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Case Report

Incomplete rotation and zygosis of gut: A case report

Mamata Sar*, Srikanta Kumar Mishra, Manoj Kumar Dehury

Department of Anatomy, VSS Institute of Medical Science and Research, Burla, Odisha, India

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ABSTRACT

During routine dissection practice we observed that in a 50 year old male cadaver the large intestine was situated in the left half of abdominal cavity and small intestine was on the right side. We studied the detailed organisation of different parts of gut and their derivatives and tried to find out its embryological significance. This type of arrangement of gut happens when the mid gut tube fails to rotate during its return into abdominal cavity after its development in the umbilical coelome. Ascending colon and distal duodenum were not fixed to the posterior abdominal wall due to failure of zygosis. This case is not only important for us from academic point of view but is very much important for surgeons and radiologists as well. So we would like to share this unique experience through this case report.

1. Introduction

Development of midgut is a complex process. It has to herniate and develop in the extra embryonic coelom till 10th week of intra uterine life. When the size of abdomen increases and liver size reduces it returns back. During this process midgut rotates by 270° anticlockwise. Any deviation in this course of development will lead to mal rotation of gut.

During routine dissection practice we observed in a 50 year old male cadaver all the parts of large intestine were in the left half of abdominal cavity and small intestine occupied the right half. As this type of organisation can occur due to non rotation of gut it complements to our academic interest. Abnormality in rotation is also accompanied by abnormal zygosis. So we studied this case thoroughly to derive its embryological significance.

The change in relative position of organ misleads the radiologists and clinicians creating confusion in diagnosis. These cases are commonly complicated by volvulus, intestinal obstruction and vascular compression. So awareness about such abnormalities can avoid missing diagnosis and problems in surgery.

2. Methods

In a 50 year old male cadaver while demonstrating the normal disposition of abdominal viscera to the 1st year MBBS students we reflected the coils of small intestine to the left to show the ascending colon in the right paravertebral gutter. But it was found to be empty. Then we searched for the caecum and appendix which was on the left side. From there we traced all parts of the colon and also searched for other associated abnormalities.

3. Case report

The study of relative position of abdominal viscera showed that the small intestine starting from 3rd part of duodenum to the distal part of ilium occupied the right half of abdominal cavity (Fig. 1). The terminal part of ilium crossed the vertebral column to the left and opened to the caecum on its lateral aspect. The appendix was attached to the caecum just below the iliocaecal junction. Ascending colon was on the left side and ascended up to right colic flexor. The right colic flexor was in its normal position under the right lobe of liver. The transverse colon, left colic flexor and descending colon were also in their normal position. Large intestine occupied the left half of abdominal cavity. Pelvic colon was in the centre of the area, bounded by all other parts of colon

* Corresponding author at: Department of Anatomy, VIMSAR, Burla, Dist. Sambalpur, Odisha, 768017, India.
E-mail address: mamatasar@gmail.com (M. Sar).

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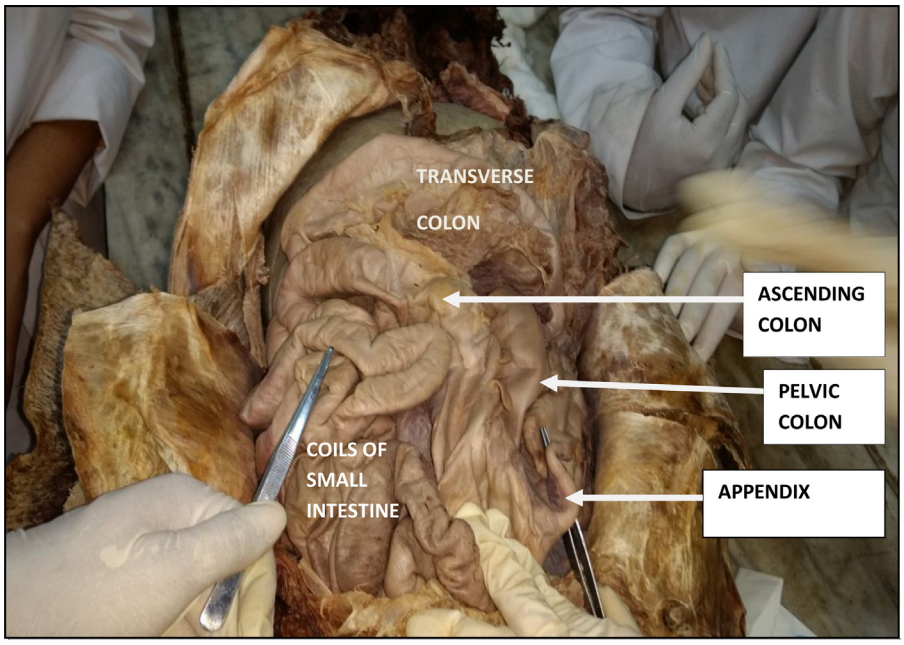

Fig. 1. Abdominal cavity showing small intestine on the right side and large intestine on left.

(Fig. 2). A large part of the gut starting from 3rd part of duodenum to the left colic flexor was suspended by a common mesentery attached transversely from right to left at the level of 3rd lumbar vertebra (Fig. 3). Mesentery was unusually long, attached by a narrow base (Refer Fig. 3). 3rd and 4th part of duodenum which normally loses its mesentery by zygosis was suspended by the mesentery. The ascending colon which should normally be secondarily retroperitoneal was also suspended by the same mesentery (Fig. 3).

4. Discussion

The midgut extends into the umbilical coelom having already rotated through an angle of 90° anticlockwise. This relative position is roughly maintained so long as protrusion persists during which time the proximal limb which forms small intestine elongates rapidly.[1] At this stage the cranial segment of midgut loop which develops into small intestine, remains on the right side and caudal segment is shifted to the left. By the time the foetus has attained a length of 40 mm (10 weeks) the peritoneal cavity has enlarged and the relative size of liver and mesonephos is much less. The re-entry of gut occurs rapidly and in a particular sequence during which it continues the process of rotation.[1] But at the time of reduction of physiological hernia if the umbilical ring is unusually wide the whole midgut loop may return at a time without undergoing rotation so that its cranial and caudal segment remain on the right and left half of abdominal cavity respectively. The present case with small intestine on right and large intestine on left resulted from arrest of 2nd and 3rd stage of rotation taking place during reduction of physiological hernia. This congenital abnormality is described as non rotation of gut.

The mesentery of jejunoileal loop is at first continuous with that of ascending colon. When the mesentery of ascending colon fuses with posterior abdominal wall, the mesentery obtains the new line of attachment.[2]

In the present case ascending colon did not lose its mesentery. So the foetal position of mesentery is maintained i.e. mesentery was transversely attached to the posterior abdominal wall by a short root at the level of 3rd lumbar vertebra. The mesentery was abnormally long in size with a narrow base of attachment. Non rotation results in undue narrow base and lengthening of mesentery leading to torsion and volvulus.[3]

5. Conclusion

Change in relative position of organs leads to missing diagnosis of cases like appendicitis. Clinical presentation will be different and the procedure of surgery will also change depending on its position.[3] So knowledge on congenitally abnormal position of parts of intestine is very much required for the clinicians as well as radiologists. Midgut volvulus and intestinal obstruction are common complications of abnormalities in rotation of gut. So any patient with signs and symptoms of intestinal obstruction should be investigated to rule out mal rotation of gut.

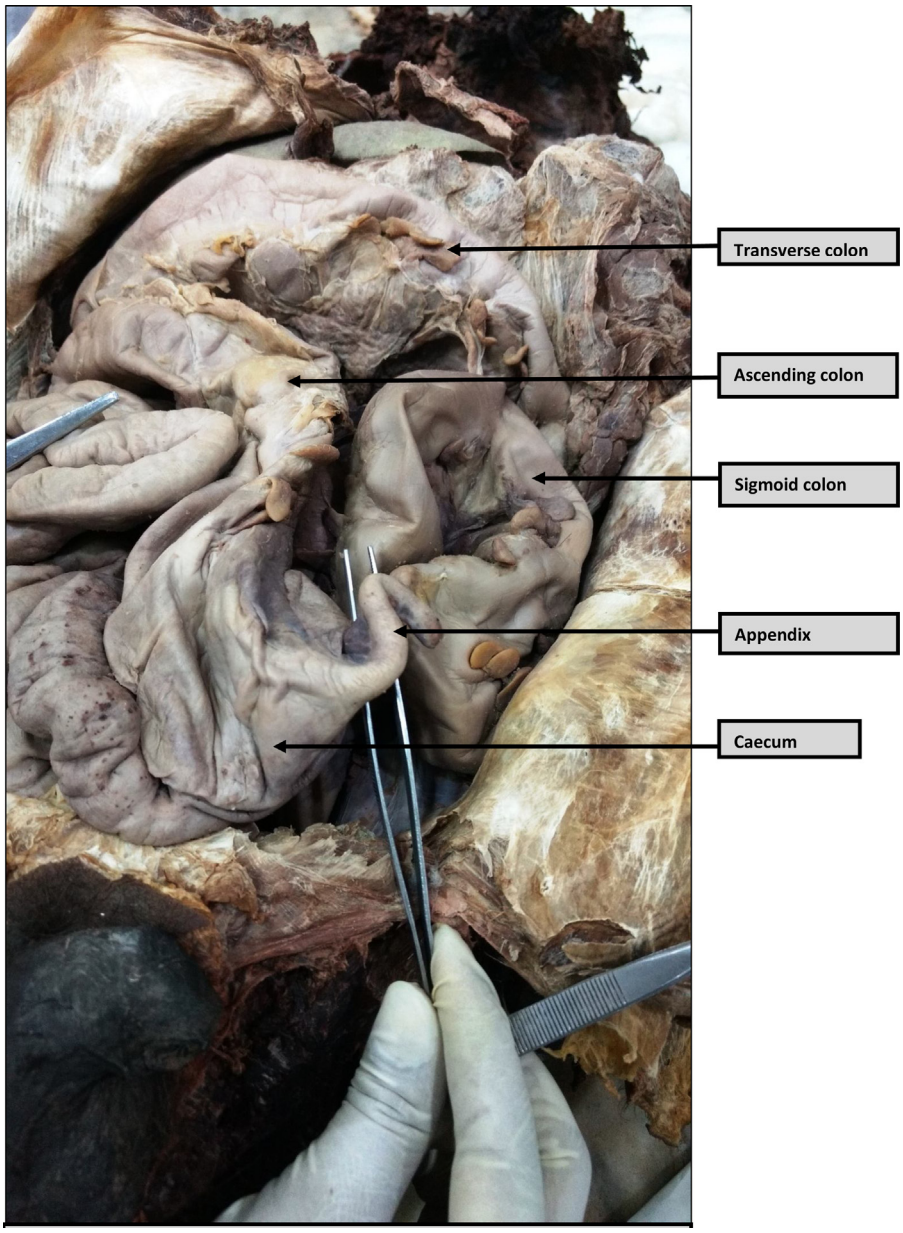

Fig. 2. Left half of abdomen occupied by large intestine. Large intestine identified by the presence of appendices epiploicae.

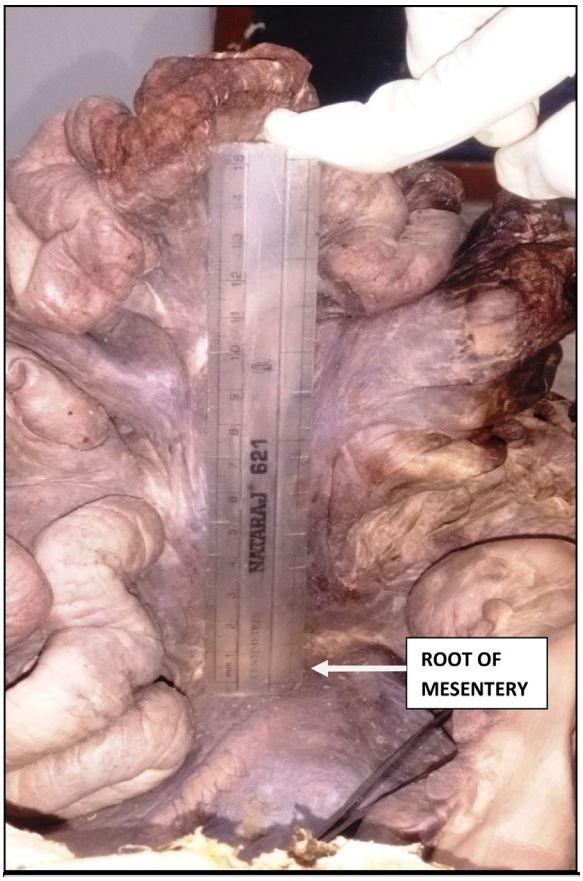

Fig. 3. A long mesentery attached by a narrow base.

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