VOLVULUS RESULTING FROM ABNORMAL DEVELOPMENTAL FIXATION OF THE SMALL INTESTINE

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At an operation for an intestinal obstruction an unusual disposition of the peritoneal relationships and the blood supply of the whole small bowel was found. There was apparently failure of normal fixation during the third embryological stage of rotation.

Dott has described in detail the development of the midgut, which is that part of the gastrointestinal tract extending from the biliary papilla to the left half of the transverse colon. A short résumé of the normal course of events will serve to make clearer the findings in this patient.

NORMAL EMBRYOLOGY

During the first and second stages of rotation the midgut, from being a single, partially extra-abdominal loop, elongates and migrates from the umbilical cord into the abdominal cavity by a series of manoeuvres which leads to the normal disposition of the small and the large bowels.

In the so-called third stage of rotation the following sequence of events takes place: 'This stage is characterised by the further descent of the caecum, and by the fixation of certain portions of the intestine to the posterior abdominal wall by fusion of their mesenteries with the posterior parietal peritoneum. By elongation of the colon, the caecum is caused to descend, so that by the fifth month it has reached the level of the iliac crest. The lower part of the duodenum, having arrived in its retro-arterial position, becomes fixed there by fusion of its mesentery with the posterior parietal peritoneum, and with that of the mesenteric pedicle in front. The duodeno-jejunal flexure is formed and fixed. The superior mesenteric artery is directed towards the right iliac region by the migration of the caecum to that site. At about the twelfth week the mesentery becomes adherent from above downwards to the posterior abdominal wall along the line of the artery. The area of adhesion spreads out towards the right until the ascending colon and caecum become quite fixed. Thus that portion of the post-arterial mesentery in relation to the caecum, ascending colon and hepatic flexure is entirely obliterated by fusion. The post-arterial mesentery of the transverse colon persists as its mesocolon. To the left of the line of adhesion along the superior mesenteric vessels, the pre-arterial mesentery remains free as the mesentery of the small intestine. In this way the line of fusion comes to constitute the wide, obliquely placed root of the mesentery of the small intestine. The mesentery of the hindgut is completely obliterated from its attachment along the midline to the left loin, by fusion with the posterior parietal peritoneum; thus the colon from the splenic flexure to the left iliac region becomes fixed. A free mesentery is of course retained at the sigmoid flexure. The practical importance of the third stage lies less in the minor degree of rotation it completes, than in the fixation of the parts in such a way that displacement, and especially torsion and volvulus, are rendered impossible. Thus the ileo-caecal angle is held steady by adhesion of the caecum and ascending colon. The mass of small intestine originally dependent from a very narrow pedicle at the origin of the superior mesenteric artery, acquires a wide secondary attachment along the 'root of the mesentery' and is stabilised by it (Dott).

CASE REPORT

In this case the whole of the small intestine was suspended by a narrow pedicle, due to the failure of normal fusion of the primitive mesentery along the line of the superior mesenteric. At the same time the caecum and ascending colon, though more mobile than normal, were fixed and could not be lifted up and turned towards the spleen.

History. A Mchopi Native male aged 28 years was admitted to hospital at 2.30 p.m. on 7 November 1947 with acute abdominal pain which had commenced suddenly at midday on that date. He had vomited with the onset of pain, which was griping in nature and continuous between spasms. It was severe enough to make him roll about in bed. There was slight distension of the abdomen, mainly central, and tenderness on pressure. No mass could be felt. A flat X-ray revealed multiple fluid levels. An enema was followed by a large result, but without relief of his pain. He vomited several times in bed, the vomitus consisting of stomach contents, and then bile.

A diagnosis of acute intestinal obstruction was made.

Operation. 7 p.m. General anaesthesia was given by Dr. V. Wright, and Dr. D. Hendry assisted. A mid-line incision extending above and below the umbilicus was made. Free fluid slightly blood-stained was encountered on opening the peritoneum. Distended and cyanotic small bowel immediately presented. The caecum was found not to be distended. It was more mobile than normal as it could be delivered into the mid-line incision. It was, how-
ever, fixed, and the ascending colon could not be mobilised. The whole of the small bowel was brought out on to the abdominal wall. There were small areas of haemorrhage in the neighbourhood of the Peyer’s patches and in the root of the mesentery. When the whole mass of small bowel was turned through \(180^\circ\) in a clockwise direction, the normal pink colouration returned to the whole length of bowel from a point just distal to the duodeno-jejunal junction to the terminal portion of the ileum near the ileo-caecal junction.

Further examination revealed that the whole small bowel was suspended by a pedicle just below and to the right of the duodeno-jejunal flexure. The mesenteric pedicle was anterior to the third part of the duodenum and was crossed anteriorly by transverse colon, so that the first and second stages of rotation during development had been normal. The caecum, though more mobile than usual, was fixed, as was the ascending colon. When all the small bowel was lifted towards the liver, the posterior abdominal peritoneum from duodeno-jejunal flexure to caecum was seen to be smooth and continuous and with no normal line of attachment of the mesentery of the small bowel.

The vascular supply of the entire small intestine could be grasped by passing the hand from the duodeno-jejunal flexure towards the patient’s right. The terminal ileum and the supero-medial angle of the ileo-caecal junction were normal, with fusion of the peritoneum to the posterior abdominal wall.

After these points had been verified the small bowel was returned to the abdominal cavity. No attempt was made to fixate the bowel, as it was considered that with the narrowed primary pedicle, the creation of any further ones would be unwise. The abdominal incision was closed. Post-operatively he was put on Wangensteen duodenal suction. He made an uneventful recovery. The prognosis about future twists is precarious.

The unusual features in this case were:

1. The single mesenteric pedicle suspended the entire small intestine;
2. Despite this, the caecum and the ascending colon were fixated.

REFERENCE


RADIOLOGICAL CASE BOOK. XIII

EXTENSIVE CALCIFICATION OF THE PERICARDIUM

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M. M., aged 42, a hospital dresser from Nyasaland, was admitted on 18 July 1947 under Dr. Grek, complaining of cough. He felt well until three days before admission, when he developed a dry cough. There was no pain. He stated that he had ‘chest trouble’ in 1937.

On Examination. His throat was congested. No abnormal physical signs were noted in the chest or the heart. Blood-pressure 200/150 mm. Hg. He was not febrile on admission. Pulse and respiration were normal.

Radiological Examination. Very extensive calcification of the pericardium was demonstrated (Figs. 1-3). Screen examination showed limited pulsation of the heart, but normal pulsation of the aorta.

The patient was discharged after three days with a clinical diagnosis of tracheitis.

Comment. In view of the absence of any symptoms or physical signs in relation to the cardiovascular system, and the indefinite history of ‘chest