

Anatomical Study of Sigmoid Colon

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Abstract: In this era there is increased incidence of carcinoma of the large bowel, sigmoid colon is one of the commonest sites affected. The knowledge of this study is of immense value in which surgery should be planned in resection of this region & need to be investigated. The knowledge of the anatomical study of sigmoid colon is having great importance in patients with carcinoma of Rectum the sigmoid colon is often selected as site for performing a colostomy. The mobility of sigmoid colon makes it suitable for implantation of the ureters after surgical removal of bladder. Sigmoid colon shows great variation in its length as the length is more it can cause pathological condition like volvulus.

Laparoscopic colorectal interventions in sigmoid diverticulitis are, for the most part, carried out as elective procedures for peridiverticulitis, stenosis, or recurrent attacks of inflammation. The conversion, complication, and mortality rates associated with these interventions are acceptable. Laparoscopic procedures in Hinchey stages I to IV sigmoid diverticulitis and in the presence of fistula and bleeding are more likely to be associated with complications, and should be carried out only by highly experienced laparoscopic surgeons. For that importance to conduct the sigmoid colon surgeries and procedures here we are studying about sigmoid colon shape, location and length.

Keywords: Sigmoid Colon, Shape of Sigmoid Colon, Location of Sigmoid Colon, Length of Sigmoid Colon

I. Introduction

Sigmoid colon is continuation of the descending colon begins at the left pelvic brim & ends at the rectosigmoid junction in front of the third sacral vertebra. Functionally it form the storage [or] reservoir for the faecal matter until the final evacuation and as such is distended to a great extent than other regions of the gut. The name sigmoid is given for this part of colon as it usually describes two bends resembling the shape of a Σ [greek letter sigma].

Sigmoid colon lies in the pelvic cavity between the rectum and bladder in males, and rectum and uterus in females. The sigmoid loop ends relatively constant position lie just to the left of the mid line at the level of the left of the mid line at the level of the left of the mid line at the level of the third sacral vertebra where it bends inferiorly continues with the rectum.

It forms a variable loop of about 40cms it lies normally in the lesser pelvis. If it's long the sigmoid loop may arises out of the pelvic in the abdominal cavity & lie in contact with loop of ileum.

Sigmoid loop is fixed at its junctions with descending colon & rectum and quite mobile between them. It is suspended by a fold of peritoneum from the posterior abdominal wall forming a mesentery, the sigmoid mesocolon.

Position and shape of the sigmoid colon vary according to the length of the colon. The length and mobility of its mesocolon. The degree of distension is when distended it rises in the abdominal cavity and sinking again in to the lesser pelvic when empty.

The details of sigmoid colon have been evidence of fact that has a great value. As it is seat for pathological condition. Pathological conditions are acquired. They are as follows.-carcinomas, volvulus, colonic varices, diverticulosis, ulcerative colitis, Epiploic appendicis, Diverticulitis.

Congenital anomalies: congenital mega colon, atresia, duplication, Complications occurring due to surgical procedures of colon like Resection of colon, resection can cause the complications like Stricture & ischemic colitis. Surgery should be planned in resection of this region in view of the arterial supply and arterial supply need to be investigated. The procedure to study the sigmoid colon Radio imaging techniques like, sigmoidoscopy, colonoscopy, Barium Enema.

II. Materials and Methods

In regular dissection for the undergraduates in siddhartha medical college, vijayawada we observed the specimens from the cadavers during the year 2011 to 2015. The total number of cadavers are 50. Out of them 10 are females, 40 are males. While dissecting the abdomen we followed the descending colon upto the sigmoid colon. The sigmoid colon is suspended by a fold of peritoneum from the posterior abdominal wall known as sigmoid mesocolon which is inverted V shaped. We observed the location shape and length of the sigmoid

colon. After that measurement of sigmoid colon is done with the help of thread along the anti mesenteric border. The length of the thread is kept on the scale and measured in centimeters.

III. Observations

Shape of the Sigmoid Colon - It is observed that in all 50 specimens the shape of the sigmoid colon is in the form of 'S' shape or Σ [greek letter sigma].

Location of Sigmoid Colon - In all cases sigmoid colon is located in the lesser pelvis.

Length of Sigmoid Colon - Total number of variation is one out of 50 specimens. The sigmoid colon is attached 3cm above the descending colon in adult female specimen. The specimen length of sigmoid colon is 22 cms. It starts from the left pelvic brim and ends at the recto sigmoid junction at the level of third sacral vertebra. The percentage of the variation is 2 per 100 specimens.

In the present study, the length along the Anti mesenteric border in Males (Adults) varies from 27 cms to 46 cms. In 16 out of 40 males the length varied from 33 to 38cms, the remaining Males 14 are between the 39cms to 46cms and 10 members are between 27 to 32 cms. So the average length of sigmoid colon along the anti mesenteric border in male adults varies from 27 to 46cms where as the average length in male adults is 36.5cms shown in Table I & Table II.

Where as in females 6 out of 10 are having length of sigmoid colon in between 22 to 32cms. 3 out of 10 are having in between 39 to 46cms, and the remaining 1 is having the length between 33 to 38cms, where as the average length in case of Adult female is 32.6cms shown in Table III.

IV. Figures And Tables

Table I: Average length of Sigmoid Colons in Adults (Length in centimeters)

	maximum	minimum	average
Male	46	27	36.5
Female	45	22	32.6

Table II: Observations of Length of Sigmoid Colon in Adult Male (40 observations)

Length in centimeters	No. of Adults	Percentage (%)
27 to 32	10	25%
33 to 38	16	40%
39 to 46	14	35%

Table III: Observations of Length of Sigmoid Colon in Adult Female (10 observations)

Length in centimeters	No. of Adults	Percentage(%)
22 to 32	6	60%
33 to 38	1	10%
39 to 46	3	30%

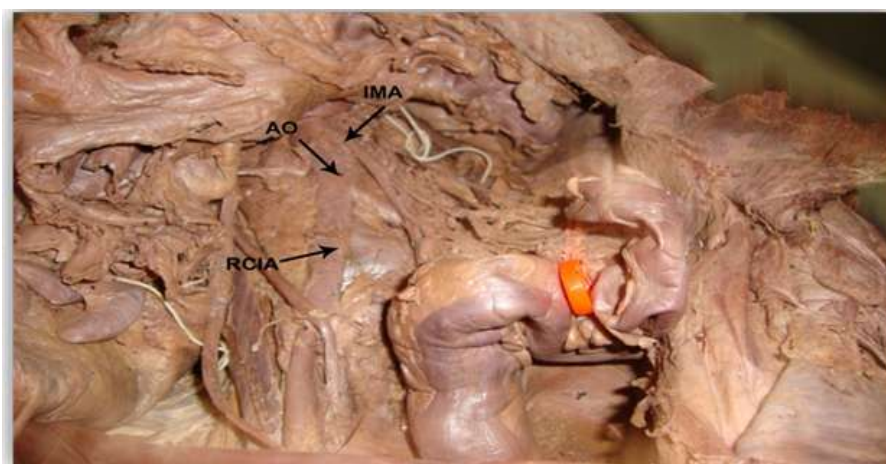


Figure 1: Showing Sigmoid colon in lesser pelvis
 IMA – Inferior Mesenteric Artery, AO – Abdominal Aorta, RCIA – Right Common Iliac Artery

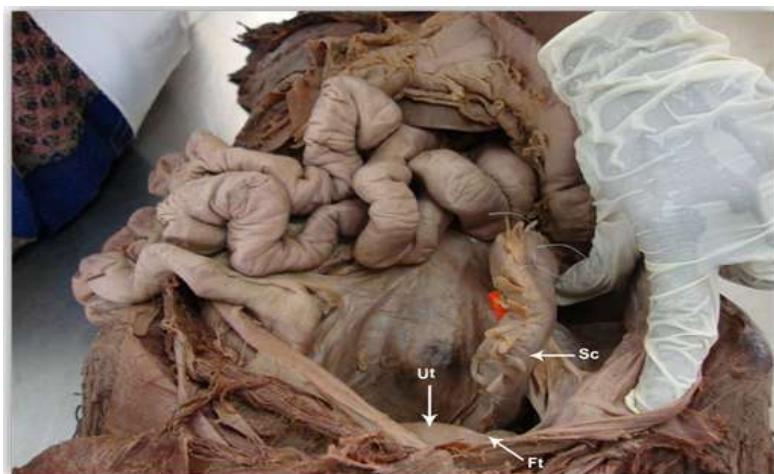


Figure 2: Showing ‘S’ shaped Sigmoid Colon, SC – Sigmoid Colon, FT – Fallopian Tube, UT - Uterus

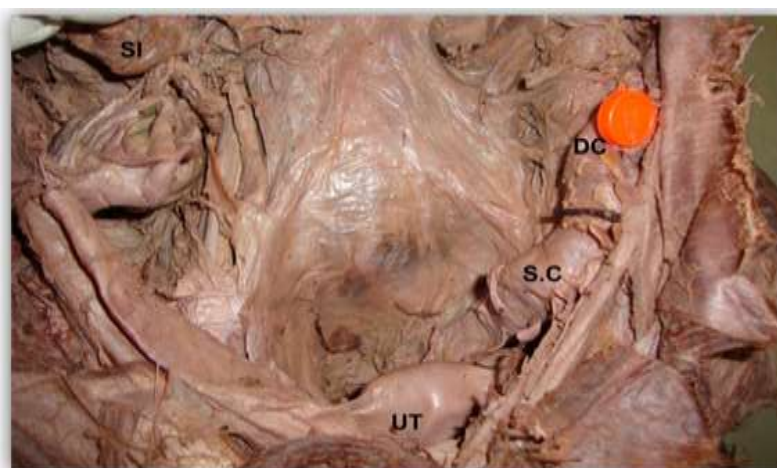


Figure 3: Showing the sigmoid colon is attached 3 cm toward the descending colon SI – Small Intestine, SC – Sigmoid Colon, UT – Uterus, DC – Descending Colon

V. Discussion

Length of Sigmoid Colon - Average length of sigmoid colon is described by all authors as 40cm. According to Cunningsham's the length of sigmoid colon varies from 16 - 80 cm. In the present study average length of sigmoid colon in Adult male is 36.5cms, whereas in adult female is 32.6cms. In the present study average length of sigmoid colon in Adult male is 4cm more, when compared to Adult females.

Name of the author	Length in centimetres
Grays anatomy	40cm
A.K.Dutta	40cm
Cunningsham's manual of Practical anatomy	16-80cm
W. Henry Hollinshead	40cm
T.S.Ranganathan	40cm
B.D.Chourasia	40cm
Inderber singh Text book of anatomy	40cm
Present study	40cm

Shape of Sigmoid Colon - Shape of sigmoid colon is described as ‘S’ shape or Σ shape by W.Henry Hollinshead, as sinuous loop by B.D.Chourasia, all the remaining authors described the direction as downwards to the right and then downwards. In the present study the shape of sigmoid colon resembles the shape of ‘S’ in

most of the cases (adults and fetuses).so the present study is coinciding with all the authors. Course (Direction) of sigmoid colon described by all the authors also resemble the shape of ‘S’.

Name of the author	Shape
Gray’s Anatomy	Directed initially downwards to the right and then downwards.
A.K.Datta	Directed initially downwards to the right and then downwards.
Cunningham’s manual of practical anatomy	Directed initially downwards to the right and then downwards.
T.S.Ranganathan	Directed initially downwards to the right and then downwards.
W. Henry Hollinshead	‘S’ shape or Σ shape
B.D.Chourasia	Sinuous loop
Last’s anatomy regional and applied	Directed initially downwards to the right and then downwards.
Callender’s surgical anatomy	Directed initially downwards to the right and then downwards.
Present Study	‘S’ shape.

Location of Sigmoid Colon - Starting point of the sigmoid colon is located at the left pelvic brim according to the most of the authors like Gray, A.K.Datta, cunningham’s manual of practical anatomy, T.S.Ranganathan, W.Henry Hollinshead, Essentials of Human Anatomy by Russell., T.wood burne, Text book of Anatomy by Inderber singh, where as Barry.J.Anson Surgical Anatomy described that iliac crest as the starting point. All the authors described the end point corresponding with 3rd sacral vertebra.

In the present study, most of the cases starting point is located at pelvic brim on left side and end point is located just infront of 3rd sacral vertebra. So in the present study, starting point is coinciding with all the authors except Barry.J.Anson Surgical Anatomy, end point is coinciding with all the authors.

Name of the author	Starting point	Ending point
Gray’s Anatomy	Pelvic brim on left side	Infront of 3 rd sacral vertebra
A.K.Datta	Pelvic brim on left side	Infront of 3 rd sacral vertebra
Cunningham’s manual of practical anatomy	Pelvic brim on left side	Infront of 3 rd sacral vertebra
T.S.Ranganathan	Pelvic brim on left side	Infront of 3 rd sacral vertebra
W. Henry Hollinshead	Pelvic brim on left side	Infront of 3 rd sacral vertebra
Barry.J.Anson Surgical Anatomy	Iliac crest	Infront of 3 rd sacral vertebra
Essentials Of Human Anatomy by Russell., T.Wood burne	Pelvic brim on left side	Infront of 3 rd sacral vertebra
Text book of Anatomy by Inderber Singh	Pelvic brim on left side	Infront of 3 rd sacral vertebra
Present Study	Pelvic brim on left side	Infront of 3 rd sacral vertebra

According to our observations the study references mentioned in references are suggestive of importance of our study

VI. Conclusion

Out of 50 specimens all are located in the lesser pelvis corresponding from the pelvic brim on the left side upto the third sacral vertebra. The average length of sigmoid colon in adult male is 36.5cms and in adult female is 32.6 cms. The shape of sigmoid colon is ‘S’ shaped in all specimens. We observed that length of adult male sigmoid colon is 4 cms more when compared to the adult female sigmoid colon. So the frequency of sigmoid volvulus is more in adult males than in females. Here we are concluding that our study may helpful for the surgeons for doing colonoscopy and surgical procedures related to the sigmoid colon.

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