation, hemorrhoids and blood in stool. Nayak SB et al.¹⁵ in 2016 found a loop of descending colon below the level of left kidney which continued as Sigmoid colon with straight course in the median plane before continuing as rectum opposite sacrum. The descending colon possessed mesocolon which continued as the mesocolon of the Sigmoid colon. B Alka

et al.¹⁶ in 2023 observed a right sided redundant loop of Sigmoid colon. Sukru Sahin et al.¹⁷ studied 1,72,000 CT images of gastrointestinal tract from 2013 to 2020 and found 5,375 cases [3.13%] with intestinal malrotation. Redundant Sigmoid colon was observed in 23 cases [0.43% of cases with intestinal malrotation and 0.013% of total population].

4. Conclusion

A redundant loop of Sigmoid colon is a rare congenital variation that may lead to serious clinical conditions and can present challenges to clinicians. They may complicate surgical manoeuvres and radiographic analysis. Thus, thorough knowledge of these malformations is of paramount importance for surgeons, obstetricians and radiologists.

5. Source of Funding

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6. Conflict of Interest

No conflict of interest in this paper.

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