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# SIGMOID VOLVULUS IN AN AFRICAN POPULATION

BY

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Volvulus of the sigmoid colon is an uncommon surgical emergency in the United Kingdom, and this point has been emphasized by Bolt (1956), who records only five personal cases and 23 others collected from the West Middlesex Hospital, the Bristol Royal Infirmary, and Weston-super-Mare General Hospital between 1946 and 1955. Vick (1932), reporting nearly 7,000 cases of intestinal obstruction occurring in 21 English hospitals between 1925 and 1932, found only 56 cases of sigmoid volvulus. Similarly, in the United States Hilton and Waugh (1951), from the Mayo Clinic, could find only 16 cases treated there during a period of 39 years. On the other hand, other American authors who have included cases occurring among negroes have significantly higher figures (Griffin *et al.*, 1945 ; Pool and Dunavant, 1951).

In Eastern and Northern Europe, however, volvulus of either large or small bowel is more common. Perlmann (1925) writes of 35 cases of sigmoid volvulus in a series of 200 cases of intestinal obstruction. Bruusgaard (1947) discusses 91 cases treated in one Scandinavian hospital over a period of 10 years. In India, Andersen (1956) found 24 cases among 168 of intestinal obstruction.

This paper describes the experience of sigmoid volvulus gained at Mulago Hospital, the teaching hospital of the University College of East Africa. This is a 628-bed general hospital which provides an emergency service for the African people of Kampala and the surrounding agricultural district, numbering about one million.

From a study of the literature it appears that no other hospital has the opportunity of dealing with such large numbers of patients presenting with sigmoid volvulus.

### Incidence

That the incidence of sigmoid volvulus was high has been known at Mulago for a long time. Burkitt (1952) drew attention to this fact, and pointed out that its occurrence was almost entirely confined to one tribe.

The 104 cases of sigmoid volvulus under review were admitted to hospital during the five-year period 1952–6. Only cases proved either at operation or by post-mortem examination are included in this series. A further 18 cases of intestinal obstruction which are thought clinically to have had a sigmoid volvulus were excluded. These cases resolved either spontaneously or after a diagnostic enema.

Table I shows the numbers of cases of volvulus and intestinal obstruction treated during the five-year period. Table II gives the incidence of sigmoid volvulus among

TABLE I.—*Figures From Mulago Over a Five-year Period and From 21 English Hospitals Over a Six-year Period*

|  | Mulago | England |
|---|---|---|
| Sigmoid volvulus .. | 104 | 56 |
| Volvulus of transverse colon | 2 | 0 |
| ,,     ,, caecum | 6 | 35 |
| ,,     ,, small bowel | 21 | 85 |
| Total volvulus at all sites | 133 | 176 |
| Intestinal obstruction (excluding ext. herniae).. | 287 | 3,625 |
| ,,     ,,     (including ,,     ,, ).. | 1,230 | 6,892 |

TABLE II.—*Sigmoid Volvulus*

|  | Mulago | England | Rough Ratio Mulago/England |
|---|---|---|---|
| Percentage of all volvulus ,,   ,, intestinal obstruction (incl. ext. herniae) | 78·2 | 31·8 | 2·5 : 1 |
|  | 8·45 | 0·81 | 10 : 1 |
| Percentage of intestinal obstruction (excl. ext. herniae) | 38·1 | 1·45 | 25 : 1 |

cases of volvulus and cases of intestinal obstruction. For comparison both Tables include Vick's (1932) findings in England.

Table II shows that sigmoid volvulus forms 78.2% of all cases of volvulus, whereas in England cases in this category account for only 31.8%. Even more striking is the relation of sigmoid volvulus to the total number of cases of intestinal obstruction—ten times as many cases occurring. If external herniae, which also have an abnormally high incidence, are excluded, an even more marked difference is observed, the ratio between Mulago and English figures being roughly 25:1.

*Double Volvulus.* — Twenty cases of " double volvulus " are included among the figures for sigmoid volvulus. This is a clinical entity which does not seem to occur with sufficient frequency outside Buganda to have gained much attention. The double volvulus recognized at Mulago is a compound volvulus of the small bowel and sigmoid colon.

*Sex and Tribe.*—From Table III it can be seen that males formed 94.2% of the patients. This high figure

TABLE III.—*Incidence of Sigmoid Volvulus in Relation to Sex and Tribe*

|  | Male | Female |
|---|---|---|
| Baganda | 80 (93%) | 6 |
| Other tribes | 18 (100%) | 0 |
| Totals | 98 (94·2%) | 6 |

is in keeping with the findings of others, Peterson (1934) quoting 86%, Perlmann (1925) 85.7%, and Bruusgaard (1947) 61%, and is probably not just a reflection of the preponderance of male admissions generally. It can also be seen that the condition is four times more common among the Baganda than among other tribes. This figure is significant, as only 40% of surgical patients are Baganda tribesmen. Also the East African Population Census (1948) showed that in the three counties surrounding the hospital the Baganda formed only 53% of the population. Of the 66 male cases reaching hospital from this area 54 (81.1%) were Baganda.
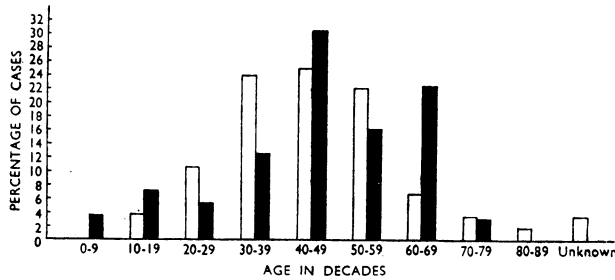


Percentages of cases distributed in decades. White columns = present series. Black columns = Vick's (1932) English cases.

*Age.*—The Chart shows the age distribution of the cases, with Vick's English figures included for comparison. Most cases fall between the ages of 30 and 60. It must be admitted that the ages recorded may often be estimated on the part of the patient or clerk documenting the case. However, the errors will probably fall among patients in these decades rather than among the young or old, whose ages can more easily be judged. If these figures are accepted, it can be said that volvulus is not a disease of early life, and that, despite a fairly short expectation of life, the incidence in later decades is considerable. Except in regard to their shorter expectation of life, the age incidence among the African patients does not differ significantly from that of the English. It may be inferred that at least some factor in the causation of the condition is acquired.

### Clinical Picture

The patient is commonly a well-nourished male Muganda between 30 and 50 years of age, giving a history of sudden onset of colicky abdominal pain around the umbilicus. The condition has been present from one to four days. Vomiting is usually associated with the onset of pain, but perhaps does not occur again unless the gut becomes gangrenous. Distension is marked and often gross enough to embarrass respiration.

Constipation is complete, and the patient states emphatically that neither faeces nor flatus has been passed, though a bowel movement is often mentioned as precipitating the attack.

A previous history of attacks of abdominal pain and mild distension, often associated with the taking of a meal, is commonly part of the picture. This is thought to be a consequence of the action of the gastro-colic reflex on a loaded pelvic colon which perhaps already has in it the 180 degrees " physiological twist " described by Bruusgard (1947). A history of previous frank attacks with either spontaneous resolution or relief by enemata is common.

On examination the patient's condition is found to be good and he is well hydrated, having continued to take fluids after the onset of pain. Distension of the abdomen is found to be gross and asymmetrical, being maximal in the right hypochondrium. Peristalsis is not usually visible, but gut sounds can be heard on auscultation. Tenderness is not marked or localized. The rectum is empty and ballooned.

When gangrenous gut is present, however, the general condition rapidly deteriorates, and all the features of severe peritonitis are found.

### Operative Procedure

The patient is prepared for operation, and an intravenous infusion is set up as a routine. If shock occurs the use of whole blood is important because of loss of blood into the bowel wall and lumen of a strangulated loop.

A general anaesthetic is given, and a flatus tube is passed into the rectum before the operation is begun. If the diagnosis is reasonably certain a left paramedian incision is used, extending from the costal margin to the pubis dividing the thinned-out rectus muscle in the line of its fibres. An immensely dilated loop of bowel immediately presents and obscures the field of operation. If there is any difficulty in delivering the bowel it is emptied of its gaseous contents by needle aspiration. This procedure is certainly indicated where distension is gross, as there is a very real danger of rupturing the bowel after the support of the abdominal wall has been removed. The direction of the volvulus is now ascertained and the loop of the bowel gently untwisted. It is not until then that the flatus tube, manipulated per rectum by an assistant, is guided into the sigmoid by the hand of the surgeon. The contents of gas and liquid stool are evacuated.

At this point some important features of the macroscopic pathology of the disease can be noted. The sigmoid can easily be delivered out of the wound, and the whole colon and caecum are found extremely mobile on the posterior abdominal wall. The taenia coli of the sigmoid are found before deflation to be very broad, the individual fibres being apparently widely separated. After deflation the bowel wall is felt on palpation to be abnormally thick and tough in texture.

The redundant bowel is suspended from a long narrow mesocolon, and its proximal and distal attachments to the posterior abdominal wall are abnormally close together. The mesocolon is thick and oedematous and almost invariably shows signs of fibrosis, ranging from fine white strands to coarse fibrous bands approximating the limbs of the loop. In this thickened mesocolon the inferior mesenteric artery may be found, not running through it at its attachment but arched up towards the gut between its layers. From here the subsequent operative procedure depends upon the state of viability of the bowel.

In most cases there is no doubt about viability, but on occasion small areas, usually at the site of torsion, require to be oversewn. There may of course be obvious gangrene of the whole loop. If the bowel is to be preserved the mesocolon is shortened and fixed to the left paracolic gutter and the lateral and anterior abdominal wall by means of interrupted cotton sutures. If the bowel is gangrenous resection and the formation of a colostomy is carried out.

In performing the resection great care must be taken to divide the bowel from the mesocolon towards the

periphery, thus avoiding damage to the inferior mesenteric artery or its lower sigmoid branches.

Difficulty is often encountered in delivering the distal stump of the sigmoid colon, gangrene having extended near to its junction with the rectum. If this is the case the end is closed and buried in the posterior abdominal wall and a single-barrelled colostomy is formed (Gabriel et al., 1953). This may be done either through the laparotomy wound or, better, through a left gridiron incision. Intraperitoneal closure of the colostomy is eventually necessary.

The wound is now closed and the patient returned to the ward with a flatus tube still in the rectum. Gastric suction and intravenous infusion of fluids are continued until bowel sounds are heard and flatus is passed.

A period of passive distension of the large bowel tends to follow reduction, and it is thought that this is due to a temporary paralysis of the gut musculature after extreme distension. It can be relieved by a flatus tube. The possibility of a recurrence of the volvulus must be borne in mind, however.

## Mortality

There were 21 deaths among 104 cases, eight of these being among the 20 cases of double volvulus. The overall mortality rate is therefore 20.2%. If cases of double volvulus are excluded the mortality is 15.5%.

The length of history prior to admission seems to have no direct relation to mortality, as the average for those who survived was 2.3 days (83 cases) and 2.2 days for those who died (21 cases).

15 of the deaths were associated with gangrenous bowel, eight of them also having a double volvulus. The history of those with double volvulus was on an average less than one day, that for the remaining cases being 2.9 days.

Of the six fatal cases in which the bowel was viable, two patients died probably after a second volvulus, one collapsed on the operating table, one died with a wrong diagnosis of tuberculous peritonitis, one sustained a perforation of the small bowel during laparotomy, and one died for no known cause five days after operation.

## Operative versus Conservative Treatment

The treatment of choice at Mulago has been operative over the period under discussion. There is, however, a good case put forward for more conservative treatment, and this was admirably done by Bruusgaard (1947). He reported a series of 91 patients who were treated conservatively where possible. The method was to intubate the sigmoid under direct vision through a proctoscope. At Mulago this method is not in regular use, but a short trial of the procedure in earlier years showed that a case with apparently viable bowel at the site of torsion may proceed to gangrene despite relief of the volvulus. The possibility of the presence of a double volvulus, which is very difficult to reduce even at laparotomy, is another contraindication to the use of this procedure.

No attempt at preventing a recurrence of the volvulus can be made unless a laparotomy is performed. In this series a primary attempt to obtain a permanent cure was made in 68 cases. This excludes those cases in which resection of gangrenous bowel was a curative procedure in itself.

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The method which has become standard is to shorten and fix the mesosigmoid to the left paracolic gutter and the lateral and anterior abdominal walls with interrupted sutures of cotton. This procedure has the effect of turning what was a short anchorage into one having the shape of a T with an exaggerated down-stroke. It is thought that this is a logical method of overcoming the predisposing anatomical feature of a long mesocolon having a short base.

The emphasis is on a primary attempt at repair for the good reason that few patients will agree to a second operation once the acute phase has passed.

## Aetiology

The aetiology of this condition remains a subject for discussion. The criteria that seem to be necessary for the production of a volvulus are that the sigmoid colon should be long and mobile, and that the points of attachment of its limbs should be approximated.

At Mulago many patients presenting with acute symptoms have a previous history of attacks of intestinal obstruction ; others with similar histories attend for treatment after the last incident has resolved. The latter group, together with those patients already mentioned who have a less well defined dyspeptic syndrome, consistently show at exploratory laparotomy one or both of the criteria suggested.

There is evidence that diet and feeding habits may also have a place in the aetiology of this condition. High-residue diets were incriminated by Bruusgaard (1947) and Andersen (1956). That of the Baganda, who eat large quantities of plantain and sweet potatoes, also falls into this category.

## Summary

In the five-year period 1952–6 104 cases of sigmoid volvulus were admitted to Mulago Hospital, which serves the African population of Kampala and district. Sigmoid volvulus formed 80% of all cases of volvulus treated, and nearly 10% of the cases of intestinal obstruction. 94% of the patients were males, and the condition was four times more common among the Baganda than among other tribes. The operative procedure carried out at Mulago Hospital is described. The overall mortality in this series was 20%. The advantages of operative over conservative treatment are outlined, with particular reference to prevention of recurrences.

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