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ABSTRACT

Background: **Small intestinal volvulus (SIV) is a common surgical emergency encountered in many countries. It was reported as the most common cause of intestinal obstruction in the southern part of Ethiopia.**
Objective: **This study was intended to evaluate the magnitude and treatment outcome of SIV in a rural hospital.**
Design: **Retrospective study.**
Setting: **A rural general hospital with 250 beds.**
Subjects: **Ninety eight of 235 patients operated on for acute intestinal obstruction. There were 88 males and 10 females (age range of 16-65 years).**
Intervention: **All patients who were operated on for acute intestinal obstruction during 1992-1996 were included.**
Main outcome measures: **Age of patients, duration of the illness and extent of the bowel involved, treatment, and complications were the main outcome measures.**
Results: **Of the 235 patients with acute intestinal obstruction, 98 (41.7%) had SIV. The mean age was 34 years (range 16-65 years). The male to female ratio was 8.8:1.0. SIV occurred mostly among young adults most of whom were farmers. Postoperative complications occurred in 36 cases. The mortality rate was 13.3%, sepsis being the most frequent cause of death.**
Conclusion: **Small intestinal volvulus was the leading cause of intestinal obstruction in this series. Early diagnosis and prompt operative intervention minimises the morbidity and mortality rate.**

INTRODUCTION

Small intestinal volvulus (SIV) is a clinical condition in which there is a torsion of all or part of a segment of the small intestine on its mesenteric axis. It is a common cause of emergency surgical problems(1-3). The incidence of SIV varies in different countries. It is rare in the U.S.A. and Western Europe while it is the commonest cause of intestinal obstruction in certain parts of Africa, India, Iran and Afghanistan(2-4). The prognosis depends on the age, duration of symptoms and length of small intestine involved. The mortality reported from different places varies from 9% to 32.1% and even more(3,4).

Little has been reported about SIV from Ethiopia. According to the few reports available from Northern and Central Ethiopia(5-8), sigmoid volvulus was a leading cause of intestinal obstruction. A report from Yirgalem, Southern Ethiopia(9), showed SIV as the most frequent cause of intestinal obstruction followed by sigmoid volvulus.

The purpose of this study is to provide information on the magnitude and the outcome of the management of SIV in Hossana Hospital, Southern Ethiopia.

MATERIALS AND METHODS

Hossana hospital is a rural general hospital located in southern Ethiopia serving a population of three million. Ninety four per cent of the population are rural dwellers and the majority are farmers(20). This was a retrospective study covering the period from June 1992 to May 1996. The operation room registry was used to retrieve the medical records of 235 patients who underwent exploratory laparotomy for acute intestinal obstruction.

Ninety eight patients with an intraoperatively confirmed diagnosis of SIV were taken as the study population. SIV was classified as primary when the cause for the twisting of the small intestine on its mesentery was not known and secondary when the cause was due to peritoneal bands, adhesions, diverticulum, or tumour.

Data were recorded by using a pre-designed data collection form including age, sex, occupation, date of admission, duration of symptoms, physical findings, investigations, pre-operative diagnosis, operative findings, type of operation and its outcome.

Patients in the paediatric age group, those who were conservatively treated, patients referred to other hospitals due to shortage of supplies and those who died shortly after admission without operative intervention were excluded from the study. Data were analysed manually.

RESULTS

Two hundred and thirty five patients were operated on for acute intestinal obstruction during the four-year study period of whom 98 (41.7%) cases (88 males and 10 females) had SIV. The male to female ratio was 8.8:1. The age ranged from 16 to 65 years with a mean of 34.1. The peak age of occurrence was between 20 and 40 years which constituted 63% of the patients (Table 2).

Table 1

Causes of acute intestinal obstruction in 235 operated cases

Cause	No. of patients	%
Small intestinal volvulus	98	41.7
Primary	93	
Secondary	5	
Sigmoid volvulus	32	13.6
Postoperative adhesion	28	11.9
Intussusception	20	8.5
Tuberculous adhesion	16	6.5
Bands	14	5.9
Colonic Ca	8	3.4
Ileosigmoid knotting	5	2.1
Strangulated hernia	5	2.1
Caecal volvulus	4	1.7
Miscellaneous	5	2.1
Total	235	100

Table 2

Age and sex distribution of 98 patients operated with small intestinal volvulus operated

Age (years)	Sex			
	Male	Female	Total	%
10-19	9	2	11	11.2
20 - 29	25	3	28	28.6
30 - 39	31	3	34	34.7
40 - 49	16	1	17	17.4
50 - 59	5	1	6	6.1
60+	2	–	2	2.1
Total	88	10	98	100

With regard to occupation, eighty three patients were farmers, eight were housewives, three merchants, three civil servants while one was a student.

Table 1 shows the causes of intestinal obstruction in 235 patients who underwent exploratory laparotomy. Small intestinal volvulus accounted for 41.7% of the intestinal obstructions. Sigmoid volvulus was encountered in 13.6%, postoperative adhesions occurred in 11.9% and intussusception was seen in 8.5% of the cases. The infrequent causes included tuberculous adhesions, bands, colonic cancer, ileosigmoid knotting, strangulated hernia, and caecal volvulus. Miscellaneous causes of intestinal obstruction were ascaris bolus in two of the cases, ileal stenosis in one case, long appendix encircling the bended lower segment of the ileum in one case, and internal hernia through a mesenteric defect in one patient.

Data with respect to cases in different seasons showed that small intestinal volvulus occurred mainly in the rainy season when there is heavy work in farming. Thirty two (32.7%) patients were seen from June to August, thirty one (31.6%) patients from September to November, twenty eight (28.6%) patients from March to May, and seven (7.1%) patients from December to February.

The majority of patients presented with symptoms of cramping abdominal pain, vomiting, constipation and abdominal distention. Seventy eight patients presented with symptoms of intestinal obstruction of 24 hours and after whereas only 20 patients presented within 24 hours of the illness. Physical findings varied from distended abdomen with stable vital signs to shock with tense and tender abdomen.

Once an impression of intestinal obstruction was made prompt resuscitative measures were taken with intravenous fluid administration and a nasogastric tube inserted for decompression. A urinary catheter was inserted into the bladder to monitor urine output and antibiotics initiated in those who had signs of strangulation. Patients were well rehydrated to obtain stable vital signs and adequate urine output. Then exploratory laparatomy was performed under general anaesthesia with endotracheal intubation.

At operation SIV was primary in 93 (94.9%) and secondary in five (5.1%) patients. With regard to secondary SIV four were in patients who had had previous laparatomy and one other was due to a band.

Table 3

The type of operative procedures mortality versus mortality in 98 patients with small intestinal volvulus

Type of operation	Cases		Deaths	
	No.	%	No.	%
Untwisting and decompression	71	72.4	6	8.3
Resection and anastomosis	27	27.6	7	25.9

Seventy one patients with viable intestine, untwisting and decompression was done (Table 3). In addition adhesolysis was performed in three patients. The mortality rate was 8.3% in this group. In 27 patients with gangrenous intestine depending on the extent and site involved the following types of procedures were done: resection and ileoileal anastomosis in 13 patients, jejunoileal anastomosis in five patients, ileocolic anastomosis in three, jejunojejunal anastomosis in one and jejunocolic anastomosis in five. Adhesolysis and band release was performed in two cases as well. The mortality rate in this group was 25.9% while the overall mortality rate was 13.3%.

Table 4 shows the complications which occurred in thirty six (36.7%) patients. Sixteen patients developed wound infection. Thirteen of the 16 patients had superficial infection and were controlled by local wound care. Three of the 16 patients had extensive wound abscess of whom two progressed to septic shock and eventually died. The others responded to treatment. Four patients had generalised peritonitis. Two were controlled by laparatomy, lavage and antibiotics. Two patients, despite the surgical interventions and antibiotics, developed septicaemia and died. Of the three patients who developed pelvic abscess, two recovered and one died from sepsis. One of the three patients who had wound dehiscence died of sepsis and two responded to surgical treatment. Three patients developed

short bowel syndrome, which was severe enough to lead to hypovolemic shock and eventual death in two of them. The other patient was taken home against medical advice by relatives due to social problems and was considered as having died at home.

Table 4

Postoperative complications in 98 patients operated for small intestinal volvulus

Complication	Cases No.	%
Wound infection	16	16.3
Peritonitis	4	4.1
Pelvic abscess	3	3.1
Wound dehiscence	3	3.1
Short bowel syndrome	3	3.1
Pneumonia	3	3.1
Enterocutaneous fistula	2	2
Postoperative intestinal obstruction	2	2
Total	36	36.8

Table 5

Relation between duration of symptoms to complications and mortality in 98 patients operated for small intestinal volvulus

Duration of symptoms (hours)	Cases	Complications No	%	Deaths No	%
0 - 24	20	5	5.1	1	1.02
25 - 48	49	15	15.3	7	7.14
49 - 72	14	8	8.2	4	4.1
Over 72	15	8	8.2	1	1.02
Total	98	36	36.7	13	13.26

Of the three patients who developed pneumonia one responded to treatment while the other two died. Of the two patients who developed enterocutaneous fistula, spontaneous closure was attained in one while the other one with a high output fistula died from hypovolemia and sepsis despite attempted operative closure. One of the two patients who had early re-obstruction became septic following second operation and also died. The overall mortality rate was 13.3% with the causes of death having been overwhelming sepsis in seven patients, hypovolemic shock in three, pneumonia in two and intraoperative cardiac arrest in one. As shown on Table 5 the duration of illness correlated well with the relative risk of complication and eventual death.

DISCUSSION

The occurrence of SIV varies in different countries. It is rare in U.S.A.(12,13) and Western Europe(14) and common in some African(3,8) and Asian countries(2,4,10,15). In the reported series from Uganda, Kenya, India and Iran, SIV accounted for 1.7% to 51.2% of all intestinal obstructions(2,3,4,16,19). The reported rate from Ethiopia ranged from 18.3% to 38.6%(8,9) making it one of the most common causes of intestinal obstruction. In the present series SIV accounted for 41.7% of all cases of intestinal obstruction which is in keeping with the report from Southern Ethiopia(9).

The finding of predominantly (94%) primary SIV in this series, is in agreement with African(3,8,9,17) and Asian(4,15) reports. Secondary SIV is more frequent in the western world(12,13,15,18).

Several common factors are thought to contribute to the development of primary SIV(2,4,10,15), despite the wide geographic differences. Hypermobility, hypermotility and rapid sudden filling of an empty intestine with voluminous diet are some of the common factors thought to initiate rotation of the intestine(4). In some populations the presence of a short mesenteric root with elongated mesentery and intestine would allow abnormal mobility (hypermobility) of the small intestine which might favour rotation. Low-grade enteritis (bacterial and parasitic) and ingestion of a bulky meal after a long interval of fasting might increase peristaltic waves (hypermobility) thereby initiating rotation of the small intestine. The author's view about the possible cause of primary SIV is in accordance with the assumptions made based on occupational and dietary-related speculations(2,4,10,15).

In the present study SIV occurred mainly in male farmers who perform hard manual work in an erect posture and ingest single voluminous meals late in the afternoon. This association is in conformity with previous reports elsewhere(2,4,15). However, these predisposing factors may not be the only ones in the pathogenesis of the disease because the occurrence of small intestinal volvulus greatly varies between countries and among different populations within the country despite having similar life styles. This is an issue which needs further investigation.

In this series SIV was found to be infrequent in females which is in agreement with the findings reported elsewhere(2,4). This is considered to be due to abdominal wall laxity from repeated pregnancies, less energetic work by women and a created tendency towards obesity(2,4).

There seems to be a seasonal variation with the peak occurrence being during the rainy season and spring when farmers are occupied with heavy field works such as ploughing and harvesting. Similar observations had been reported from Iran by Vaez-Zadeh *et al*(2). Increased incidence of SIV during Ramadan ostensibly due to the ingestion of a large single meal after long hours of fasting has been reported(10).

Twenty (20.4%) patients presented within 24 hours while seventy eight (79.6%) patients arrived after 24 hours of the onset of the illness. The reasons for the delayed presentations included: (i) misdiagnosis of small bowel obstruction for sigmoid volvulus and treating it with enemas in health centers, and was awaited until the effect was seen; (ii) lack of transport and; (iii) some patients having been treated by traditional healers initially.

Even though by the clinical and radiological findings small intestinal obstruction can be diagnosed, it is difficult to diagnose SIV in particular, as clinical features overlap(4). However, at the hospital where this study was done there was an inclination to over-diagnose SIV because the physicians were aware that this was encountered most commonly in this region.

Upon exploratory laparotomy, simple derotation and decompression was done in 71 (72.4%) patients who had viable intestine while resection and anastomosis was performed in 27 (27.6%) patients who had gangrenous segments of the intestines. The resection rate was higher in those who came late after the onset of symptoms. In addition, the overall complication and death rate was high in patients who had resection and anastomosis which stresses the importance of early diagnosis and prompt surgical intervention.

The hospital mortality rate of 13.3% in this series, though not high compared to other reports of 32.1% and 25.9% from Nairobi(3) and India(4) respectively, could be improved by early diagnosis and surgical intervention. The age of the patient, duration of symptoms and the extent and severity of the bowel involved play an important role in the outcome of the management.

In conclusion, SIV is a common surgical emergency and a significant health problem in southern Ethiopia. To reduce its morbidity and mortality improved communication among health professionals working at different levels of the health facilities may help in early diagnosis and timely referral to hospitals where prompt surgical management could be carried out. Secondly, creating an awareness about this disease among the public through health education might help patients present early.

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