

St Paul Hospital Millennium Medical College



Treatment Outcomes of Sigmoid Volvulus Patients Admitted and Managed at Saint Paul's Hospital Medical Millennium College

BY – BEZAWIT DEMOZ

(MD, SURGERY RESIDENT)

**A RESEACH REPORT SUMITTED TO THE DEPARTMENT OF
SURGERY, ST. PAUL'S MILLENIUM MEDICAL COLLEGE FOR
PARTIAL FULIFILMENT OF SPECIALIST IN GENERAL SURGERY**

September, 2018

ADDIS ABEBA

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ADVISORS - 1. Dr. AYELIG TSEHAYE

2. Dr. ENIGDA ABEBE

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Abstract

Background: Sigmoid volvulus (SV) is one of the three most common causes of acute colonic obstruction and forms 50–90% of all colonic volvulus. Africa is named as one of the regions with high incidence and is included in ‘volvulus belt’. Different type of management was employed as definitive management but later WHO recommended decompression followed by elective surgery.

Objectives: To assess outcomes for Sigmoid Volvulus among patients admitted for sigmoid colonic volvulus at Saint Paul’s Hospital Millennium Medical College (SPHMMC) from January 1st, 2012 to December 31st, 2017 G.C.

Methods: The study was conducted in SPHMMC, department of Surgery from February 2018- April 2018. A retrospective hospital based study was conducted on all patients admitted from January 1st, 2012 to December 31st, 2017 G.C. in SPHMMC. The data was entered using Epi Info and analyzed using SPSS version 20 statistical software.

Result: Majority 147 (89.0%) of the patients studied were male, making male to female ratio of 8; 1. From 165 patients with sigmoid volvulus who undergoes surgery 92% of the cases had shown favorable outcome. But, the remaining 8% of cases ended with unfavorable outcome, death. The age of patients ranges from 17 to 85yrs with a mean and SD 51.7 and 15.6 years respectively. From the Patients managed surgically; more than half 88 (53.7 %) went for resection & anastomosis on elective base. The rest 53 (32.3 %), 14 (7.9 %) and 10 (6.1 %) cases were managed by colostomy, derotation and primary repair on emergency base respectively.

Conclusions and Recommendations: Low mortality rate is observed among surgically treated patients but patients stayed longer in the hospital. Significant number of patient’s had different types of post-operative complications like wound infection. A public awareness should be increased on the presenting symptoms of sigmoid volvulus through health education to reduce the late presentation, morbidity and mortality.

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List of Abbreviations

ARDS – Acute Respiratory Distress Syndrome

E.C. – Ethiopian calendar

FMOH - Federal Ministry of Health of Ethiopia

LOS - Length of hospital stay

SPHMMC – St. Paul Hospital Millennium Medical College

SV - Sigmoid volvulus

UK – United Kingdom

USA – United State of America

WHO - World Health Organization

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Chapter 1 - Introduction

1.1. Background

The term Volvulus derived from a Latin word 'volvere' meaning 'to twist'. A colonic Volvulus refers to torsion or a twist of part of a colon on its own mesentery causing obstruction from an acute to chronic range(1). The most common sites of volvulus are the sigmoid colon and cecum (2).

Before 19th century expectant management was the main stay but latter around 1920 there were 3 kind of surgical approaches developed which include open derotation with mesenteric plication, resection with colostomy and resection with anastomosis. Because of higher mortality(~50%) with the mentioned procedures other options were sought(1). In 1947 trans-anal deflation using sigmoidoscopy was introduced. Having this procedure alone patients presented with high recurrence rate. Consequently, elective surgery was introduced after few days of deflation(1).

The disease has a wide geographic variation. Regions with high incidence such as Latin America, Africa, Eastern Europe, Scandinavia, Russia, Middle East, Pakistan and India are sometimes labeled as 'volvulus belts'. It is rare in developed countries such as USA, UK, Japan and Australia and had low-incidence of 3–5% of all acute intestinal obstructions compared with 20–54% in high incidence areas (7–9).

Predisposing factors for SV includes anatomical variations like increased colonic length and abnormal fixation, mega colon due to Chaga's disease, tumor obstruction, chronic constipation, high fiber diet and previous abdominal surgery. Males are predominantly affected(4). Low occurrence in women is usually attributed to capacious pelvis and a lax abdominal wall, which allows spontaneous untwisting of the beginning of a volvulus [31]. This hypothesis does not explain the excessive male ratio of endemic volvulus.

The golden standard of treatment which is recommended by WHO is decompression of sigmoid volvulus followed by Surgery after 48 to 72 hrs by resection and anastomosis with stool diversion or primary anastomosis.(5).

In Ethiopia some studies were conducted and indicate that sigmoid volvulus were the leading causes of intestinal obstruction(5). In a single year 200 patients were treated for sigmoid volvulus in Gondar University Hospital and from a single site these much cases in one year can be indicator of the prevalence of the disease in the country(6).

1.2. Statement of the problem

Sigmoid volvulus (SV) is one of the three most common causes of acute colonic obstruction and forms 50–90% of all colonic volvulus. It was first described by Rokitansky in 1836 (5). Sigmoid volvulus is the third major cause of colon obstruction in adults after cancer and diverticula. It is also more common in young men and the elderly people. Sigmoid volvulus may lead to serious complications, even death, before or after any clinical procedure due to strangulations which ensuing gangrene, sepsis, and peritonitis.

It is found that only 9.6% of 1206 cases of colonic obstruction in the United States were caused by sigmoid volvulus and the community-based incidence of sigmoid volvulus in the United States is 1.67 per 100,000 persons per year, mostly African American origins(2). Incidence of 251.8 (217.8, 289.6) per 100,000 surgical population was seen in a study conducted in Northern Uganda in 2011 (9). In western Nigerian hospital the rate is found to be only 6.3% from all forms obstructions managed for seven years, 2007 to 2014 (10).

Recent reports claim a decreasing incidence in some of the endemic areas such as the Middle East(11), Nigeria(12), Ghana(10), and South Africa. This is hypothetically ascribed to westernization of dietary habits(13). In contrast, an increasing incidence in non-endemic areas such as USA, Singapore and Taiwan is attributed to population migration(14). These claims are based on hospital statistics rather than on community-based data.

The study conducted in Tikur Anbessa Hospital recorded 27% of sigmoid volvulus cases with 35% of death from all deaths due to intestinal obstruction(7). And a study conducted in Gondar has also shown 13.8% of death rate among sigmoid cases treated by surgery(8). Findings indicated that mortality is associated with late presentation to the hospitals and duration of illness. According to the findings in Tikur Anbessa Patients had a mortality rate of 7.6% and 25% when they were presented within two days of illness and later than two days respectively ($p < 0.005$).

1.3. Significance of the study

Since Ethiopia is one of the countries placed in the map of ‘volvulusbelt’; this study will shed some light as to why and how to improve the occurrence and treatment options. Only some study about sigmoid volvulus was done in institutions. This study will help understand and determine the associated factors and outcome of the management performed at St. Paulo’s hospital medical millennium college (SPHMMC). The findings of this study will help to identify the gaps, provide clue and recommend most appropriate case management modalities for patients associated with sigmoid volvulus.

Chapter 2- Literature Review

2.1. Overview of Sigmoid Volvulus

There is no clear documentation for the exact cause of sigmoid volvulus but there are some predisposing factors like a long congenital sigmoid with a short mesenteric base, chronic constipation, high fiber diet, and some drugs like ant cholinergic drugs, sedatives, and anti-Parkinson agents. Clinical presentations include abdominal pain, constipation, significant abdominal distention and failure to pass feces and flatus with or without presence of vomiting (13).

Abdominal X-ray is done to confirm the diagnosis of sigmoid volvulus. The goal of therapy is relief of the acute torsion. So the management includes trans-anal deflation using endoscopic or rectal tube or emergent laparotomy for suspected gangrenous sigmoid volvulus or failed deflation (1).

2.2. Management outcome of Sigmoid Volvulus

Despite significant progress in the treatment of this disease, no consensus has been reached. Emergency surgery is the appropriate treatment for those who present with diffuse peritonitis, intestinal perforation or ischemic necrosis(7,14). Non-operative treatment is adopted if there is no evidence of these conditions. Barium enema, rectal tubes, rigid and flexible sigmoidoscopy, as therapeutic methods have been adopted by clinicians.

Study conducted in Gondar among 200 sigmoid volvulus cases reveals that 131(65.5%) of the cases were treated by deflation and the rest 69 (34.5%) went for surgery(6). The ratio of deflation versus surgery is 2:1. In Sudan's prospective study conducted on sigmoid volvulus management indicated that only 29 patients come in two hospitals within three years of the study period (2011-2013). All the patients treated by surgery and 26 were male. Mortality rate was found 7.6% among all surgeries. Surgical site infection observed in 9 (20.7%) of the volvulus patients (15).

Study conducted in Nigerian Teaching hospital among patients with bowel obstruction showed that only 8 (6.3%) of the cases were sigmoid volvulus and 7 of the patients operated and one

patient died before surgery(12). In Adama, Ethiopia from 87 cases with larger bowel obstruction 60 (69%) of the cases were due to Sigmoid Volvulus. More than 90% of all intestinal obstruction, including sigmoid volvulus, went for surgical procedures and 24.6 % of patients developed different types of complications including wound infection, facial dehiscence, anastomotic leakage, septic shock and other complications like pelvic collection or pneumonia (16).

Sigmoid volvulus cases presented at King Abdullah Hospital, Jordan, from 2000 to 2007 were only 32(9.2%) from more than 300 bowel obstruction cases and all went for operative management (11).

In Gondar from the total cases presented with sigmoid volvulus 25.5% developed SV-associated gangrene and only 16% had post-surgical complications: 2.0% had stroke, 2.5%experienced deflation failure, 2.0% developed intra-abdominal abscess, 7.0% developed sepsis, and 2.5% had septic shock. In another study conducted in Gondar post-operative complication accounts 15.1% (6,10).

According to the study conducted in Northern Uganda among 103 patients with sigmoid volvulus Post-operative complications included wound sepsis 10 (9.7%), wound dehiscence 8(7.7%), anastomotic leaks 8(7.7%), colostomy complications 7(6.8%), chest infections 6(5.8%), septic shock 6(5.8%), cardiac arrest 1(0.97%), hypertension 2(1.94%), abdominal abscess 1(0.97%), enter cutaneous fistula 1(0.97%) and urinary tract infection 1(0.97%) (17).

Clinical study conducted in Gunter government hospital among 46 patients with sigmoid volvulus showed that 29 (63%) of the cases developed postoperative complications ,of these wound infection was the most common complication (12) , anastomotic leak in 4 cases , 6 cases developed respiratory failure and 5 cases septicemic shock with ARDS. Mortality rate is 15.21 %. Mean duration of hospital stay for sigmoid volvulus patients is 10-14 days(18).

According to the study conducted in Chengalpattu medical college, India from total of 36 patients with sigmoid volvulus eight (100%) of patients survived in the sigmoidopexy group, there were two deaths from 12 cases in resection and anastomosis group plus 4(25%) deaths from Hartmann's Procedures group (19).

2.3. Factors associated with management Outcome of Sigmoid Volvulus

Duration of Illness

The result of the study conducted in Adama(16) showed that duration of illness before surgical intervention had a significant statistical association with the management outcome of patients. Patients who presented within 24 h of symptom presentation are less likely to develop an unfavorable outcome, compared with patients who presented after 24 h (adjusted odds ratio (AOR) = 0.49, 95 % CI: 0.25–0.97, p-value = 0.01).

From the patients in Northern Uganda majority of patients 61(59.2%), presented more than 3 days from the onset of symptoms and only 42 (40.7%) of the patients presented within less than 3 days from the onset of their symptoms(17).

In the study conducted in Tanzania 25 (17.1%) patients died from 146 patients in the hospital. Amongst the patients treated with primary resection and anastomosis, 17(16.7% i.e 17/102) died while 8(18.2% i.e. 8/44) of those who had colostomy died. Late presentation (≥ 24 hours) (OR = 5.4, 95% CI (2.8- 6.9), P = 0.015), presence of shock on admission (OR = 3.2, 95%CI (2.2-8.5), P = 0.001) and presence of gangrenous bowel (OR = 3.2, 95%CI (1.1- 6.8), P = 0.000) were significantly associated with mortality of patients(20).

Length of Hospital Stay

According to the findings of the study in Adama Length of hospital stay had a significant statistical association with management outcome (AOR = 0.05,95 % CI: 0.01–0.16, p-value = 0.001). Patients who had stayed for less than 7 days in hospital wards were less likely to develop unfavorable outcome compared with patients who stayed for more than 7 days(16).

According to the study conducted in Chengalpattu medical college, India Average hospital stay of patients with sigmoid volvulus was 14 days(19).

In a study conducted in Tanzania among 146 cases of sigmoid volvulus the length of hospital stay (LOS) ranged from 1 to 34 days with a median of 14 days ((inter-quartile range, 12 to 16 days).The LOS for non-survivors ranged from 1 day to 11 days (median 4 days). The length of hospital stay was significantly longer in patients with advanced age, concomitant medical illness and presence of complications (P < 0.001)(20).

Type of Procedure done

In Uganda There were 91(88.3%) patients that had a resection and primary anastomosis and only 5(5.5%) patients died. 8(7.8%) patients had a Hartmann's procedure and 2(25%) patients died. Four (3.9%) patients had a double barrel colostomy and 1(25%) patient died. Resection and primary anastomosis had a lower risk of developing an adverse outcome than a Hartmann's procedure (adj. RR=0.15; 95% CI: 0.02-0.099) and this was statistically significant (p=0.048)(17).

Co-morbidity

There were only four (3.9%) co-morbidities reported in Northern Uganda from 103 patients, which is very low. Two patients had hypertension, one patient had diabetes and the last patient had neuro-psychiatric illness. Out of these four patients presenting with co-morbidities only one patient, the diabetic died of a hypostatic pneumonia, otherwise the rest had an uneventful recovery(17).

Chapter 3 - OBJECTIVES

3.1. General Objective

- To assess treatment outcome of Sigmoid Volvulus among patients admitted in SPHMMC for sigmoid colonic volvulus from January 1, 2012 E.C to December 31, 2017 G.C

3.2. Specific objectives

- To describe common presenting symptoms and post-operative complication
- To assess the final outcome of sigmoid volvulus patients

Chapter 4 - Methods

4.1. Study Area and Period

The study was conducted in SPHMMC department of Surgery from the period of February 1st, 2018 to April 30, 2018. The hospital is found in Addis Ababa.

Metropolitan Addis Ababa, dominant socio economic, political and historical city, has estimated 3,384,569 dwellers according to the 2007 census projection with annual growth rate of 3.8% and 540 Km² of land. The city is divided in to ten sub-cities which are the second administrative units (24).

One of the oldest hospitals in the capital, the study site for this paper, is SPHMMC. It is established by the Emperor Haile Silase in 1961. The hospital gives 75% of its service to people free of charge for those who cannot cover their medical expense. More than 800 clinical and supportive staffs of the hospital give service to approximately 110,000 people per annum. St. Paul receives referrals from all corners of the country and it is under the Federal Ministry of Health of Ethiopia (FMOH). In 2007 the medical college added to the hospital with yearly enrollment rate of more than 250 students and it has different residency programs including general surgery and obstetrics and gynecology (25).

4.2. Study design

Hospital based retrospective study was conducted to assess treatment outcome of Sigmoid Volvulus for patients diagnosed and admitted from January 1, 2012 E.C to December 31, 2017 G.C in SPHMMC, Addis Ababa

4.3. Population

4.3.1. Source Population

The source population was all patients admitted in SPHMMC surgical ward for Intestinal Obstruction.

4.3.2. Study Population

The final study unit was documents of the surgical patients admitted with diagnosis of Sigmoid Volvulus in the hospital in the past five years.

4.4. Sample size determination, sampling technique and Sampling Procedure

The sample size was calculated using single population proportion formula:

$$n = \frac{z_{\alpha/2}^2 \times p(1-p)}{d^2}$$
$$= \frac{(1.96)^2 \times (0.27)(1-0.27)}{0.05^2}$$

$$n = 221$$

Where:-

n = the desired sample size

p = prevalence of sigmoid volvulus from intestinal obstruction cases in Black lion = 27%(7)

$Z_{\alpha/2}$ = critical value at 95% confidence level of certainty (1.96)

d = the margin error between the sample and the population =5%

4.4.1. Sampling Procedure

All the recorded data in the register was sampled.

4.5. Source and data collection procedures

Structured secondary data extraction format was prepared based on the objective of the study and the available data in the hospital based Surgery register from operating room log book ward admission discharge log book and Patient Chart.

4.6. Study variables

Dependent variables

- Presentation pattern
- Type of intervention
- Pre procedure, intra procedure and Post procedure Complication
- Length of hospital stay

Independent Variables

- Age
- Sex
- Residency
- Previous Attack
- Treatment options

Eligibility criteria

Inclusion Criteria

Patient admitted with the diagnosis of SV and operated on emergency

Patient diagnosed with SV admitted and operated electively

Exclusion Criteria

Patient transferred to other departments of the hospital or self-discharged patients was excluded from this study.

Patient's record with missed information on dependent variables was excluded from this study.

Patient with different intra-operative diagnosis was excluded from this study.

4.7. Operational Definitions

Outcome – the result or effect of the disease on the patient which increases morbidity and mortality

Successful Outcome – outcome of the patient without complication

Unsuccessful outcome–outcome of the patient with complication

Complication – altered outcome of patients that forces them for longer hospital stay and death

Sigmoid Volvulus – twisting of sigmoid colon on its own mesentery

Deflation of SV – to decrease the accumulated content gas or feces in order to give relief

Primary repair – to create anastomosis between to bowel after removing the diseased part

Anastomosis – to create an artificial connection b/n two things

Colostomy – surgical procedure in which artificial opening is formed by drawing the health part of the colon through anterior abdominal wall incision

4.8. Data Analysis Procedure

The data was entered using Epi Info and analyzed using SPSS version 20 statistical software. Based on the objective of the study the association between stated variables was calculated.

4.9. Data Quality Management

Before data collection has started the data extraction format was tested and reviewed. After data collection the data in the table was cross checked with the data in the register by taking 5% of the samples randomly

4.10. Ethical Consideration

Before any data collection was started, Ethical Clearance was obtained from the ethical review board of SPHMMC and the issue was communicated to the surgical department of the hospital. The study objectives, rationale and expected outcomes of the study was briefed to the staffs of the department for their cooperation.

4.12. Dissemination of the result

The result of this study will be disseminated to St. Paul Hospital Millennium Medical College Surgery department staffs, SPHMMC Library, FMOH and other relevant groups. Results can also be presented in different forums and workshops. The findings will also be published in a peer reviewed scientific journal.

5. RESULT

5.1. Response Rate

A total of 225 patients were operated from January, 2012 till December, 2017 with the diagnosis of large bowel obstruction secondary to Sigmoid Volululus. And of these only 165 complete cards were obtained. Cards with incomplete information, absent cards and cards with different intra operation diagnosis were excluded from the analysis.

5.2. Socio demographic Characteristics of patients

Majority 147 (89.0%) of the patients were male, making male to female ratio of 8;1. The age of patients ranges from 17 to 85yrs with a mean and SD 51.7 and 15.6 yrs respectively. There was a difference in the mean (SD) age of males to females which was 53.6 (15.2) for males and 36.4 (9.5) for females. Median age of males was 56yrs and whereas of females was 35yrs.

More than half 93 (56.4 %) of the patients came from Oromia region.

Table 1: Socio-demographic characteristics of patients with sigmoid Volvulus, SPHMMC, 2018

Sex	No. (%)	Mean(SD) age	95%CI	
Male	147 (89)	53.6 (15.2)	51.27	56.8
Female	18 (11)	36.4 (9.5)	32.12	41.0
Total	165 (100)	51.7 (15.6)	49.33	54.05

Residence	No. (%)	Mean(SD) age	95%CI	
Oromia	93(56.4)	52.7 (16)	49.8	55.64
A.A.	59(35.8)	50.6 (16.5)	46.6	54.5
Amhara	12 (7.2)	54.3 (8.1)	49.4	59.5
Other	1 (0.6)	34 (0)	34	34
Total	165 (100)	51.9(15.7)	49.8	54.3

Region	No. (%)	Mean(SD) age	95%CI	
Addis A.	58 (35.2)	50.4 (16.6)	45.6	54.5
Others	107 (64.8)	52.73 (15.3)	49.9	55.7
Total	165 (100)	51.92 (15.74)	49.45	54.37

5.3. Clinical Characteristics of Patients

5.3.1. Patient presentation

The prevalent complaint of sigmoid volvulus cases presented in SPHMMC was abdominal distention 86% (52.1%) followed by failure to pass feces and flatus 76 (46.1%). Few 3 (2.1%) of the cases were complaining for abdominal pain.

From total cases 165, 85(51.5) patients presented to hospital after 5 days followed by 64 patients 64(38.8) presented between 1 up to 5 days.

The prevalent abdominal finding was distended, hypertympanic abdomen for 120 (72.7%) of the patients. Generalized peritonitis and localized tenderness was observed for 11(6.7%) and 3 (1.8%) of the patients.

Table 2: Clinical characteristics of patients managed for sigmoid volvulus in SPHMMC, Addis Ababa

Characteristics	Category	Frequency (%)
Presenting Complaint	<i>Failure to pass Feces and Flatus</i>	76 (46.1)
	<i>Abdominal Distention</i>	86 (52.1)
	<i>Abdominal Pain</i>	3 (1.8)
Duration of Illness	<i>Less than one day</i>	16 (9.7)
	<i>1 to 5 days</i>	64 (38.8)
	<i>>5 days</i>	85 (51.5)
Abdominal Findings	<i>Normal</i>	31 (18.8)
	<i>Distended, Hypertimpanic or Percussion</i>	120 (72.7)
	<i>Generalized peritonitis</i>	11 (6.7)
	<i>Localized Tenderness</i>	3 (1.8)

5.3.2. Past History of patients

More than one third 56 (38.4%) of patients has no history of deflation. For patients with deflation history, 38 (26.0 %) deflated two times previously, 32 (21.9 %) deflated only once and 12 (8.2%) deflated three times before their definitive management.

And only 20 (11.5 %) of the patients had previous history of surgery for the complaint of sigmoid volvulus of those 3 had resection and anastomosis 7,10 and 20 years back. The remaining 17 patients had derotation prior to the definitive resection and anastomosis.

Table 3: Previous History of Sigmoid Volvulus Management among patients managed at SPHMMC, Addis Ababa, 2018.

Characteristics	Category	Frequency (%)
<i>Previous History of Deflation</i>	<i>No Deflation History</i>	<i>69 (41.8)</i>
	<i>Once</i>	<i>32 (21.9)</i>
	<i>Twice</i>	<i>38 (26.0)</i>
	<i>Three Times</i>	<i>12 (8.2)</i>
	<i>More than three times</i>	<i>8 (5.5)</i>
<i>Previous History of Surgery</i>	<i>Yes</i>	<i>20 (11.5)</i>
	<i>No</i>	<i>145 (88.5)</i>

5.4. Treatment of sigmoid Volvulus patient

From a total of 165 cases of sigmoid volvulus patients managed surgically; more than half 88 (53.7 %) went for resection & anastomosis on elective base. The rest 53 (32.3 %), 14 (7.9 %) and 10 (6.1 %) cases were managed by colostomy, derotation and primary repair on emergency base respectively.

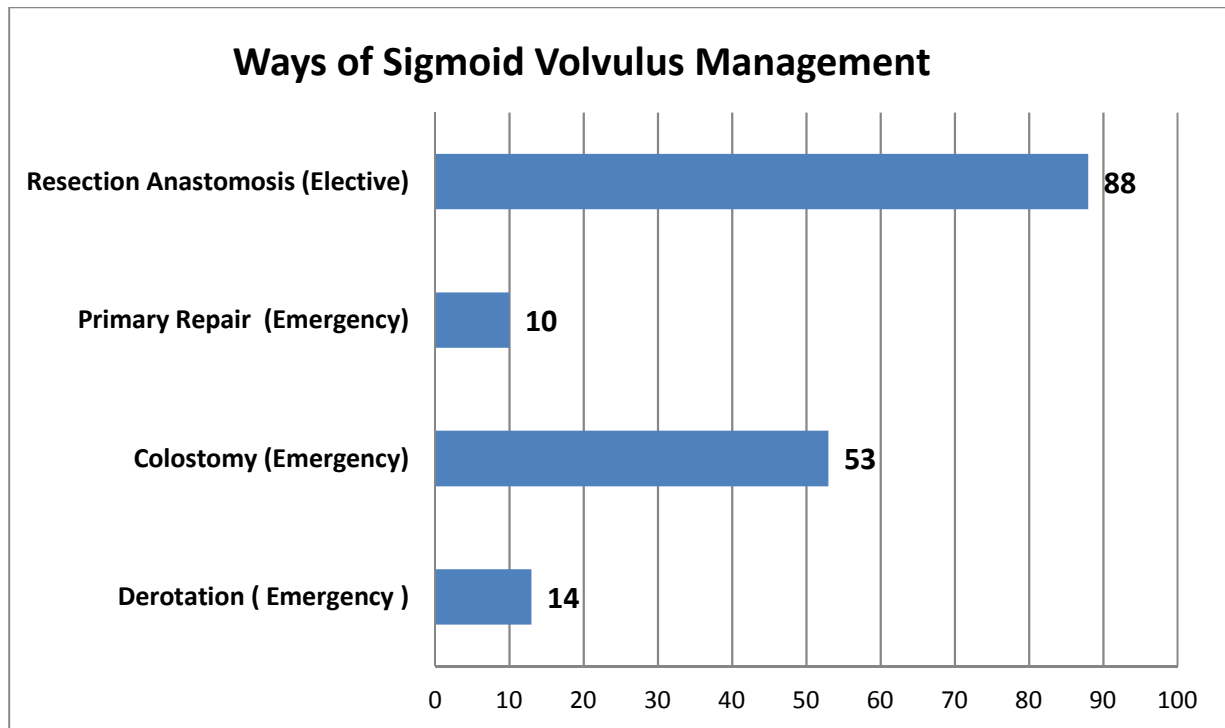


Figure 1: Types of Surgical procedure conducted to Manage Sigmoid Volvulus cases in SPHMMC, Addis Ababa, 2017.

5.5. Complication of patients operated for sigmoid volvulus

From all patients with cases of sigmoid volvulus great majority 136 (82.4%) of patients reported no complication due to the procedure used for management of the cases. The remaining 29 (17.6%) patients reported different types of complications including wound infection 8 (4.85%), chest infection 5 (3.0 %); wound dehiscence with chest infection 4 (2.4%); wound dehiscence 4 (2.4%); anastomotic leak 3 (1.8%); and colostomy site complication 2 (1.2%).

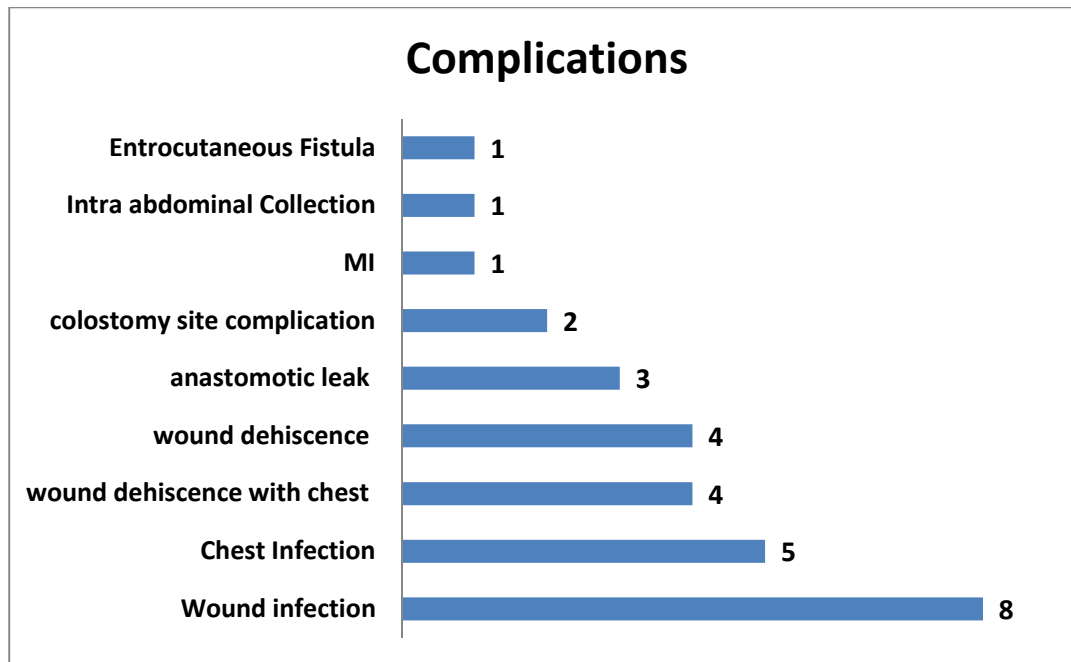


Figure 2: Complications related to sigmoid volvulus found during management of Patients in SPHMMC, Addis Ababa, 2018

5.6. Outcome of patients

From those who undergoes surgery due to sigmoidal problem great majority 150 (92%) of the cases had shown favorable outcome and their health status has become improved and discharged to their home from the hospital. But, the remaining 14 (8%) sigmoid volvulus cases ended with unfavorable outcome, their health status has worsened and finally died.

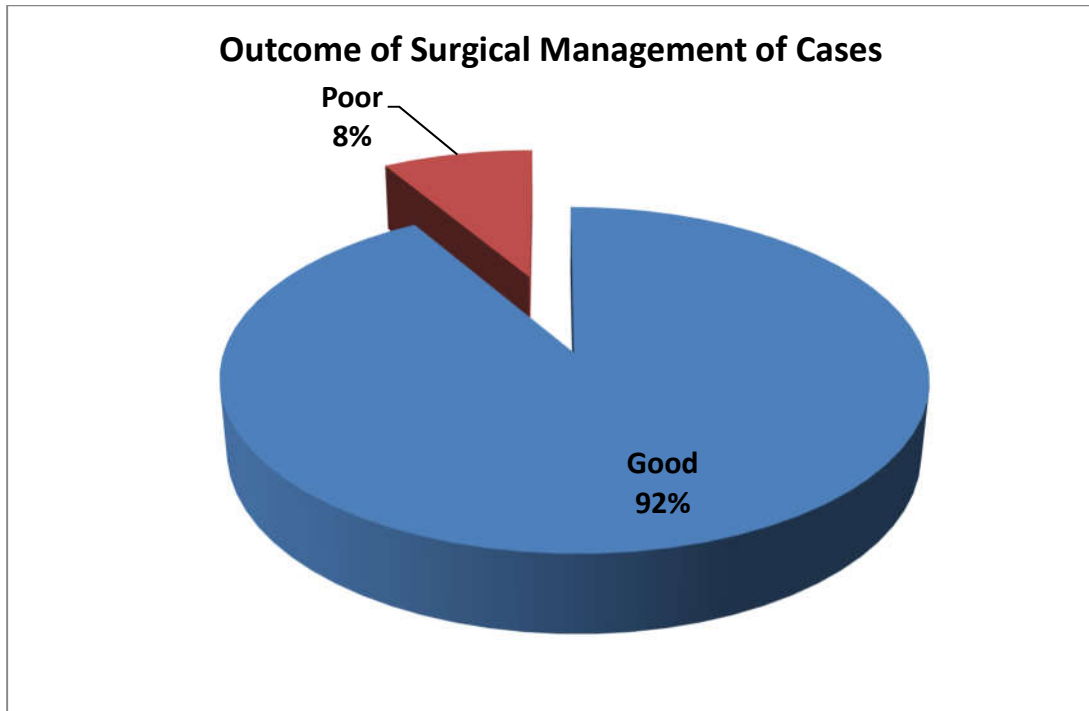


Figure 3: Final Outcome of Surgically Managed Sigmoid Volvulus Cases in SPHMMC, Addis Ababa, 2017.

Length of hospital stay

The mean length of hospital stay was 12.8(SD 9.5) days with the range of 01 to 103 days. Patient's above 55 years of age account for the highest mean (SD) length of stay, 14.1 (11.9) days. The least average length of stay recorded for patients between 35 and 44 years of age, 10.3 (6.1) days.

Male patients stay longer than female patients, 13.02 (9.7) days and 10.94 (8.1) days of mean (SD) length of stay observed for male and female patients respectively.

And 77 (52.7 %) of patients had more than five days hospital length of stay for management of sigmoid volvulus.

Table 2: Mean Hospital Length of Stay of sigmoid volvulus patients by age group, sex and residence in SPHMMC, Addis Ababa, 2018

Age	No. (%)	Mean(SD) Hospital Length of Stay	95%CI	
15 – 24 Years	8 (4.8)	11 (7.2)	7.0	19.0
25 - 34 Years	21 (12.7)	12.4 (6.6)	9.7	16.0
35 - 44 Years	20 (12.1)	10.3 (6.1)	7.9	13.4
45 – 55 Years	39 (23.6)	12.1 (7.0)	10.0	14.5
>55 Years	77 (46.7)	14.1 (11.9)	11.8	17.6
Total	165 (100)	12.8 (9.5)	11.5	14.4

Sex	No. (%)	Mean(SD) Hospital Length of Stay	95%CI	
Male	147 (89.0)	13.02 (9.7)	11.5	14.7
Female	18 (11.0)	10.94 (8.1)	7.5	15.8
Total	165 (100)	12.8 (9.5)	11.5	14.4

Residence	No. (%)	Mean(SD) Hospital Length of Stay	95%CI	
Addis A.	58 (35.2)	13.9 (13.3)	11.2	17.24
Others	107 (64.8)	12.2 (6.7)	11.1	13.6
Total	165 (100)	12.8 (9.5)	11.5	14.4

6. Discussion

Sigmoid volvulus has a wide geographic variation Africa being found in labeled volvulus belts. Majority of patients in the present study are with mean (SD) age of 51.7(15.6) which is comparable to other studies in Ethiopia. Study conducted in Gondar has similarly people with age of above 50 years (53.65 ± 15 Years) (8). Age has great importance in health problems like intestinal obstruction and when the age of an individual increases and comes with intestinal obstruction the probability of being sigmoid volvulus is very high. Study conducted in Eritrea and India showed that more than half of patients diagnosed with sigmoid volvulus were between the ages of 40 years and 60 years (25,26).

Male individuals were predominantly affected by sigmoid volvulus and the present study showed a male to female ration of 8:1 or nearly 90%. These findings are also similar to that of the study conducted in Gondar which comprises more than 90% of male patients. In Eritrea more than 98% of the patients were male (8,26).

More than half of the patients presented at SPHMMC are from Oromia region due to the regional referral system.

From the presenting symptoms abdominal distention is lower in the present study by 40% compared to a study conducted in Eritrea. But, abdominal distention is 10% higher in the present study compared to a study conducted in Debre Birhan (26, 27). The other common symptom, failure to pass feces and flatus is also lower by 10% compared to a study in Eritrea. This is possibly because our patients presented late and the more worrisome complaint was either failure to pass feces & flatus and abdominal distention.

Our study shows that majority of our patients presented with physical finding of abdominal distention & hypertympanic percussion note. But, a study conducted in India showed that all patients had findings of abdominal distention which is 30% higher than that of the present finding. The discrepancy may be due to their late presentation (21).

Almost half of the patient, 85(51.5%) were presented after 5 days of total duration of illness in the present study and unlike our findings the study conducted in debre birhan showed that most of the patients present in the health facility within three days (27).

People with similar diagnosis who reported previously were higher in the present study compared to a study conducted in Gondar. The percentages of people who do have previous attack were 25% higher than that of our findings (8).

Previous history of abdominal surgery reported for 11.5% of the patients in the present study and findings from china showed 10% higher number of people with history of abdominal surgery. The discrepancy may be due to few sample size (n=28) in the Chinese study and the socio economic situation of the study populations (28).

More than half of patients with sigmoid volvulus managed by resection anastomosis in the present study but in a study conducted in India only 34% of patients were managed similarly. The discrepancy may be due to clinical characteristics of patients presented in the facilities. In addition, choice of procedure depended on the clinical condition of the patient, preoperative findings, viability of bowel, and surgeon's experience (21).

The most frequently observed complication is post-operative wound infection which is seen in 7(4.2%) of all operated cases. The complications include chest infection 5 (3.0 %); wound dehiscence with chest infection 4 (2.4%); wound dehiscence 4 (2.4%); anastomotic leak 3 (1.8%); and colostomy site complication 2 (1.2%). This is similar to findings from Black Lion Hospital (7).

Mortality rate of 8% from the present study is lower than that of the studies conducted in Ugandan with death rate of 12.9% and the 15.3% mortality at Black Lion Hospital. There is slight difference in mortality since our study included both elective and emergency cases (7).

The mean length of hospital stay for sigmoid volvulus management in the present study was 12.8 days. In a study conducted in Gondar less than five days of length of stay for 66% of patients. But, more than 50% of patients in the present study stayed greater than five days in the hospital. The reason behind this discrepancy is that all the study participants in the present study went for surgery and only 34.5% of the cases in Gondar managed surgically (8).

7. Conclusion and Recommendations

7.1. Conclusions

Sigmoid volvulus was common in male Patient with common presenting symptoms of abdominal distention and failure to pass feces and flatus.

Low mortality rate is observed among surgically treated patients but patients stayed longer in the hospital. Significant number of patient's had different types of post-operative complications like wound infection being the commonest followed by wound dehiscence with and without chest infection. About 8% of patients died while the other improved and discharged home.

7.2. Recommendations

A public awareness should be increased on the presenting symptoms of sigmoid volvulus through health education to reduce the late presentation, morbidity and mortality.

Most of patient charts were found either incomplete or totally absent which should be improved for further studies.

Also chart elements were incomplete or totally absent which makes studies difficult for interpretation and implementation.

8 - References

1. Scott C Thornton, John Geibel. Sigmoid and Cecal Volvulus: Background, Anatomy, Pathophysiology [Internet]. Medscape. 2016 [cited 2017 Dec 13]. Available from: <https://emedicine.medscape.com/article/2048554-overview>
2. Madiba TE, Aldous C, Haffajee MR. The morphology of the foetal sigmoid colon in the African population: a possible predisposition to sigmoid volvulus. *Colorectal Dis Off J Assoc Coloproctology G B Irel*. 2015 Dec;17(12):1114–20.
3. Atamanalp SS, Disci E, Atamanalp RS. SIGMOID VOLVULUS: WHAT HAS CHANGED IN THE LAST 50 YEARS? *Ethiop Med J* [Internet]. 2017 Sep 20 [cited 2017 Nov 4];55(4). Available from: <http://www.emaemj.org/index.php/EMJ/article/view/566>
4. Bachmann M, de Boer W, Schandelmaier S, Leibold A, Marelli R, Jeger J, et al. Use of a structured functional evaluation process for independent medical evaluations of claimants presenting with disabling mental illness: rationale and design for a multi-center reliability study. *BMC Psychiatry*. 2016 Jul 29;16:271.
5. Treatment of sigmoid volvulus: a single-center experience of 952 patients over 46.5 years | SpringerLink [Internet]. [cited 2017 Nov 3]. Available from: <https://link.springer.com/article/10.1007/s10151-013-1019-6>
6. Berkeley C, Bonney V. *A Textbook of Gynaecological Surgery*. Cassell; 1920. 854 p.
7. Kotiso B, Abdurahman Z. Pattern of acute abdomen in adult patients in Tikur Anbessa Teaching Hospital, Addis Ababa, Ethiopia. *East Cent Afr J Surg*. 2007 Jan 1;12(1):47–52.
8. Patricia R Messmer YJR. Treatment of Sigmoid Volvulus within a Large Cohort of Patients in Gondar, Ethiopia. *J Nurs Care* [Internet]. 2015 [cited 2017 Nov 3];04(01). Available from: <http://www.omicsgroup.org/journals/treatment-of-sigmoid-volvulus-within-a-large-cohort-of-patients-in-gondar-ethiopia-2167-1168.1000227.php?aid=38972>
9. Richard Wismayer. Factors Influencing Outcome of Sigmoid Volvulus in Northern Uganda, A prospective Observational Study. *East Cent Afr J Surg*. 2016 Dec;21(3):85–97.
10. Nuhu A, Jah A. Acute sigmoid volvulus in a West African population. *Ann Afr Med*. 2010;9(2):86.
11. Heis HA, Bani-Hani KE, Rabadi DK, Elheis MA, Bani-Hani BK, Mazahreh TS, et al. Sigmoid Volvulus in the Middle East. *World J Surg*. 2008 Mar;32(3):459–64.
12. EA AA and A. Changing pattern of acute intestinal obstruction in a tropical African population. - PubMed - NCBI [Internet]. [cited 2018 Jan 31]. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/8997863>

13. I S. The effects of westernisation on sigmoid volvulus. - PubMed - NCBI [Internet]. [cited 2018 Jan 31]. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/2992135?dopt=Abstract>
14. SH TL and G. Sigmoid volvulus: diagnostic twists and turns. - PubMed - NCBI [Internet]. [cited 2018 Jan 31]. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/16525235>
15. Gingold D, Murrell Z. Management of Colonic Volvulus. Clin Colon Rectal Surg. 2012 Dec;25(4):236–44.
16. Cresswell M, On J, Mlotshwa M, Levy B, Simson J. Sigmoid volvulus in the elderly, outcomes following various treatment modalities. Int J Surg. 2013 Oct;11(8):625.
17. M.M. Achick, F.K. Tawad, B.M. Alier, C.T. Yur. One Stop Management of Sigmoid Volvulus in an African Setting with Limited Resource. East Cent Afr J Surg. 2015 Apr;20(1):68–72.
18. Soressa U, Mamo A, Hiko D, Fentahun N. Prevalence, causes and management outcome of intestinal obstruction in Adama Hospital, Ethiopia. BMC Surg [Internet]. 2016 Dec [cited 2017 Dec 13];16(1). Available from: <http://bmcsurg.biomedcentral.com/articles/10.1186/s12893-016-0150-5>
19. S. Tsegaye, M. Osman, A. Bekele. Surgically Treated Acute Abdomen at Gondar University Hospital, Ethiopia. East Cent Afr J Surg. 2007 Apr;12(1):53–7.
20. Billa.Vanaja Ratna Kumari, Ankareddi.Vijayalakshmi, G.Anil Kumar, B.Srikanth. A Clinical Study on Management of Sigmoid Volvulus in Government General Hospital, Guntur. IOSR J Dent Med Sci. 2017 Sep;16(9):56–9.
21. Durai MR, Kumar JK, Vijayanand . A clinical study on the management of sigmoid volvulus. Int Surg J. 2017 Feb 25;4(3):1039.
22. Chalya PL, Mabula JB. Sigmoid volvulus and ileo-sigmoid knotting: a five-year experience at a tertiary care hospital in Tanzania. World J Emerg Surg. 2015;10(1):10.
23. Central Statistics Agency. Population Projection of Ethiopia for All Regions At Wereda Level from 2014 – 2017 [Internet]. Addis Ababa: CSA; 2013. 118 p. Available from: www.csa.gov.et
24. St. Paul's Hospital Millennium Medical College Curriculum Report [Internet]. 2012. Available from: http://globalreach.med.umich.edu/sites/default/files/files/Porter%2C%20Annie_Ethiopia.pdf
25. Michael SA, Rabi S. Morphology of Sigmoid Colon in South Indian Population: A Cadaveric Study. J Clin Diagn Res JCDR. 2015 Aug;9(8):AC04-07.

26. Samuel JC, Qureshi JS, Mulima G, Shores CG, Cairns BA, Charles AG. An Observational Study of the Etiology, clinical presentation and outcomes associated with peritonitis in Lilongwe, Malawi. *World J Emerg Surg.* 2011 Nov 8;6:37.
27. Yohannes M. Proportion of Intestinal Obstruction and Associated Factors Among Patients with non Traumatic Acute Abdomen Admitted to Surgical Ward in Debre Birhan Referral Hospital, North East Ethiopia. *Am J Biomed Life Sci.* 2017;5(3):54.
28. Lou Z, Yu E-D, Zhang W, Meng R-G, Hao L-Q, Fu C-G. Appropriate treatment of acute sigmoid volvulus in the emergency setting. *World J Gastroenterol WJG.* 2013 Aug 14;19(30):4979–83.

9. Annex

Data Collection Questionnaire

ID. No _____

S. No	Question	Answer
1.	Sex of the Patient	1. Male 2. Female
2.	Age of the patient	_____ years
3.	Residence category	1. Urban 2. Rural
4.	Presenting complaint of the patient	1. Vomiting Yes/ No 2. Abdominal Pain Yes/ No 3. Diarrhea Yes/ No 4. Distention..... Yes/ No 5. Constipation..... Yes/ No 6. Anorexia..... Yes/ No 7. Nausea..... Yes/ No 8. Other _____
5.	Previous history of deflation	a. 1x b. 2x c. 3x d. .>4x

S. No	Question	Answer
6.	Previous history of surgery for similar complaint	1. Yes 2. No
7.	Duration of illness	_____ hours/_____ days
8.	Physical findings	
9.	General Vital Sign	1. PR _____ 2. T _____ 3. BP _____ 4. RR _____
10.	Abdominal Findings	1. Normal 2. Distended 3. Localized tenderness (RUQ LUQ RLQ LLQ) 4. Generalized tenderness 5. Guarding and rigidity 6. Other _____
11.	Investigation Result	1. Hgb/HTC _____ 2. WBC _____

S. No	Question	Answer
12.	Case Managed through	1. Deflation 2. Surgery
13.	Pre-Operative Diagnosis	_____
14.	Post-Operative finding	_____
15.	Type of Procedure done for emergency cases	1. Primary repair 2. Colostomy
16.	Complications	1. Wound Infection 2. Wound dehiscence 3. Anastomotic leak 4. Chest infection 5. Chest infection with wound dehiscence 6. Intra-abdominal collections 7. Colostomy complication 8. Enterocutaneous fistula 9. Death 10. Other _____
17.	Length of Hospital Stay in days	_____
18.	Condition at Discharge	