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Adult sigmoid volvulus in West Africa: Management and outcome at principal hospital of Dakar

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Abstract

Background: Sigmoid volvulus (SV) is the commonest cause of large bowel obstruction in sub Saharan Africa. However few studies have been done in our country. Our goal was to describe the presentation, management outcome of adult SV and to evaluate our therapeutic methods in a context of non availability of endoscopic decompression.

Methods: It was a retrospective, descriptive review of all adult patients, admitted in the visceral surgery department of Hospital Principal of Dakar for SV, from January 2014 to August 2018. We studied demographics variables, clinical and paraclinical features, treatment and outcome. The data were entered and analyzed using Excel 2017 software and Epi-info version 7.2.2.6.

Results: We collected 103 cases of SV for 86 patients, representing 45.9% of intestinal obstruction. The mean age was 54.9 years. There were 82 males and 4 females. The mean duration of symptoms was 3.8 days. The triad acute abdominal pain, inability to pass gas and feces, abdominal meteorism was noted in 52.4%.

Plain abdominal X-ray (n=55; 53.3%) showed the classical 'coffee bean' sign in 69%. CT scan (n=77; 74.7%) confirmed the diagnosis in 100%. It revealed signs of intestinal gangrene in 8 cases confirmed at laparotomy in 6 cases. In 4 cases imaging was not performed.

Detorsion was spontaneous in 2 cases. Faucher rectal tube decompression was performed in 81 cases with a success rate of 86.4% representing 53 patients. Elective sigmoidectomy was realized in 33 patients (31 after successful rectal tube decompression, 2 after spontaneous decompression). After elective sigmoidectomy mortality and morbidity were nil.

In those with successful rectal tube decompression, 7 did not have elective sigmoidectomy for comorbidities, 12 refused the elective sigmoidectomy.

Emergency surgery was performed in 34 patients: 20 patients for suspicious of complicated SV, 14 patients after failure of rectal tube decompression. It was 9 (26.4%) one stage sigmoidectomy, 24 (70.5%) 2 stage sigmoidectomy, 1 surgical detorsion without pexy. Mortality and mortality after emergency surgery were respectively 8.3% and 14.7%. After 2 stage sigmoidectomy, 86.3% benefited from a restoration of digestive continuity. During the follow-up, no recurrence occurred in patients who were operated.

Conclusion: SV is a middle-age man pathology in sub Saharan Africa. In uncomplicated SV rectal tube decompression followed by elective sigmoidectomy is a good option.

Keywords: Sigmoid colon, volvulus, faucher rectal tube, sigmoidectomy

Introduction

Sigmoid volvulus (SV) is the torsion of the sigmoid colon around its mesenteric axis according to a variable degree of rotation, leading to an acute colonic obstruction by strangulation [1]. SV is an abdominal emergency known since Ancient Egypt. Hippocrates indeed advocated the insufflation of air in the anus to devolvulate the SV. However, since the middle of the 20th century, emergency colectomy was the standard of treatment. The effectiveness of non surgical treatment was proven in 1947 by the Norwegian Bruusgaard. This non surgical treatment consisted on using a protoscope to untwist the loop. The success rate was then 86% [1, 2].

The incidence of SV varies largely from a region to another one of the globe. In developed countries, like North America and Western Europe, SV is a rare cause of intestinal obstruction [1, 2, 3]. While in Africa, Southern America, India, Middle East, Pakistan and Eastern Europe, called "the volvulus belt", the incidence of SV is very high [4, 5, 6, 7].

The goal of the treatment is to untwist the sigmoid and to prevent recurrence [2]. However, the choice of the adequate treatment is still subject of debate.

In western countries, endoscopic decompression followed by elective sigmoidectomy is the

Treatment of choice in uncomplicated SV [1, 8]. In our setting, as in most sub-Saharan African countries, endoscopic decompression is not available in emergency [4, 5, 9, 10]. Therefore, surgical treatment appears to be the only alternative to treat SV as recommended by Touré and Schwartz [4, 9, 10]. However, in our hospital, the reduction of SV by using a Faucher rectal tube is done for many years with good outcome [5] as shown by Diémé in his study with a success rate of 76% [5].

The controversial on the adequate treatment of SV in low income countries has motivated this new study. Our goal was to describe the presentation, management outcome of adult SV and to evaluate our different therapeutic methods.

Methods

It was a retrospective, descriptive review of all adult patients, aged over 16 years old, admitted in the visceral surgery department of the Military Teaching hospital Principal of Dakar (HPD) for SV, from 1st of January 2014 to 31 of august 2018.

All patients benefited, on admission, from a medical treatment including the placement of a gastric tube, a urinary catheter, a peripheral venous route for IV fluid and electrolytes resuscitation.

In uncomplicated SV, a non-surgical treatment was performed

while in complicated SV or failure of the non-surgical treatment, a surgery was done.

The non-surgical treatment consisted to insert by anus a lubricated rectal Faucher tube to decompress the sigmoid. The procedure was performed in operating room without anesthesia, the patients in supine position. The success of the procedure is reflected by the loose of much flatus and feces through the tube and the immediate resolution of the abdominal distension with the relief of symptoms. Subsequently a plain abdominal X ray was done to confirm the decompression of loop and the absence of intestinal perforation (pneumoperitoneum). The tube was then taped to the buttock and left in situ 2 days. Then an elective sigmoidectomy was planned and done if the patient agrees to that. This elective sigmoidectomy was carried out in the same admission or in a 2nd admission, with or without mechanical bowel preparation (bowel lavage through the rectum the day before sigmoidectomy). The failure of the procedure was followed by an emergency surgical treatment.

The emergency surgical treatment consisted to performed either a one stage sigmoidectomy, a two stage sigmoidectomy or a surgical decompression. Figure 1 shows the global management of adult SV in HPD.

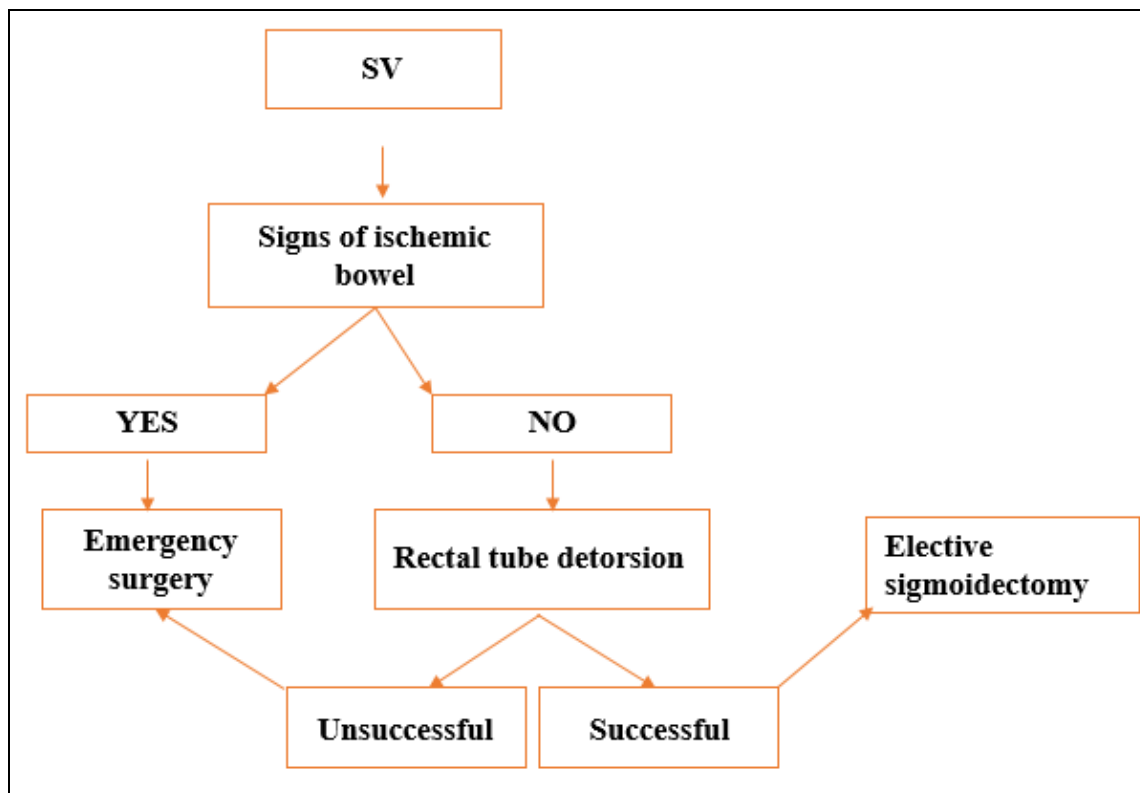


Fig 1: Algorithm of management of adult SV in HPD

We studied demographics variables (age, gender, past medical history), clinical and paraclinical features, treatment and outcome. The data were entered and analyzed using Excel 2017 software and Epi-info version 7.2.2.6. The data were collected under confidentiality. The access to the data were only allowed to the responsables of the study.

Results

Epidemiological aspects

We collected 86 patients for a total number of 103 cases of SV. Seventeen (17) patients had prior episodes of SV decompressed by rectal tube insertion: 14 patients 1 episode, 2 patients 2

episodes, 1 patient 3 episodes.

During the study period, 3602 patients were admitted at the visceral surgery department, in which 224 were for intestinal obstruction. Thus, SV represented 2.8% of admissions and 45.9% of intestinal obstruction.

The mean age was 54.9 years and ranged from 20 to 90 years. There were 54 patients (63%) under 60 years old. There were 82 males (95.3%) and 4 females (4.7%). The past medical history is reported in table I. The mean duration of symptoms was 3.8 days (range, 1 - 21 days). Thirteen cases (12.6%) reported sick within the first day, 38 (36.8%) between the 2nd and the 3rd day and the rest (50.4%) after the 4th day of onset of illness.

Table 1: Past medical history

Past Medical History	Number	Frequency
Aortic dissection	1	1.2%
Pulmonary embolism	1	1.2%
Heart surgery	1	1.2%
Lymphoma	1	1.2%
Diabetes	1	1.2%
MICI	1	1.2%
Stroke	2	2.3%
HIV AIDS	3	3.5%
Psychiatric disorder	3	3.5%
Dolichosigmoïde	4	4.6%
High blood pressure	6	7%
Previous SV treated by rectal tube	17	19.7%
Chronic constipation	26	30.2%

Diagnostic aspects

The symptoms were abdominal pain in 87 cases (84.4%), inability to pass flatus and feces in 83 cases (80.5%), vomiting in 44 cases (42.7%). Abdominal meteorism was noticed in 94 cases (91.2%) while abdominal tenderness was present in 9 cases (8.7%). The triad acute abdominal pain, inability to pass gaz and feces, abdominal meteorism were associated in 52.4% of cases. One patient presented with fever on admission and dehydration was noticed in 7 (6.7%) cases. Total WBC count raised in 10 cases (9.7%), associated with gangrenous bowel at laparotomy in 4 cases. The sodium and the potassium were low respectively in 20 cases (19.4%) and in 75 cases (72.8%). An hypernatremia were noticed in 3 cases while there were no raise of the potassium in blood test.

Plain abdominal X-ray, performed in 55 cases (53.3%), showed the classical ‘coffee bean’ sign or ‘inverted U’ sign typical for SV in 38 cases (69%). CT scan performed in 77 cases (74.7%) confirmed the diagnosis of SV by showing the classical ‘whirl’ sign in all cases. It was the mesenterico-axial type in 68 cases and the organo-axial type in 9 cases. The direction of the bowel torsion was precise in 6 cases: anticlock wise direction 4 cases and clockwise torsion 2 cases. The degree of torsion was precise in 20 cases: 270°, 1 case; 360°, 9 cases; 360° and half, 3 cases; 720°, 7 cases. CT scan revealed signs of intestinal ischemia or gangrene in 8 cases; these signs were confirmed at laparotomy in 6 cases.

In 36 cases plain abdominal X-ray was associated with CT scan. However, in 4 cases imaging was not performed.

Treatment

The detorsion was spontaneous in 2 cases.

Rectal tube decompression was performed in 81 cases (78.6%). The success rate was 86.4% (70 cases representing 53 patients). There were neither incident, nor colonic iatrogenic perforation during the procedure. We had 8 immediate recurrences at the removal of the tube. Five of them had new success rectal tube decompression while in the rest (3 cases) the rectal tube decompression failed.

Elective sigmoidectomy was realized in 33 patients (31 after success of rectal tube decompression and 2 after spontaneous decompression). Twenty patients had 2 bowel lavages per rectally the day before sigmoidectomy. In 21 patients (63.6%), the elective sigmoidectomy was performed in the same admission with a mean time of 11 days (range, 4 - 41 days). In the rest (n=12, 36.3%), the elective sigmoidectomy was performed in a 2nd admission with a mean time of 63 days (range, 10 - 180 days). Ten (30.3%) patients underwent midline laparotomy under general anesthesia, while 23 (69.6%) patients

underwent a 5 to 7 cm left iliac fossa mini-incision (mirror image of Mc Burney incision) under spinal anesthesia or epidural anesthesia. The mean length of the sigmoid loop was 72.5 cm (range, 40 – 105 cm). On average, 55.33 cm of sigmoid loop was resected ranged from 40 to 90 cm. After the resection of the loop an hand sawn end to end colo-colic anastomosis was performed in 6 patients. In 27 patients we performed a side to side colo-colic mechanical anastomosis using GIA linear stapler and the anastomosis was completed by application of a linear stapler.

The mean hospital stay after the elective sigmoidectomy in the same admission was 7 days (range, 2 – 22 days). After the elective sigmoidectomy in a 2nd admission, the mean hospital stay was 7 days (range, 4 – 22 days). There were no morbidity and mortality.

In those with success of rectal tube decompression (n=53), 7 did not have an elective sigmoidectomy for major comorbidities and 12 refused the elective sigmoidectomy.

Emergency surgical treatment was performed in 34 patients: 20 patients due to suspicious or presence of ischemic or gangrenous bowel, 14 patients due to failure of rectal tube decompression (11 patients after failure of emergency rectal tube decompression and 3 patients after failure of rectal tube decompression of recurrence on removal of the tube).

All patients had midline laparotomy under general anesthesia. The table II showed observations on laparotomy. One patient had a SV associated with a volvulus of the transverse colon and 2 had SV associated with ileo-sigmoid knot (ISK). The direction of the torsion was noted in 23 patients.

Table 2: Observations on laparotomy

	Immediate Surgery	Surgery after failure of rectal tube detorsion	Total
Gangrenous bowel	6	6	12
Viable bowel	14	8	22
360° of torsion	8	3	11
540° of torsion	1	2	3
720° of torsion	10	8	18
1080° of torsion	1	1	2
Mesenterico-axial type	18	12	30
Organo-axial type	1	1	2
SV+ISK	1	1	2
Anti-clock wise torsion	9	6	15
Clock wise torsion	5	2	7

Nine (26.4%) patients had one stage sigmoidectomy with an hand sawn colo-colic end to end anastomosis, while 24 patients (70.5%) had 2 stage sigmoidectomy (11 Hartman’s intervention, 13 Bouilly Wolkman colostomy) and 1 a surgical detorsion without pexy (figure 2).

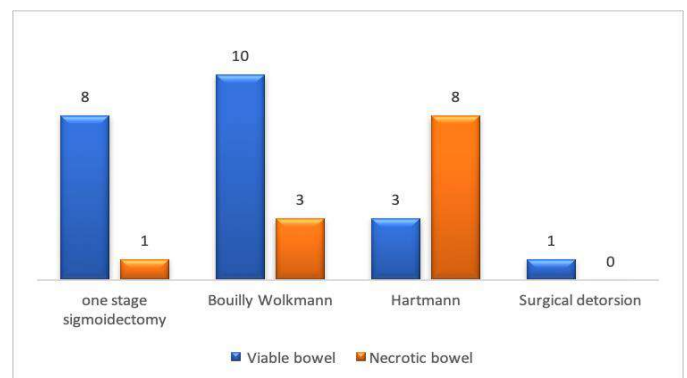


Fig 2: Surgical procedures according to the vitality of the bowel.

The average length of hospital stay after one stage sigmoidectomy, Bouilly Wolkman colostomy and Hartman's procedure, was respectively 12 days (range, 4 – 20 days), 12 days (range, 6 – 31 days) and 12 days (range, 5 – 31 days)

The overall mortality after emergency surgery was 8.3% (n=3). However, the overall morbidity was 14.7% (n=5) with 3 cases of wound infection (Hartman's procedure), 1 anastomotic leakage (one stage sigmoidectomy) and 1 case of evisceration (Bouilly Wolkman).

Table III shows mortality and morbidity according to the vitality of the bowel and the surgical procedure.

Table 3: Mortality and morbidity according to vitality of bowel and surgical procedure

	Morbidity	Mortality
Surgical detorsion (n=1)	0	0
One stage Sigmoidectomy (n=9)	1 (11.1%)	1 (11.1%)
Bouilly Wolkman (n=13)	1 (7.9%)	1 (7.9%)
Hartman's procedure (n=11)	3 (27.2%)	1 (9%)
Viable bowel (n=20)	2 (10%)	1 (5%)
Gangrenous bowel (n=12)	5 (41.6%)	2 (16.6%)

In patients with good outcome after Bouilly Wolkman colostomy (n=12), 91.6% (n=11) had a second surgery to reestablish the intestinal continuity (8 in the same admission and 3 in a 2nd admission). One patient was lost during the follow-up. The mean time for this surgery was 34 days (8 – 136 days) and the mean length of hospital stay was 9 days (range, 5 – 25 days). In patients with good outcome after Hartman's procedure (n=10), 80% (n=8) had a second surgery to reestablish the intestinal continuity in a 2nd admission. One patient had pulmonary tuberculosis and was not operated, 1 was lost during the follow-up. The mean time for this surgery was 159 days (range, 60 – 372 days) and the mean length of hospital stay was 9 days (range, 4 – 24 days).

Follow-up

The minimum follow-up time was 2 years and the maximum follow-up time was 6 years. We did not have any recurrence of SV in patients who were operated. However, 1 patient had an anastomotic stenosis 6 month after an elective sigmoidectomy with side to side mechanical colo-colic anastomosis. He benefited subsequently from a midline laparotomy with colic resection and colo-colic end to end manual anastomosis.

In the 12 patients who refused elective sigmoidectomy after successful decompression by rectal tube decompression, 2 (16.6%) had recurrence and were operated on.

3. Discussion

With 45.9% of all cause of intestinal obstruction, SV is one of the leading cause of intestinal obstruction in our hospital. Indeed, Dieme found in his previous study in the same department this high frequency of SV with around 18.1 cases of SV per year [5]. This high incidence is also reported elsewhere in Africa, in Latin America, in India, in Pakistan, in the Middle East, in Scandinavia and in Russia [2, 9, 11, 12]. In these countries called the « volvulus belt », SV represents 20% to 54% of all cause of intestinal obstruction. However, in United States, Western Europe, Australia, Japan, SV represents 3% to 5% of intestinal obstruction [2]. This wide geographic variation is thought to be due to dietary factors (fiber-rich diet in Africa, protein-rich diet in Western countries), high altitude (in the

Peruvian Andes and Ethiopia), endemic infections (Chaga's disease in Latin America causing megacolon), anatomical and cultural factors [13]. In “the volvulus belt”, as found in our study, SV is a pathology of young adult patients around the 4th and 5th decade of life [4, 5, 9, 11, 14, 15, 16]. However, in Western countries, SV occur over the 7th decade of life in patient institutionalized and debilitated, with underlying neuropsychiatric disorders and taking life long psychotropic medications [2, 3, 17]. Three of our patients (mean aged 55.3 year, range 34–70 years) had psychiatric disorder and were under long-term neuropsychiatric medication.

But, the anatomic prerequisite of volvulus occurrence, is dolichosigmoid which main clinical manifestation is chronic constipation [2, 18]. In our study, 4.6% of patients were known to have dolichosigmoid, while 30.2% had chronic constipation and 19.7% had recurrence of SV.

Our male to female ratio showing a net male predominance in the occurrence of SV was in accordance with the literature [3, 4, 6, 11, 14, 15]. This seemed to be due to the fact that men have a very high meso-colon, called dolichomesocolon, while women have a brachimesocolon, a capacious pelvis and a less toned abdominal wall especially after pregnancy, which allows spontaneous detorsions [13, 19].

SV is suspected with the triad acute abdominal pain, inability to pass gaz and feces, abdominal distension which was present in our study in 52.4% of cases [4, 5, 11, 14, 15, 16]. This triad is not specific for SV that's way imaging is necessary to confirm the diagnosis [2]. Nevertheless, in our study 4 recurrence cases did not have imaging. Plain abdominal X-ray shows the classic ‘coffee bean’ sign in 57 to 90% of cases [2, 7, 14]. It was done in 53.3% of cases in our study and made the diagnosis in 69%. In many African studies, plain abdominal X-ray is the only imaging tool performed [4, 9, 11, 14, 15, 16]. However, plain abdominal X-ray has limitation to evaluate the viability of the loop, to exclude association with others pathology like volvulus others part of colon, colonic tumors [10, 20]. Abdominal computed tomography scan (CT) is an imaging exam of choice in acute intestinal obstruction. It has a high sensitivity and specificity in the diagnosis of SV. It can also illustrate associated complications, such as bowel ischemia and perforation. In addition, it could characterize the type of volvulus, the degree of rotation and exclude other etiologies of bowel obstruction, informations which are important in the choice of the adequate treatment [8, 10, 20, 21].

In Africa, abdominal CT is rarely used owing to its nonavailability and high cost [4, 11, 12, 14, 16]. In the previous study done in our department CT was realized only in 25% of cases, while in this new study, the realization rate (75.4%) of CT was multiply by 3 compared to the previous study [5]. This was explain by the better availability and accessibility of abdominal CT due to the reduction of its cost and the presence of an on-call radiologist, on the other hand to the need to assess systematically the viability of the intestinal loop to guide the treatment. Our abdominal CT accuracy rate for the positive diagnosis of SV was 100%, while the accuracy rate for intestinal necrosis was 75%. The treatment of SV is based on two main goals, first to decompress the sigmoid and second to prevent recurrences. However, this treatment is still controversial [2, 4, 10]. Spontaneous detorsion is possible but rare. It is found in the literature in 2 to 3% of cases [2, 22]. In our series, it was observed in 1.47% of cases.

Many studies have concluded that the endoscopic detorsion, popularized by Bruusgaard in 1947, followed by elective sigmoidectomy is the treatment of choice in the absence of signs

of bowel ischemia [2, 6, 7]. However, surgery under various modalities is advocated if endoscopic detorsion fails or presence of ischemic or gangrenous bowel [3, 4, 6, 7].

As in many African countries, endoscopic decompression is not available in our setting. In these conditions, for most African authors, the only alternative for management of SV is the emergency surgical treatment [4, 9, 10, 11, 12, 14, 15, 16]. However, rectal tube decompression, common practice in our department, is used in case of uncomplicated SV with good results as shown by Diémé [5]. Nevertheless, very few authors in the literature report the use of rectal tube decompression in the management of uncomplicated SV [11, 16, 23, 24].

In our series, rectal tube decompression was performed in 78.6% of cases, in patients whose initial evaluation showed an uncomplicated SV. The success rate was 86.4%. This rate was similar to the success rate of endoscopic decompression which is 77 to 98% [2, 6, 7] and close to Mulas in Spain and Nuhu in Gambia who use the rectal tube decompression [16, 23]. On the other hand, it was clearly superior to Mulugeta in Ethiopia, Tank in Singapore (he uses Foley catheter) and especially to Diémé in the previous study in the same department [5, 11]. This improvement in the detorsion success rate between the 2 studies is due to the better selection of patients who should benefit from rectal tube detorsion (better clinical assessment of patients and increase of CT scan performing rate to evaluate the vitality of the bowel). Rectal tube detorsion is a simple technique, easily performed with little equipment and without anesthesia [5, 25]. It has the disadvantage to be a blind detorsion method with the risk of colonic perforation or to miss a mucosal ischemia. However, no incident was noted during the procedure while in the previous study in the department there was 1 case of iatrogenic colonic perforation. This method can also be a good alternative to emergency surgery in patients with particular comorbidities and conditions (lymphomas, HIV, stroke, etc.), as found in our series in 17.4% of cases, and in elderly patients [Diémé]. It allowed to relieve the obstruction and to prepare patients (correction of hydroelectrolyte imbalance and co-morbidities) for the elective sigmoidectomy.

After successful rectal tube detorsion, an immediate recurrence can occur at the removal of the tube [5]. Our immediate recurrence rate (11.2%) was similar to the one of the previous study (10.2%) [5]. However, these recurrences are amenable to a new rectal tube detorsion. Diémé had in his previous study a success rate of 100% while it was 62.5% in this new series [5].

Rectal tube detorsion failed in 11 patients in whom abdominal CT scan was performed in 6 patients prior to the procedure. Subsequent laparotomy revealed intestinal necrosis in 6 patients and in 7 patients a degree of torsion greater than or equal to 720°. We can then assume, as stipulated by Diémé, that the failure of the rectal detorsion is due to the presence of necrosis and/or a degree of torsion equal or over 720° [5]. Of the 6 cases of intestinal necrosis only 2 did abdominal CT scan which miss the diagnosis of necrosis. After successful non-surgical detorsion, elective sigmoidectomy should be done within 2 to 15 days, either in the same admission or in a second admission to prevent recurrences which may occur up to 90% if the sigmoidectomy is not performed [2, 6, 8, 23, 24]. In accordance with these recommendations, we performed this elective sigmoidectomy in the same admission in 63.6% of cases with a mean time of 11 days. In most of the cases (69.7%), the elective sigmoidectomy was performed by left iliac fossa mini-incision which is now recommended by many recent authors [8, 17, 26]. Our morbidity and mortality after rectal tube detorsion followed by elective sigmoidectomy were nil.

The presence of ischaemic or gangrenous bowel or failure of non-surgical decompression necessitates emergency surgery [2, 7]. In our study, emergency surgery was done in 39.5% of patients (n=34) in whom 58.8% (n=20) had signs of complicated SV and 35.2% (n=14) after failure of non surgical decompression.

Several surgical techniques are possible. However, safety must remain the rule, because these surgeries are performed urgently in unprepared and fragile patient, sometimes at night, by "junior surgeon". The technique must therefore be simple, efficient and short, without the risk of postoperative fistula.

Surgical detorsion techniques with or without pexy are interesting in elderly patients with comorbidities. However, they should be abandoned because associated with high mortality and recurrence rate [2, 3, 6, 8, 12]. These techniques are less and less carried out in our department. In fact, in the previous study in the department, surgical detorsion without pexy was performed in 10 out of 116 cases, while in our series it concerned only one 80-year-old patient [5].

The 2-stage sigmoidectomy has long been the reference due to the fear of occurrence of anastomotic leakage, however recent series have demonstrated the safety and the feasibility of one stage sigmoidectomy [4, 8, 10, 14, 27, 28, 29, 30, 31].

In our series, most of the patients (70.5%) who had emergency sigmoidectomy underwent 2-stage sigmoidectomy. Morbidity and mortality were respectively 20.8% and 8.3%. In those who recover well from this 2 stage sigmoidectomy, 86.3% benefited from a restoration of digestive continuity. In contrast, one stage sigmoidectomy was performed in only 26.4% of cases. The loop was necrotic in 1 patient, whose postoperative outcome was favorable. In this patient, the option of performing a 1-stage sigmoidectomy was mainly due to the fact that he presented with psychiatric disorders and would have difficulty in supporting the management of a colostomy. The mortality (11.1%) of the 1-stage sigmoidectomy was higher than that of the 2-stage sigmoidectomy, while the morbidity (11.1%) was lower than that of the 2-stage sigmoidectomy.

Conclusion

Our study confirms that SV is a middle-age man pathology in sub Saharan Africa. It shows that rectal tube detorsion followed by elective sigmoidectomy in uncomplicated SV is a good alternative by reducing mortality and morbidity. One stage sigmoidectomy should be performed in well selected patient while gangrenous SV should benefited from 2 stage sigmoidectomy.

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