VOLVULUS OF THE CAECUM

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Three cases of volvulus of the caecum are presented and their symptoms and treatment are discussed. It is suggested that this condition may be commoner than is thought and would be diagnosed more frequently if considered in the differential diagnosis.

Volvulus of the alimentary tract accounts for 10% of all intestinal obstructions. It occurs most frequently in the sigmoid colon, less so in the small intestine and caecum, and least of all in the transverse colon. Whereas volvulus of the sigmoid colon is a well-known and well-documented entity, volvulus of the caecum is considered a rarity, a review of the literature published in English showing that only about 400 cases have been reported since Rokitansky's first case in 1839. Despite this, the three cases reported here are all seen inside five months in a general hospital of moderate size. This report is presented with the idea that perhaps this condition is much commoner than the textbooks suggest, and, if it is kept in mind, pre-operative diagnosis is possible and appropriate treatment may be started at an earlier stage than it usually has been.

Case Reports

Case I.—Mrs. L. W. is an old-age pensioner, aged 77, who was admitted to hospital on November 26, 1958, having had abdominal pain for 10 days. This pain was colicky in nature and worst in the left iliac fossa. She was nauseated and had anorexia but had not been vomiting, being able to keep down small amounts of water. She said that she was usually constipated and often passed no motions for three or four days, but she had passed none for eight days before admission; she had, however, been passing flatus each day. She had been quite well previously and had had no abdominal operations.

On examination Mrs. L. W. was a thin, dehydrated patient who was in no great pain. Her pulse rate was 100/minute and her blood pressure 190/100 mm. Hg. Examination of the heart and lungs showed no abnormality. The abdomen was distended symmetrically, being tender all over, the left side more than the right, but there was no rebound tenderness and no definite masses were felt. Bowel sounds were heard but were much reduced. Rectal examination revealed no abnormality, and repeated enemata yielded no result.

A provisional diagnosis of obstruction of the large bowel by a carcinoma of the sigmoid colon was made, owing to the predominance of signs on the left side of the abdomen.

Intravenous therapy and continuous gastric aspiration were started.

Laparotomy that same evening showed a large volvulus of the caecum in an anticlockwise direction with one turn (360°) which had perforated in a very thinned-out area of anterior wall, releasing liquid faeces into the peritoneal cavity. Toilet was performed by mopping and sucking and the volvulus was untwisted. The perforation of the caecum was closed with mattress sutures and a caecostomy tube was sewn into the caecum with two purse string sutures and brought out through a loin stab incision. The main incision was closed in layers.

After operation the patient made a very good recovery, being kept on intravenous "achromycin" for three days. The caecostomy tube was removed on the eighteenth post-operative day and the stab wound closed quickly leaving no fistula. She was discharged from hospital on the thirty-fourth day (the long stay being partly due to social reasons) and when seen subsequently as an out-patient was well with no complaints.

Case 2.—Mr. T. D. is an unemployed man, aged 40, who was admitted from another hospital where he had been sent two weeks before having taken an overdose of "persomnia" tablets. He was treated for this overdosage with gastric washouts and was restored to health in 24 hours. He gave a history of a partial gastrectomy having been performed in 1956 for a duodenal ulcer.

On December 9, while still in this other hospital, the patient had a sudden onset of abdominal pain, colicky in nature, which came on about two hours after a large meal. He was found to have a distended abdomen and a "loop of bowel" was noted as felt just below the umbilicus. There was no tenderness or rebound tenderness and bowel sounds were heard: he was put on a fluid diet and observed. The following morning he vomited and it was noted that no flatus had been passed for 24 hours and that repeated enemata had no result. That evening his clinical condition was a little worse and he was getting dehydrated: the loop of bowel previously noted was still palpable and was now tender. He

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TABLE
SUMMARY OF FINDINGS IN THE THREE CASES

<table>
<thead>
<tr>
<th>Duration of Symptoms</th>
<th>Female, aged 77 years</th>
<th>Male, aged 40 years</th>
<th>Female, aged 78 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Pain</td>
<td>Constipation</td>
<td>Pain</td>
<td>Constipation</td>
</tr>
<tr>
<td>No vomiting</td>
<td></td>
<td>No vomiting</td>
<td></td>
</tr>
<tr>
<td>History</td>
<td>No previous operations</td>
<td>Polya gastrectomy 1956</td>
<td>No previous operations</td>
</tr>
<tr>
<td>No previous attacks</td>
<td></td>
<td>No previous attacks</td>
<td></td>
</tr>
<tr>
<td>Signs</td>
<td>Dehydrated</td>
<td>Slightly dehydrated</td>
<td>Dehydrated</td>
</tr>
<tr>
<td>Distended</td>
<td></td>
<td>Not distended</td>
<td></td>
</tr>
<tr>
<td>Tenderness</td>
<td></td>
<td>Tenderness</td>
<td></td>
</tr>
<tr>
<td>No rebound tenderness</td>
<td></td>
<td>tympanitic</td>
<td></td>
</tr>
<tr>
<td>Bowel sounds</td>
<td></td>
<td>Vague mass</td>
<td></td>
</tr>
<tr>
<td>Anticlockwise</td>
<td>one turn</td>
<td>two turns</td>
<td>two turns</td>
</tr>
<tr>
<td>Perforated at apex</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

was therefore transferred to Edgware General Hospital. At admission Mr. T. D. was a slightly built man who was moderately dehydrated but not in any acute pain. His pulse was 96/minute and his blood pressure was 150/85 mm. Hg.; examination of the heart and lungs showed no abnormality. The abdomen was distended and a tender, vague mass was felt below the umbilicus in the midline but there was no other tenderness and no rebound tenderness, the bowel sounds being slightly increased. Rectal examination revealed nothing abnormal. A provisional diagnosis of intestinal obstruction from gastrectomy adhesions was made and intravenous therapy and regular gastric aspirations were started. The following morning the dehydration had improved but the abdominal findings were unchanged and so laparotomy was performed.

At operation, the caecum, terminal ileum, and descending colon were involved in an anticlockwise volvulus of two turns (720°) passing upwards towards the left hypochondrium, the caecum itself being grossly distended and its wall very much thinned. The volvulus was unwound and the caecum decompressed by a caecostomy tube passed into the lumen, secured by two purse string sutures and brought out through a loin stab incision. The main incision was closed in layers.

The patient made a good post-operative recovery, the caecostomy working well from the start and the caecostomy tube came out of its own accord on the twelfth day, the caecostomy wound closing and leaving no fistula. The patient was discharged on the twenty-third post-operative day and when seen as an out-patient later was perfectly well.

Case 3.—Miss J. B. is a miniature painter, aged 78, who was admitted on March 6 complaining of abdominal pain for four days. The pain was colicky and had
gradually worsened over the first two days, becoming more constant over the last two. Since the onset of pain she had diarrhoea for the first two days but no motions or flatus since then. She had not taken any food for the four days and had not vomited. She volunteered that she had had attacks of this sort of pain lasting two or three days every few months for 10 years and that they had always cleared spontaneously. She had had no abdominal operations and was vegetarian in her diet.

Examination showed a dehydrated, thin old lady; her pulse was 82/minute and blood pressure 150/100 mm. Hg. The heart and lungs were clinically normal. The abdomen was distended and tympanic, a large obvious mass passing from the right iliac fossa towards and below the umbilicus. This was even more tympanic than the rest of the abdomen. Occasional bowel sounds were heard and rectal examination revealed no abnormality. Repeated enemata yielded no result and intravenous therapy and gastric aspirations were started. A pre-operative diagnosis of volvulus of the caecum was made.

At laparotomy that evening an antclockwise volvulus of the caecum, lower ascending colon, and the last 5 in. of ileum, with two turns (720°), was found. The volvulus was unwound and a caecostomy performed, the tube being secured by two purse string sutures to the caecal wall and brought out through a loin stab incision. The main incision was closed in layers.

Post-operative recovery was good, the patient being kept on intravenous "achromycin" for three days since there had been faecal soiling at operation. The caecostomy tube came out of its own accord on the tenth post-operative day and the patient was discharged on the twenty-ninth day.

**DISCUSSION**

The case histories of the three patients presented here show several interesting points when reviewed against the background of cases previously reported.

The aetiology of volvulus of the caecum is understood when the embryology of the region is remembered. Briefly, the midgut is formed from an endothelium-lined tube, the caecum being an outpocketing of it. During the third month of intrauterine life, after the gut has re-entered the peritoneal cavity and rotated around the axis of the superior mesenteric artery, the caecum begins to descend to the right iliac fossa where it is usually found by the time the infant is born. While the caecum is descending the mesentery of the ascending colon usually fuses with the parietal peritoneum of the posterior abdominal wall so that caecum and ascending colon are more or less bound down posteriorly.

In all these three cases, as in others reported, the caecum which had undergone volvulus was abnormally mobile due to deficient fixation during its descent into the right iliac fossa. The full range of movement of the caecum is well known, for commonly at appendicectomy it can be drawn out of the abdomen with ease. Several authors have demonstrated excessive mobility of the caecum; Wolfer, Beaton, and Anson (1942) found that in 14 out of 125 bodies the caecum was mobile enough to allow development of volvulus, the lack of fixation being more common in women than in men. Other series of figures show that the caecum has a wide range of mobility, between 10% and 20% of human caecums being highly mobile (Kantor and Schechter, 1934; Coughlin, 1927). As well as this predisposition there must be an additional factor to cause volvulus, otherwise the condition would be even commoner. Among such factors are constipation (as in Case 1), previous irritation of the peritoneum by inflammation or operations (as in Case 2), pregnancy, recent loss of body fat (Cases 1 and 3), and a coarse vegetable diet (Case 3). The final exciting cause is usually considered to be increased peristalsis, commonly after a heavy meal (as in Case 2), or after violent purging, although over-exertion and trauma have been cited.

Volvulus of the caecum has been reported in all age groups but is commonest in the young adult, more than half the cases occurring in patients between 20 and 40 years. In our three cases, however, the ages were 40, 70, and 77, the last patient being one of the oldest recorded to survive. Further, the volvulus is said to occur more frequently in males than in females despite the increased potential mobility of the female caecum.

**PATHOLOGY.**—It is usually considered that in order to produce pathological changes in intestine a volvulus must be of at least 180° on its mesenteric border. In this connexion, it is interesting to see that Ingelfinger (1942) in a radiological series showed that the normal caecum could in some people rotate through 180° just by stimulation of simple body movements and the patient did not complain of any symptoms. If, however, the rotation exceeded 180°, then colicky pain was experienced. In these three cases the degree of torsion was 720° in two and 360° in the other but it was the latter case which had perforated and so the actual amount of twist was not the sole initiating factor. It is the tightness of the twist of the mesentery (and its duration) rather than the number of times which determines the amount of vascular occlusion and whether gangrenous changes will follow. This is well shown in the patient described as Case 1 who had only one complete twist but had had symptoms for eight days.

A further consideration is the torsion of the gut itself. In a volvulus, the intestine is twisted in two places and so produces a closed loop obstruction. From this loop gas, which is produced by fermentation of large bowel contents, cannot escape and so
FIG. 1.—Erect view of abdomen showing grossly dilated loops of small bowel and free air under the diaphragm.

FIG. 2.—Views of abdomen, the patient lying flat and lying on the right side. There is a dilated loop of large bowel which falls over to the left, and a huge fluid level is seen when the patient lies on his side.

FIG. 3.—Erect view of abdomen showing a loop of large bowel twisted on itself arising from the right iliac fossa. Two separate fluid levels can be seen in the two limbs of the loop. (Shadows of calcified costal cartilages are seen in the upper part of the abdomen.)
rapid distension may occur leading to a thinning of the caecal wall which is already ischaemic from blockage of its blood supply. This too may pre-dispose towards perforation of the peritoneum.

As well as the acute cases there would appear to be those patients who have an intermittent twisting which allows of a form of subacute obstruction. The subject of Case 3 showed this, for she told of attacks of pain for 10 years every few months which passed without treatment. In such cases the volvulus of the caecum obviously untwists spontaneously with complete relief of symptoms and may earn the patient the diagnosis of "subacute appendicitis" or "appendicular colic".

At operation in every case the twist was found to be anticlockwise. It has been previously stated that most cases had a clockwise twist but, as Wolfer et al. (1942) point out, it depends on the sitting of the clock. It is obvious from some descriptions and diagrams that the clockwise twist is in relation to the observer whereas most recent reports relate the clock to the patient. Hence this apparent anomaly may be one of nomenclature and the anticlockwise left-to-right volvulus may really be the commoner disease.

Symptoms and Signs.—The presenting symptoms were those of a lower small intestine obstruction. They may be acute and fulminating or more gradual, even resolving, as mentioned above. Case 1 had a 10-day history of gradually worsening obstruction whereas that of Case 2 was of only three days' symptoms starting suddenly after a heavy meal. Case 3 fell between these two, with four days' illness that had obviously only been severe for the last two days. Examination showed signs varying with the degree of obstruction and its duration but particular stress is placed on the abdominal distension and the tympanitic mass, which can often be felt arising from the right iliac fossa and passing towards the umbilicus or even to the left hypochondrium. This mass was felt at some stage in two of the three cases, its full significance not being fully appreciated in one of them until operation but in the other it led to the true diagnosis.

Radiographs were taken of the patient lying flat and standing up or in one case lying on his side (Case 2) soon after admission. They showed dilated loops of large bowel with caecal fluid levels in Cases 2 and 3. These confirmed the diagnosis of obstruction of the large bowel and in Case 3 aided the diagnosis of volvulus of the caecum.

Treatment.—The treatment of caecal volvulus is operative. Once dehydration and electrolyte imbalance have been corrected a laparotomy must be performed and subsequent procedures will then depend on the intra-abdominal findings and the patient's condition. If the caecum is viable and not very distented, simply untwisting may suffice. Because of the possibilities of recurrence it is advocated that the caecum be fixed to the abdominal wall. A simple manoeuvre is to remove the appendix and use one end of the purse string suture to fix the caecum to the anterior abdominal wall (Lyall, 1946). Should there be much distension a safer method is to perform a caecostomy by sewing into the lumen of the caecum a de Pezzer catheter with its tip amputated. By bringing this out of the abdomen through a separate loin incision, it both decompresses and later fixes the caecum by forming adhesions.

Should the caecum not be viable then either an exteriorization and excision should be performed leaving an ileostomy, or, if the patient's condition allows, a resection with ileo-transverse colostomy.

In all three cases it was considered that the distension warranted deflation before untwisting could be safely performed: further, after reduction of the caecum, it may be several days before normal peristalsis occurs in the damaged segment and distension must be avoided. Hence a caecostomy tube as described above, led out through a loin stab incision, was used in every case. In all cases the tube came out easily in the early post-operative period and the wound healed well with no faecal fistula.

The mortality in published cases of volvulus of the caecum is in the region of 50 to 60% (this includes cases reported before the days of antibiotics). One reason for this high figure may be the delay in operating because the diagnosis is not made.

In our three cases the pre-operative diagnoses were respectively: (1) Obstruction of the large gut due to carcinoma of the colon; (2) lower ileal obstruction due to adhesions; and (3) volvulus of the caecum. But it is most important to admit honestly that the last and correct diagnosis was only made because we had seen two similar cases recently and had it in mind. It is possible that caecal volvulus is a much commoner condition than was thought and, that being so, it should be considered in the differential diagnosis of intestinal obstruction more often, for it is a condition that responds well to treatment.

I wish to thank Mr. D. B. Craig, under whose care these patients were admitted, for his help and permission to publish these cases and to express my appreciation to Professor Ian Aird for his advice.

References