

# Elective surgery after successful endoscopic decompression of sigmoid volvulus may be considered

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## ABSTRACT

**INTRODUCTION:** Volvulus is an axial twist of any part of the gastrointestinal tract along its mesentery. If it goes unattended, it will cause bowel obstruction and bowel ischaemia with gangrene and perforation. The primary treatment is endoscopic desufflation, but the place for elective surgery is controversial. Volvulus is a rare condition in Western Europe and North America that most often affects elderly of either gender.

**MATERIAL AND METHODS:** We reviewed all records on patients admitted to our Hospital during an 11-year period. Age at first admission, co-morbidity and number of readmissions were registered. The results of primary endoscopic treatment and any surgery were registered together with complications, 30-day and one-year mortality rates.

**RESULTS:** A total of 41 patients were treated. The mean age at first admission was 70 years. Significant co-morbidity was found in 33 patients (81%). Thirty patients (73%) were treated for recurrence. Fourteen patients were treated with decompression alone, and 27 patients were operated (14 acute and 13 elective cases). The 30-day mortality was 43% after acute operation and 8% after elective operation ( $p < 0.05$ ). In the group of patients with decompression alone, the one-year mortality was 50%.

**CONCLUSION:** Elective surgery should be considered because of a high recurrence rate and one-year mortality after initially successful decompression.

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Sigmoid volvulus primarily affects males at a male/female ratio of 2:1, and it is most often seen in elderly persons of either gender [1-4].

Volvulus is an axial twist of a portion of the gastrointestinal tract along its mesentery. In the colon, volvulus of the sigmoid colon is the most common (65-85%), volvulus of the caecum constitutes 15-30% and volvulus of the transverse colon 2-5% of all cases. Volvulus of the flexures has been reported, but is a rare condition [3, 4]. If left unattended, volvulus will cause bowel obstruction, which in turn may lead to bowel ischaemia with gangrene and perforation [2, 5]. Endoscopic decompression is generally accepted as the primary treatment of sigmoid volvulus [5].

In case of severe ischaemia or gangrene, the patient

must undergo acute resection. This is often associated with considerable morbidity and a mortality rate of up to 40% [6-9]. After endoscopic decompression, a high recurrence rate of 55-90% has been reported [3, 10]. Because of the high recurrence rate after endoscopic decompression and the high mortality rate after emergency resection, elective surgery has been advocated [4-6, 11], but the evidence for elective surgery is limited, and we therefore found it worthwhile to review our results on the treatment of sigmoid volvulus.

## MATERIAL AND METHODS

The records of all patients treated for sigmoid volvulus in our department during the 11-year period from January 2000 to December 2011 were reviewed. The hospital provides primary medical care for approximately 350,000 inhabitants. Patients were identified from the Hospital Diagnostic Index. The diagnosis was confirmed by radiological studies (plain abdominal X-ray and/or computed tomography), endoscopic or operative findings. Patients with volvulus in other segments of the colon were excluded as were patients younger than 18 years.

Demographic data, including age at first admission, co-morbidity, previous admissions for sigmoid volvulus (also in other hospitals in Denmark established via a national databases), mode of treatment and number of post-treatment readmissions were registered. The observation period varied from one to 12 years. The outcome of the non-operative and operative treatment was registered. In patients undergoing surgery, the following complications were registered: post-operative wound infection that needed operative intervention, wound dehiscence, pneumonia proven by X-ray, cardiopulmonary complications and clinical anastomotic leakage. Vital status and date of death were checked in the central database of the Danish Health and Medicines Authority. We registered death within 30 days and within one year after initial treatment.

The primary treatment was endoscopic decompression with a flexible scope.

Depending on the surgeon's preference, a rectal tube would be inserted under endoscopic visualization and left in place for 24 hours. Emergency surgery was performed on patients with signs of bowel ischaemia at

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 TABLE 1

Number of different co-morbidities.

Co-morbidities, n	Patients, n	
	surgery	non-surgery
0	7	1
1	8	4
2	4	4
3	5	5
4	1	0
5	2	0

 TABLE 2

The different types of co-morbidity.

Types of co-morbidity	Patients, n
Hypertension	15
Stroke	12
Diabetes	8
Neurological disorder	8
Cardiac disorder	6
Atrial fibrillation	4
Dementia	4
Congenital brain damage	3
Hypothyroidism	3
Respiratory disorder	2
Psychiatric disorder	2
Lymphoma	2
Alcoholism	1
Respiratory insufficiency	1
Renal insufficiency	1

 TABLE 3

Number of deaths (%) within 30 days/one year of surgery or decompression (N = 14).

	30 days	1 year
Non-surgery	2 (14)	7 (50)
Acute surgery	6 (43)	7 (50)
Elective surgery	1 (8)	2 (15)

endoscopy, failure to decompress the colon and early recurrences (within 48 hours). The operation performed was sigmoid resection with a primary anastomosis or Hartmann's procedure depending on the intra-operative findings and the surgeon's preference. Elective surgery was defined as surgery performed later than 48 hours after a previous, successful decompression with no signs of ongoing volvulus. To compare the mortality in the groups we used the  $\chi^2$ -test, and  $p < 0.05$  were considered significant.

*Trial registration:* not relevant.

## RESULTS

A total of 41 patients were treated during the 11-year period. The median age was 78 years (range 32-92 years). Twenty-four patients (58%) were males. Thirty patients (73%) were treated for recurrences and the median number of recurrences was three (range 2-16 recurrences). Significant co-morbidity was found in 33 patients (81%) as shown in **Table 1**. A total of 21 patients (51%) had one or more co-morbidities, the most frequent being hypertension (36%) and previous stroke (29%) (**Table 2**).

### Conservative management

A total of 14 were managed with decompression alone. The median age of the patients was 79 years (range 40-92 years). All but one had 1-3 co-morbidities (Table 1). There was no complication to the endoscopic decompression, and the patients were discharged within 1-2 days as the patient either denied further surgery or had a significantly increased risk of severe complications if undergoing surgery, as judged by the surgeon. A total of seven patients (50%) died within one year after their last treatment (**Table 3**): one patient from gangrenous bowel due to recurrence, one from pneumonia and sepsis and five from unknown reasons. There was no difference in the number of co-morbidities between those who died and those who survived for more than one year. In another two patients, primary decompression failed, and they were included in the group of surgically treated patients.

Three patients had no recurrences during the observation period. Eleven patients showed recurrences with a median of four (1-16) episodes. The time from the first admission to the first recurrence was a median four (1-12) months.

### Surgical management

In all, 27 patients underwent surgery – acute (14 patients) or elective (13 patients). The median age was 78 years (range 32-89 years). Prior to surgery, the median number of recurrences was three (range 1-16). Seven (25.9%) patients had no co-morbidities, and twenty patients (74.1%) had 1-5 co-morbidities (Table 1). In the elective surgery group, there was a median of three (2-14) recurrences before surgery and the median time from the first admission to the first recurrence was two months (1-9 months).

The indications for acute surgery were bowel gangrene demonstrated by endoscopy (four patients), recurrence (six patients), failed endoscopic decompression (two patients) and other reasons (two patients). Five patients had a primary anastomosis and the rest had a Hartmann's procedure. One patient was successfully re-operated for anastomotic leakage. Among the nine pa-

tients who underwent a Hartmann's procedure, one had to be re-operated due to a non-vital stoma; the outcome was fatal. In all, six patients (43%) died postoperatively within the first 30 days. The one-year mortality rate was 50% (Table 3).

The indications for elective surgery were recurrence (11 patients) and young age at first admission in two patients (age 50 and 51 years) Four patients had a Hartmann's procedure, eight a primary anastomosis and one had a diverting loop ileostoma due to serve co-morbidity. One patient was re-operated for anastomotic leakage. Only one patient died postoperatively within 30 days from pulmonary complications. This mortality rate was significantly lower than the mortality rate observed for acute surgery ( $p < 0.05$ ). The mortality rate within one year was 15% (two patients).

## DISCUSSION

Initially, we succeeded in decompressing 97% of the patients with a flexible endoscope. This is a high rate compared with other studies (50-90%) [2, 12], but many of the previous studies did not distinguish between flexible and rigid scopes.

There is a high recurrence rate after endoscopic decompression, in some studies up to 90% [1, 8]. In our study, the recurrence rate was 82%. High rates of gangrenous bowel have been reported in recurrence of volvulus and with high mortality and morbidity rates [8, 13].

We found that there was a high 30-day mortality rate (43%) for those who underwent acute surgery. This rate was significantly higher than the 30-day mortality rate of 8% observed in the elective surgery group. The mortality rate in the elective group is comparable to those reported in the literature. However, in the group of acute surgery, our rate was higher than the rates reported by others which range from 7 to 42% [5, 7, 8, 14-16]. This may be explained by the fact that most studies are conducted in endemic areas where patient selection may play a role. Thus, in our study there was a high frequency of gangrenous bowel associated with a high mortality rate [5, 7].

The 30-day mortality rate in the group of non-operatively treated patients was 14%, which is comparable to the rates reported by other studies [8, 15], and after one year the mortality rate was 50%. We have not been able to investigate the reasons for the high mortality rate after one year, but recurrence of volvulus may explain this. The difference between the three groups according to the one-year mortality rates was non-significant. The small study population may explain this finding.

A one-stage resection with primary anastomosis for the treatment of acute sigmoid volvulus has been rec-



Unattended, volvulus will cause bowel obstruction, which, if left untreated, may lead to bowel ischemia with gangrene and perforation.

ommended in several studies, also in the case of gangrenous bowel [5, 11, 16-18]. However, these studies included younger patients with less co-morbidity. Raveenthiran [9] showed no difference in the outcome of surgery with primary anastomosis in gangrenous versus viable sigmoid except for a higher frequency of wound infections in patients with gangrenous bowel. However, the patients included then were younger than the patients included in our study [5, 9]. Atamanalp & Ozturk [8] recommend that anastomosis be avoided in elderly patients undergoing acute surgery, and particularly in patients with gangrenous bowel due to considerable co-morbidity and delayed diagnosis with severe sepsis [8].

Even though the population in our study consisted of elderly patients with a high degree of co-morbidity, our results showed that elective surgery after the first recurrence should be considered. This is due to the high one-year mortality rate in the non-operative group, the high mortality rates in the acute surgery group and the low mortality rate in the elective surgery group. This conclusion is in line with recommendations made in other studies [8, 10-12, 19, 20].

Our study and others have showed that existing co-morbidity should not be given as the reason for excluding patients from surgery. Elective surgery seems to favour primary anastomosis. In our study, the incidence of primary anastomosis was 33% and 73% in acute and elective surgery, respectively. The morbidity rates were low in both groups in our study, whereas others have found a lower rate after elective surgery than after acute surgery [2, 9, 11, 14, 20].

In conclusion, our results support the recommendation of elective surgery after successful endoscopic decompression of sigmoid volvulus even in cases with significant morbidity. Although the evidence is relatively weak and based on retrospective studies, the conduction of prospective randomized studies seems unrealistic.

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