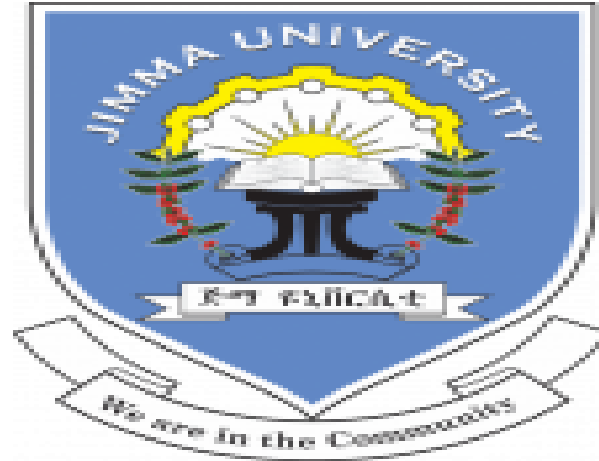


# Magnitude and Management Outcome of Sigmoid Volvulus in Tercha General Hospital, SNNPR, South Western Ethiopia



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## **ABSTRACT**

**Background:** Sigmoid volvulus is the commonest cause of large gut obstruction in many regions of world including Pakistan India, Bengal and African countries. According to the few reports available in Northern and Central Ethiopia, sigmoid volvulus was the leading cause of IO. In the subocclusive group mortality was 35% and it increased up to 50% in those patients with a late diagnosis who underwent a sigmoid resection.

**Objective:** The objective of this study is to assess the magnitude and management outcome of sigmoid volvulus in patients admitted with a diagnosis of sigmoid volvulus at Tercha General Hospital from January, 2012 to December 2016.

**Methods:** A five year institutional based quantitative retrospective cross sectional study design done using data collecting from 113 patient's medical card who were managed in Tercha General Hospital, Dawro zone, SNNPR region, Ethiopia with the diagnosis of Sigmoid volvulus. The collected data was checked for any inconsistencies, coded and fed in to Spss version 22 computer software for the analysis of the data.

**Results:** The male to female ratio was 7.1:1. The ages range from between 36 and 80 years with a median and mean of 56 and 58.5 years. Sigmoid volvulus was the leading cause of obstruction in 113(40.2%) patients. Laparotomy was done for 52(46%) patients. Hartmans colostomy done in 15(13.3%). Length of hospital stay ranged from 3 – 21 days with a mean of 8.9 days. The commonest complications were wound infection 11(9.7%) and respiratory complications 8(7.1%). Complication and Mortality rates were 25.7% and 5.3% respectively.

**Conclusions and Recommendations:** Sigmoid Volvulus is a commonly encountered condition of the surgical emergency procedures done for Intestinal Obstruction in our study. Conservative management with rectal tube deflation was associated with low mortality rate, in this series. Health facilities capable of handling patients with intestinal obstruction should be available within the reach of the community.

**Key words:** sigmoid volvulus, magnitudes of sigmoid volvulus, Clinical manifestation, conservative management.

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## List of Acronyms and Abbreviations

BLH Black line hospital CBC

Complete Blood Count GUH

Gondar university hospital IO

Intestinal obstruction

LAP Lymph adenopathy

LBO Large bowel obstruction

LOS Length of Hospital stays

TGH Tarcha General Hospital

NGT Naso gastric tube

PUD Peptic ulcer disease

R&A Resection and anastomosis

SBO Small bowel obstruction

SBV Small Bowel Volvulus

SSI Surgical site incision

SV Sigmoid Volvulus

US Ultrasound



# CHAPTER ONE: INTRODUCTION

## 1.1. BACKGROUND

Sigmoid volvulus is the twisting of the sigmoid colon around its own mesentery axis resulting in complete or partial obstruction. Compromised blood supply along with increase in intraluminal pressure, which if left unattended often leads to life-threatening complications such as intestinal, bowel ischemia, gangrene, and perforation [1, 2, 4, 9].

The most common sites of volvulus are sigmoid colon and cecum. The Volvulus of other portions of the alimentary tract, such as the stomach, gallbladder, small bowel, splenic flexure, and transverse colon, are rare [8, 18].

Sigmoid volvulus is an important cause of colonic obstruction worldwide. It has been known to man since time immemorial. Detailed records of sigmoid volvulus were found in the Egyptian Papyrus Ebers and in ancient Greek and Roman writings. It ranks high as a cause of acute intestinal obstruction in many African countries [8, 10,13].

Sigmoid volvulus usually occurs in older adults with a mean age of 70 years at presentation. Patients are often institutionalized and debilitated due to underlying neurologic or psychiatric disease and have a history of constipation. Sigmoid volvulus has been reported in younger patients and in children in association with abnormal colonic motility. Although some series have reported predominance in men, others have found no difference in incidence by gender. A longer sigmoid colon and mesentery in males (especially in black Africans) could be the reason for an increased likelihood of volvulus. Sigmoid volvulus has been reported in patients with Crohn disease, pregnancy, and Chagas disease [2, 12, 13].

Clinically in almost all cases of sigmoid volvulus, the presenting signs and symptoms are acute colicky abdominal pain associated with varying degrees of distension and constipation. Bowel sounds are either normal or increased but tympanicity is characteristic of sigmoid volvulus. Rebound tenderness, tachycardia, and hypotension, are late manifestations associated with the presence of an inflamed or gangrenous loop [4, 6, 8, 23].

Almost all plain erect or lateral decubitus abdominal radiographs show a typical, grossly distended sigmoid loop (coffee bean configuration) that completely fills the abdomen with no sign of haustral markings, and in some instances with air fluid level secondary to small bowel obstruction. Barium investigation, which is contraindicated in patients with gangrene, reveals a characteristic tapering picture of the barium column towards the point of torsion, the “bird's beak” appearance is pathognomonic of sigmoid volvulus [3, 4, 13].

In the absence of peritonism or bowel gangrene, an initial attempt with non operative reduction is reasonable. Some of these techniques described included tube decompression inserted per rectally, sigmoidoscopic decompression, or enema-guided decompression. Initial treatment involves sigmoidoscopy with decompression and detorsion, with or without placement of a rectal tube, Barium enema. The success rate for sigmoidoscopic decompression is between 79% and 81%. Signs of perforation or gangrene are indications for emergency surgery [1, 4, 6, 17].

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. Nonoperative treatment is adopted if there is no evidence of these conditions. The condition has a tendency to recur in 45%-71% of patients treated conservatively, with a mortality of 7%; therefore, clinicians recommend that patients undergo sigmoid resection, either with a primary anastomosis or Hartmann's procedure. Both surgeries can be done as emergency procedures, semi-electively, during the patient's first admission, or as elective procedures during readmission. Despite the high rate of recurrence without surgery, up to 65% of patients do not undergo a prophylactic resection after their first incidence of sigmoid volvulus [4, 17, 21, 22].

## **1.2. Statement of the problem**

Sigmoid volvulus is the commonest cause of large gut obstruction in many regions of world including Pakistan India, Bengal and African countries. It accounts for 80-90% of all volvulus cases and occurs more commonly in males, elderly institutionalized patients and those with neurological disorders, but rare in children. In the USA sigmoid volvulus is the most common type, accounting for 90% of the cases of volvulus of the colon, with most patients being the elderly from institutions or nursing homes. Although in western countries intestinal obstruction caused by sigmoid volvulus is rare, its mortality remains significant in patients with a late diagnosis. It is the leading cause of Intestinal Obstruction (IO) and a significant health problem in Ethiopia [2, 7, 24, 27].

A study done at the College Teaching Hospital, St Paul's Hospital Millennium Medical, Addis Ababa showed that Gangrenous sigmoid volvulus is the leading indication for colostomy in 57% of patients, and of which 47.1% developed different types of complications. Similarly, a study done in black lion hospital (BLH) showed that sigmoid volvulus was the leading cause of colonic obstruction with the mortality rate of 35% [5, 20].

The commonest symptoms of SV and the outcome of emergency laparotomy may be affected by different factors. Some of these factors include duration of illness, age, presence of peritonitis, and complication detection time. The knowledge of clinical presentations and management outcomes of IO in different areas within a country is very important. Except few studies, in north and central Ethiopia, no report is available in southwest Ethiopia regarding the spectrum of causes and management outcomes of SV [1, 5, 7].

### **1.3. Significance of the Study**

This study would help to detect the magnitude and management outcome of SV in our setup. This will have further advantage to minimize morbidities and mortality of patients with SV. It will also have significant advantage for health professionals in that it will add useful information regarding the scope of SV and management outcome such that the importance of early prediction and detection of SV, initiation of resuscitation and on time definitive management during practice.

The outcome of this study will also add epidemiological and clinical information that will serve as essential input for policy makers to design proper strategies and serve as baseline information for other studies.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1. Overview of literatures:**

The strengths of the literatures included in this research was in majority they selected their study population based on evidence; in some of the literatures important descriptive information about outcome of surgically treated sigmoid volvulus patients was mentioned. The limitations of the literatures were majority of them they used small sample size; study was conducted in a single institution, no fixed protocol of management of patients in the institution. Owing to the paucity of prospective randomized trials, controversy still exists regarding the optimal treatment of acute sigmoid volvulus.

### **2.2. Pathophysiology of Sigmoid Volvulus**

Classically, sigmoid volvulus occurs in the face of three factors: Elongation of the sigmoid colon; Narrowing of the base of the sigmoid mesocolon at its parietal attachment a torque force to the sigmoid colon, which initiates the torsion process [31].

As the sigmoid colon twists on its mesenteric axis, both ends are occluded resulting in a closed-loop obstruction. Bowel gas can enter this closed loop, but is unable to escape. This results in bowel dilatation and further tightening of the twist, ultimately compromising blood supply to the bowel, resulting in ischemia and perforation. In Western cultures chronic constipation results in an over-loaded sigmoid loop, whose weight provides the momentum to initiate the volvulus. In African and Middle Eastern societies, a high-fibre diet results in a bulky sigmoid colon that provides the necessary impetus. A shift in the relative positions of the intra-abdominal organs, as seen in pregnancy or in the presence of large pelvic tumors, may shift the relative positions of the intra-abdominal organs and also precipitate an episode of sigmoid volvulus. Sigmoid volvulus, although a disease of adults, occasionally presents in children. Predisposing conditions in children are intestinal malrotation, omphalomesenteric abnormalities, Hirschsprung's disease and anal stenosis [18, 31].

When intestinal obstruction is not relieved in time, the patient may die. Early diagnosis and prompt management are therefore mandatory. Several factors contribute to poor

outcomes in the case of intestinal obstruction. Some of these determinants may include poor health seeking behavior, ignorance and poverty. Poor clinical judgment is also one of the negative factors leading to poor prognosis in case of intestinal obstruction [4].

### **2.3. Magnitude of Sigmoid volvulus**

Sigmoid volvulus is the commonest cause of large gut obstruction in many regions of world including Pakistan, India, Bengal and African countries. It accounts for 80-90% of all volvulus cases and occurs more commonly in males, elderly institutionalized patients and those with neurological disorders, but rare in children[23].

In the study conducted in the United States about colonic volvulus in a nationwide inpatient sample 2002-2010 was retrospectively reviewed for colonic volvulus cases admitted emergently. An estimated 3,351,152 cases of bowel obstruction were admitted in the United States over the study period. Colonic volvulus was found to be the cause in

63,749 cases (1.9%). SV was more common in elderly males (aged 70 years), African

Americans, and patients with diabetes and neuropsychiatric disorders [27].

In a study done on management of sigmoid volvulus in Eritrea sigmoid volvulus accounts 37% of cases admitted with a diagnosis of intestinal obstruction (132 SV cases out of 351 IO cases).130 patients were males and two females, most affected patients are age 66-75 years and 72 % cases were farmers in occupation[6].

In a study conducted in Debre Birhan Referral Hospital in 2016 concerning Intestinal Obstruction and associated factors among patients with non traumatic abdomen admitted to the surgical ward to the hospital from December 8, 2015 to January 9, 2016. Facility based cross-sectional study was conducted by using 357 patient's record with acute abdomen, from the study subjects 181(50.7%) and 141(39.5%) were Intestinal Obstruction and acute appendicitis cases respectively with response rate of 99.4%. Large bowel Obstruction (LBO) accounts for about 109(60.2%) of cases while 72(39.8%) of cases were small bowel obstruction (SBO).Male gender, residence and constipation are significantly associated with Intestinal Obstruction ( $p < 0.05$ ). The commonest causes detected during preoperative period are Sigmoid Volvulus 105(58%), small bowel volvulus 36(19.9%), Adhesion 15(8.3%), Intussusceptions 8(4.4%) and hernia 12(6.6%) in the study area [7].

In a retrospective analysis of patients who underwent colostomy reversal procedure from September 2004- 2007 (Over a three year period) at the two teaching university hospitals in Addis Ababa Ethiopia, namely the Tikur Anbessa Hospital (TAH) and the Saint Paul's Hospital (SPH) in A total of 87 patients; The three most common indications of colostomy creation were Gangrenous sigmoid Volvulus in 56 (36.1%), Colonic cancer in 45(29%) and Colonic trauma in 28 (18.1%) [11].

#### **2.4. Management outcome of sigmoid volvulus**

Between 1996 and 2011, a total of 132 patients were diagnosed with volvulus at the Department of Surgery P, Aarhus University Hospital in Denmark. Sigmoid volvulus is a serious condition independent of the mode of treatment. The conservatively treated group in their study had a 30-d mortality of 15% (4/26) compared to the 9%-36% reported in other studies. However, the prognosis and survival for patients who had surgery was considerably better in the long run compared to those for the conservatively treated patients [5].

In a study done at Tan Jock Seng hospital in 2010, although the majority (75%) of acute sigmoid volvulus can be successfully decompressed nonoperatively. Emergency surgery in these patients is associated with a mortality of 17.6%. Elective definitive surgery is suggested in view of the high recurrence rate (>60%) and the considerable risks of emergency surgery [1].

A retrospective study was carried out at District Headquarter Hospital, Bannu from August 2001 to April 2006 on all cases that had sigmoid volvulus but were haemodynamically stable and without co-morbids. Amongst the total 83 patients, there were 72(86.7%) males and 11(13.3%) females, with an age range of 35-80 years (mean 55 years). All patients presented with the typical symptoms of intestinal obstruction. Local and systemic signs of toxicity were more common in the gangrenous group. Postoperatively 17 (53.12%) patients in the gangrenous group and 9 (17.64%) cases in the viable group developed paralytic ileus; 2 (6.25%) patients in the gangrenous group developed anastomotic leakage leading to peritonitis; 2 (6.25%) patients in the gangrenous group and one (1.96%) in the viable group developed intra abdominal abscess; eight patients in the gangrenous group

and five in the viable group developed wound infection, two of these patients later on developed incisional hernia. The mean hospital stay in the gangrenous group was 10 days as compared to eight days in the viable group. The difference in the outcome of primary anastomosis in both the viable and nonviable groups was insignificant [18].

In a study done on management of sigmoid volvulus in Eritrea a total of 132 cases of sigmoid volvulus were included in the study. Fifty four patients were successfully treated with the non operative method, while the remaining sixty two had to undergo explorative laparotomy. There were 14 preoperative deaths and two have declined to accept surgical intervention. The numbers of recurrences reported were few probably due to improper recording and follow-up. A very high mortality rate (58.3%) i.e. seven out of twelve patients was observed among patients who had undergone Hartmann's procedure following explorative laparotomy. Similarly two out of four patients (50 % mortality) died after emergency resection and anastomosis. On the other hand, there was only one death among 23 patients on whom elective resection and anastomosis was done following adequate bowel preparation and other required resuscitation measures prior to surgery [14].

A retrospective study conducted on 200 adult SV patients hospitalized in 2012 at Gondar University Hospital, Ethiopia shows that Among the 200 patients diagnosed with SV, the ratio of deflation to surgery was almost 2:1 ratio to surgery. The total patient days in the study were 856 days. Patients with LOS > 5 days accounted for 79% of patient days. Patients with a maximum LOS of 30 days accounted for 10.5% of total patient days. The shortest LOS (1.36 days) was among patients who underwent sigmoidoscopic decompression only and had no treatment complications. Complications associated with surgery accounted for 10.6 to 17.0 LOS days. Age, gender, gangrene and previous attacks were not significantly associated with surgery [1].

The numbers of researches done on Sigmoid Volvulus in general are very few in Ethiopia. Especially in Southern and western part of the country, no research conducted on Sigmoid Volvulus. This study was conducted in Tercha General Hospital, Dawro zone, SNNPR Regional State, Ethiopia, to investigate base line information on the magnitude and management outcome of SV.



## **CHAPTER THREE: OBJECTIVES**

### **3.1. General objective**

The objective of this study is to review the magnitude and management outcome of sigmoid volvulus patients admitted at Tercha General Hospital from January, 2012 to December, 2016.

### **3.2. Specific objective**

To assess the magnitude of Sigmoid Volvulus at TGH from January, 2012 to December, 2016.

To assess the common clinical presentation of patients with SV.

To assess the types of surgery done to relieve SV.

To assess management outcome of Sigmoid Volvulus patients admitted at TGH from January, 2012 to December, 2016.

## **CHAPTER FOUR: SUBJECTS AND METHODS**

### **4.1. Study area and period**

This study was conducted at TGH using records of patients admitted with a diagnosis of sigmoid volvulus from January 1, 2012 to December 2016. The hospital is located south west of Addis Ababa 489km along the Jimma road and 282km far from Hawasa which is capital city of Dawro Zone. The zonal climate temperature ranges from 15.1-27.5°C, annual rain fall 120-1800ml and 500m -2820m above sea level. The service has been operative since 1995 E.C. The service is owned by MOH. Dawro Zone has total population 573077 & 4436km<sup>2</sup> area i.e. 129 inhabitants per square kilometer. The total number of population in the catchment area is 850,000. Out of this the number of women in the reproductive age group (15-45 year) is 131808 and the expected number of deliveries per year is 20289. There are 18 Health Centers, 175 health posts, 8 private clinics, and 6 rural drug vendors from 5 woredas and tarcha town using the Hospital as referral center. The nearest Hospitals are jimma university specialized Hospital in jimma, 145km away, and wolayta referral Hospital, 120km away, Hawasa referral hospital, 282km away.

The Hospital has 112 beds. There are 48 beds in the Maternity ward, 3 Labor Beds and 2 Delivery Beds. 51 beds are found in surgical ward. Some of the services which are given by the surgical department are in patient service, emergency and elective minor and major surgical operations and blood transfusion. There is 1 obstetrician/gynecologist, 1 surgeon, 5 GPs, 3 Health officer, 3 pharmacists, 5 druggists, 55 nurses, 4 laboratory technologists, 5 lab technicians, 10 midwifery. There are 87 supportive staff members. The numbers of health professionals in surgical ward are one surgeon, and 13 clinical nurses.

### **4.2. Study design:**

Institutional based retrospective cross sectional study design was conducted in TGH.

### **4.3. Population**

#### **4.3.1. Source population**

The source populations were all patients admitted with a diagnosis of intestinal obstruction at Tercha General Hospital during the study period.

#### **4.3.2. Study population**

All Patients admitted with a diagnosis of sigmoid volvulus at TGH from January, 2012 to December, 2016 were the study population.

### **4.4. Inclusion and exclusion criteria**

#### **4.4.1. Inclusion criteria**

All Patients admitted with a diagnosis of sigmoid volvulus at TGH from January, 2012 to December, 2016. Patients whose charts were available. Completely documented charts with important information were included during the study.

#### **4.4.2. Exclusion Criteria**

Patients whose charts were lost and incompletely documented charts.

### **4.5. Sample size:**

A single population proportion formula was used to determine the minimum number of client required for the study,

$$n = Z^2 p (1-p) / w^2$$

Where: - n = the required sample size

Level of confidence 95%, which gives the percentile of the normal distribution,  $Z_{\alpha/2} = 1.96$

w = Margin of error assumed to be 5%

p = Prevalence of sigmoid volvulus, based on study done on Gonder Hospital the prevalence of SV is 58% of intestinal obstruction.

In this study population, P=0.58 was used to get the maximum sample size needed.

$$n = Z^2 p (1-p) / w^2 \quad , \quad n = (1.96)^2 * 0.58(1-0.58) / (0.05)^2 = 374$$

By taking non-respondents rate 5%, that total sample size will be 393.

However, since the study was retrospective review it was impossible to get all the sample size, therefore, all patients admitted with a diagnosis of Sigmoid Volvulus during the study period were included. A total of 122 patients were admitted for SV during the study period among them 113 fulfils the inclusion criteria and included in the study.

#### **4.6. Study variables:**

Study variables include:

Age

Sex Residence

Duration of illness

Procedure done

Length of hospital stay

Management outcome (post operative complications, died in the hospital or discharged Alive)

#### **4.7. Data collection procedures (Instrument, personnel, data collection technique)**

##### **4.7.1. Format:**

Structured format was prepared and the data was collected by two trained Bsc nurse using operation room registration book, inpatient registration book and retrieved patients' records. The data collectors were given one day training on how to review and abstract the required and pertinent information from the main document starting from January 2012 up to December 2016.

#### **4.7.2. Data collection method:**

A five years record was used from records of patients admitted with a diagnosis of sigmoid volvulus. First, the card numbers were collected from operation room registration book and inpatient registration book to get the main files of the patient in record room. Then, Socio-demographic characteristics, duration of symptoms, preoperative diagnosis, operative findings, surgical procedure done, length of hospital stay, and outcome of management were collected from the main file.

#### **4.8. Data analysis:**

The collected data was checked for any inconsistencies, and feed in to SPSS version 22.0 for windows. Frequencies, percentages and means with SD were computed to describe the key variables of the study.

#### **4.9. Ethical consideration:**

Ethical clearance and letter of collaboration to Tercha General Hospital were sought from ethical review committee of Jimma University. Permission was asked from Tercha General Hospital administration and concerned department heads. All information's taken during the data collection were confidential.

#### **4.10. Data quality management:**

To assure the quality of the data, the patient's data were cross checked with registration books in operation room, anesthesia and admission discharge. Regular daily supervision was done to check, the consistency and completeness of the filled out questionnaires, by the principal investigator. Also, before starting data analysis completeness was checked.

#### **4.11. Operational definitions:**

**Adhesion:** The joining of normally unconnected parts of intestine by bands of fibrous tissue.

**Anastomosis:** The surgical union of two hollow organs, example; blood vessels or parts of the intestine, to ensure continuity of the passageway.

**Anastomosis leak:** Refers to leakage through surgical union site.

**A patient with SV:** A patient present with abdominal pain, nausea, abdominal distension, and constipation or Plain abdominal X-rays reveals evidence of sigmoid volvulus.

**Cecal volvulus:** Refers to torsion of caecum, which often leads to bowel obstruction.

**Clinical features:** Signs and symptoms of sigmoid volvulus.

**Colostomy:** Is a surgical operation that creates an artificial anus through an opening made in the abdomen from the colon.

**Facial dehiscence:** Is facial disruption due to abdominal wall tension overcoming tissue or suture strength, or knot security. It can occur early or late in the postoperative period, and involve a portion of the incision (partial dehiscence) or the entire incision (complete facial dehiscence).

**Laparotomy:** Refers to a surgical incision through the abdominal wall made to allow investigation of an abdominal organ or diagnosis of an abdominal disorder.

**Length of hospital stay:** The duration of time from admission to discharge.

**Management outcome of SV:** The condition of the patient after the procedure that means whether complication developed or not, discharged alive or died in the hospital.

**Non operative management:** Means management of patients with sigmoid volvulus with rectal tube deflation, and frequent clinical reassessment to rule out bowel strangulation which may need operative management.

Operative management: Means surgical exploration of the abdomen which is determined by the nature of obstruction and whose goals are to diagnose and resolve the source of the obstruction, resect any nonviable sigmoid colon.

Post op complications: Paralytic ileus, Anastomotic leakage leading to peritonitis, Perianastomotic / pelvic abscess, Wound infection, Wound dehiscence, Incisional hernia, etc.

Procedure done: the main procedure done after laparotomy to relieve the obstruction.

Rectal tube deflation: Rigid or flexible tube is inserted through anus and into rectum to empty its contents. This procedure is usually done to relieve large bowel obstruction from SV.

Rural: Patients who came from outside their respective woreda's town.

Small bowel volvulus:-refers to torsion of small intestine on itself which leads to intestinal obstruction.

Sigmoid volvulus: Refers to torsion of sigmoid colon on its mesentery.

Surgical site infections (SSI): Infection following surgical incisions and classified as.

1. Superficial Incisional SSI: Infection occurs within 30 days after the operation and infection involves only skin or subcutaneous tissue of the incision.
2. Deep Incisional SSI: Infection occurs within 30 days after the operation and infection involves deep soft tissues (eg, fascial and muscle layers) of the incision.
3. Organ/Space SSI: Infection with anastomotic leak occurs within 30 days after the operation.

Unfavorable outcome: A patient who developed post op complications or died after getting treatment.

Urban: Patients who came from their respective woreda's town.

#### **4.12. Dissemination plan of the Study findings:**

Findings will be presented during Master's thesis defense. The results of this study will be submitted to the department, and disseminated to the study site and Dawro Zonal health beaureu. Also there will be an attempt to publish the result in a standard journal.



## CHAPTER FIVE: RESULTS:

### 5.1. Socio demographic characteristics:

Among 122 patients admitted for SV, the charts of 9(7%) patients did not fulfill inclusion criteria. Therefore, the remaining 113 patients admitted for Sigmoid Volvulus during the study period aged between 36 and 80 years (mean=58.5, median= 56 and SD=19.691) included in this study. There were 99(87. 6%) males and 14(12.4%) females and the M: F ratio was 7.1:1. There were 102(90.3%) patients from outside tercha town and 11(9.7%) patients from tercha town. (Table 1)

**Table 1: Socio-demographic frequency of sigmoid volvulus managed Patients at Tercha General Hospital (Jan, 2012 –Dec, 2016), (N=113)**

Variables	Category	Frequency	
		No	%
Age	20-29	2	1.8
	30-39	8	7.1
	40-49	18	15.9
	50-59	57	50.4
	60-69	1	0.9
	>=70 years	27	23.9
Sex	Male	98	86.7
	Female	15	13.3
Residence	Outside tercha town	102	90.3
	From tercha town	11	9.7
Total		113	100

#### 5.1.1. Magnitude of Sigmoid volvulus among other cause of intstinal obstruction:

During the five year study period a total of 281 intstinal obstruction patients was admitted. sigmoid volvulus was the leading cause in 113(40.2%) patients followed by small bowel volvulus (SBV) in 53(18.9%), Intussusceptions was third in 45(16%) patients.(Table 2).

**Table 2: Other causes of intestinal obstruction at Tercha General Hospital from (Jan, 2012 –Dec, 2016)**

Etiology	Frequency	
	No	%
Sigmoid Volvulus	113	40.2
Small bowel volvulus	53	18.9
Intussusceptions	45	16
Post-operative adhesions	40	14.2
Groin hernia	18	6.5
TB Peritonitis	5	1.7
Pseudo-abdominal obstruction	3	1.1
Iliosigmoid knotting	2	0.7
Cecal volvulus	2	0.7
Total	281	100

**5.2. Clinical presentation and diagnosis:**

Eighty six (76.1%) patients presented less than 48 hours from the onset of their symptoms. All (100%) patients presented with the clinical symptoms of abdominal pain, abdominal distention and constipation. Six (5.3%) patients had septic shock, 19(16.8%) had guarding, 28(24.8%) had hypoactive bowel sound, 16(14.2%) patients had bloody discharge during digital rectal examination. X-ray was taken in 94(83.2%) of patients, of this 92(97.8) are suggestive of sigmoid volvulus. Of the sigmoid volvulus patients 85 (75.2%) was their first attack. (Table 3)

**Table 3: Duration of illness, clinical presentation at admission before initiating management for patients with SV at TGH (Jan, 2012 –Dec, 2016), (N=113)**

Variables	Category	Frequency	
		No	%
Duration of illness	<48 hrs	85	75.2
	2-5 days	17	15
	>5 days	11	9.7
clinical presentation at admission	abdominal pain	113	100
	Vomiting/ nausea	30	26.5
	abdominal distension	113	100
	Constipation	113	100
	Guarding	19	16.8
	dehydration/hypovolumic shock	23	20.4
	Septic shock	6	5.3
	bloody discharge on DRE	16	14.2
x-ray taken	Yes	94	83.2
	No	19	16.8

### **5.3. Types of sigmoid volvulus and procedures performed:**

From the 113 patients admitted with a diagnosis of sigmoid volvulus 97(85.8%) was non-gangrenous type and 16(14.2%) patients was gangrenous from the outset. From the non - gangrenous sigmoid volvulus type rectal tube deflation was successfully performed in

88(91.6%) patients. Laparotomy was done for 52(46%) patients with indication of redundant SV, gangrenous SV and failed rectal deflation attempt in 25(22.1%), 16(14.2%) and 9(8%) patients respectively. Additional two patients also undergone laparotomy with suspicion of gangrenous SV after passage of bloody discharge during rectal tube deflation attempt. Milking and Derotation was done in 3(2.7%), Primary resection and anastomosis on emergency bases in 9(8%) and on elective bases in 25(22.1%) and Hartman's colostomy in 15(13.3%) of sigmoid volvulus patients. (Table 4)

**Table 4: Types of sigmoid volvulus, and Frequencies of Surgical Procedures done to relieve the obstruction of patients with SV at TGH (Jan, 2012 –Dec, 2016), (N=113)**

Variables	Category	Frequency	
		N <sub>0</sub>	%
Types of sigmoid volvulus	non- gangrenous	95	84.1
	gangrenous	18	15.9
rectal tube deflation attempt	successful	88	91.6
Indication for Laparatomy	failed rectal deflation	9	8
	redundant SV	25	22.1
	gangrenous SV	18	15.9
Procedures done	Milking and Derotation	3	2.7
	Resection and anastomosis	34	30.1
	Hartman’s colostomy	15	13.3

#### **5.4. Management outcome:**

Twenty nine (25.7%) patients developed post operative complication before discharged from the hospital and a single complication was found from a single patient. Sixty one patients discharged within one week of admissions after conservatively managed with rectal tube deflation. From those who had undergone laparatomy seven of them stayed in the ward less than a week, forty two patients stayed more than a week and all discharged within two week of admission. The mean duration of length of hospital stay (LOS) in this series was 8.9 days, median of 8 days with the maximum of 21 days. All patients who developed post operative complication were present to the hospital after 48 hrs onset of symptoms. The overall mortality rate was 6(5.3%). All patients who died have presented

48hrs after the onset of symptoms. Five (4.4%) patients who died had undergone Hartman’s colostomy. These five patients represented 33.3% of the 15 patients who had Hartman’s colostomy. One patient who died had undergone resection and anastomosis with unprepared bowel which represented 2.9% of 34 patients who had resection and anastomosis. Bowel status has influence on post operative complication and mortality. Mortality was low in the young age group while it is high at the old age.

(Table

5)

**Table 5: Type of complication, condition of the patient at discharge and length of hospital stay for operated patients with SV at TGH (Jan, 2012 –Dec, 2016), (N=113)**

Variables	Category	Frequency		Length Of Hospital		
		No	%	<1 week	1-2 weeks	>2 weeks
Complications	Respiratory Complications	8	7.1	0	8	0
	Cardiovascular Complications	6	5.3	5	0	1
	Urinary Complications	3	2.7	0	3	0
	Surgical site infection	10	8.8	0	10	0
	Anastomotic leak	2	1.8	0	0	2
Condition of the patient at discharge	Discharged alive without Complication	84	74.3	61	23	0
	Discharged alive after one Complication	23	20.4	0	23	0
	Died	6	5.3	5	0	1
	Total	113	100	66	46	1

#### **5.4.1. Factors affecting management outcome of sigmoid volvulus**

On Binary logistic analyses done for selected variables; Sex of patient, vital sign at admission, Guarding, Type of sigmoid volvulus, rectal tube deflation attempt outcome and indication for laparotomy had significance on outcome of sigmoid volvulus patients. Male patients had nine times more bad outcome than female sigmoid volvulus patients, sigmoid volvulus patients with unstable vital sign at admission had seventeen times more bad outcome than those who came with stable vital sign, sigmoid volvulus patients who were not successfully deflated with rectal tube had six times more bad outcome than those who were successfully deflated. But, it is difficult to conclude the findings because of small sample size and retrospective nature of the research. (Table 6)

**Table 6: Binary logistic analyses for selected variables and factors affecting management outcome of SV at Tercha General Hospital (Jan, 2012 – Dec, 2016), (N=113)**

Variables	category	Management out come		P Value	COR
		Unfavourable N (%)	Favourable N (%)		
Age of patient	20-50 years	0(0)	28(100)	0.988	1
	>50 years	29(34.1)	56(65.9)		
Sex of patient	Female	0(0)	14(100)	0.00 *	1
	Male	29(29.3)	70(70.7)		0.09(0.635-1.537)
Residence	Urban	0(0)	11(100)	0.99	1
	Rural	29(28.1)	73(71.9)		
Duration of presentation	<48 hours	1(0.01)	84(99.99)	0.998	1
	2-5 days	17(100)	0(0)	1.00	
	>5 days	11(100)	0(0)		
Vital sign at admission	Stable	0(0)	84(100)	0.00 *	1
	Unstable	29(100)	0(0)		0.17(0.04-0.067)
Guarding	yes	17(89.5)	2(10.5)	0.00*	1
	no	12(12.8)	82(87.2)		0.017(0.004-0.084)
Type of SV	Non gangrenous	1(1.2)	83(98.8)	0.00 *	1
	Gangrenous	15(51.7)	14(48.3)		0.011(0.001-0.092)
Rectal deflation attempt	Successful	4(4.8)	80(95.2)	0.001*	1
	Unsuccessful	21(72.4)	8(27.6)		0.06(0.12-0.299)
Indication for laparotomy	No laparotomy done	0(0)	61(100)	0.004	1
	Redundant SV	7(28)	18(72)	0.996	
	Failed rectal deflation	7(77.8)	2(22.2)	0.001*	0.08(0.017-0.3540)
	Gangrenous SV	15(83.3)	3(16.7)	0.727	
*= <i>shows statistical significant at p&lt;0.05</i>					

When adjusted odds ratio was done using Multivariate analyses for selected variables only vital sign at admission and guarding during physical examination were significant on outcome of sigmoid volvulus patients. (Table 7)

**Table 7: Multivariate analyses for selected variables and factors affecting management outcome of SV at Tercha General Hospital (Jan, 2012 –Dec, 2016), (N=113)**

Variable	category	Management outcome		P Value	COR	P Value	AOR
		Unfavourable N (%)	Favourable N (%)				
Vital sign at admission	Stable	0(0)	84(100)	0.00	1	0.003	1
	Unstable	29(100)	0(0)				
Guarding	Yes	17(89.5)	2(10.5)	0.00	1	0.045	1
	No	12(12.8)	82(87.2)				
					0.017(0.004-0.084)		0.002-1.105

## **Chapter 6: Discussion:**

Sigmoid volvulus is the twisting of the sigmoid colon around its own mesentery, which if left unattended often leads to life-threatening complications, such as intestinal obstruction, bowel ischemia, gangrene, perforation and death. Clinically, in almost all cases of sigmoid volvulus, the presenting signs and symptoms are acute, colicky abdominal pain associated with varying degrees of distension and constipation. Bowel sounds are either normal or increased but tympanicity is characteristic of sigmoid volvulus. Rebound tenderness, tachycardia, and hypotension, are late manifestations associated with the presence of an inflamed or gangrenous loop [1, 2, 3, 14].

In this series Sigmoid volvulus was found to be the leading cause of bowel obstruction responsible in 40% of patients admitted to surgical ward. This finding is similar with studies conducted in Northern Ethiopia (Debrebirhan, Gondar) which accounts in 58% of cases, but in Tikur Anbessa hospital and eastern Ethiopia it accounts 22% and 16% among surgically treated patients respectively. The number of patients with sigmoid volvulus might have been increased if cases of sigmoid volvulus which were managed as an outpatient by simple rectal tube deflation were included in the last two studies. The finding is also similar with other African countries, but higher than developed countries due to dietary differences [7, 8].

A total of 113 cases of sigmoid volvulus were included in the study. 102(90.3%) patients came from rural area, males constituted 87.6% and the age ranges from 36 years to 80 years with mean age of 57.5 years which is similar to studies in Gondar, Debrebirhan, African and western countries. The significantly high preponderance of male patients in this case coincides with a study in Gonder and Eritrea. It was concluded that this was due to the irregular bowel behavior in males associated with the high fibre content in the diet which overloads the sigmoid making it prone to volvulus. They pointed out that 85% of the total adult population in Ethiopia live in rural areas (same as in Eritrea), and defecate in unsheltered latrines. Although males have much more freedom to defecate any time they wish to compare to females, they usually tend to ignore or postpone the body's call for defecation, and are often reluctant to discontinue the work or circumstances which they are already occupied with. This postponing type of bowel behavior together with a high



fiber diet produces flatus and bulky stool which tends to overload the sigmoid colon thus elongating and dilating it to an extent which subsequently ends up in volvulus. On the other hand the regular behavior of bowel movement in women protects the colon (sigmoid) from being overloaded despite the fact that they consume a similar diet. [10, 12, 14, 20].

The major complaints in this study were abdominal pain, constipation and distension which were present in all patients and vomiting present in 26.5% (N=113) of patients. This is similar to other studies in our country as well as other African countries. Rebound tenderness and guarding are in many cases typical to peritonitis or any other inflammatory process involving the peritoneum; in sigmoid volvulus, however, they are less manifested until the sigmoid loop is gangrenous enough to affect both the peritoneum and internal organs. Hence, at the initial stage, the patient with sigmoid volvulus may even appear more relaxed and less sick than somebody suffering from acute appendicitis or a perforated peptic ulcer. This could definitely be another contributory factor for the late presentation of patients in hospitals. 85(75.2%) patients treated for sigmoid volvulus presented themselves in hospital less than 48 hours, 28(24.8%) patients presented later than 48 hours. Almost all patients who developed postoperative complications presented later than 48 hours in this study, this agrees with study done in Northern Ethiopia and some African countries [7, 8, 14].

Sixty one patients were successfully treated with the non operative method, while the remaining fifty two had to undergo explorative laparotomy. Rectal tube deflation success rate was 80% similar to studies done in Gondar and some African countries and worldwide with success rate of 80-90%. There were six deaths which accounts 5.3% among those who undergone surgical intervention. Probable cause of death was septic shock with multiorgan failure; five of those deaths had Hartman's colostomy. A very high mortality rate five (33.3%) out of fifteen patients was observed among patients who had undergone Hartmann's procedure following explorative laparotomy. This finding agrees with a study conducted at the St Paul's Hospital Millennium Medical, Addis Ababa and African countries such as Eritrea and worldwide. The prognosis of patients affected by sigmoid volvulus tightly depends on the disease stage, surgical timing and co morbidities. In fact the highest mortality rate is observed in the obstructed patients group with late

presentation, aging in those patients with clinical signs and symptoms of peritonitis and ileus who underwent Hartmann's procedure. There was one death among those who undergone resection and anastomosis after failed rectal tube deflation with unprepared bowel, but no death in those patients managed with the non operative method. Several factors could explain this delay. Poverty, ignorance, poor road infrastructures and lack of transport means are some of the most important ones [1, 2, 6, 11].

Twenty nine patients developed postoperative complications. Wound infections was the commonly encountered postoperative complication in 10(8.8%) patients followed by respiratory complications 8(7.1%), cardiovascular complications 6(5.3%), urinary complications 3(2.7%) and anastomotic leak 2(1.8%). In our series, although there seems to be a correlation between advanced age and the occurrence of gangrene, no concrete explanation can be given apart from assuming the likelihood of elderly people who could suffer from malnutrition and other chronic underlying diseases more than the younger population. Length of hospital (LOS) in this study shows that 68(60.2%) stayed less than 7 days, 42(37.2%) stayed latter than 7 days 3(2.7%) stayed latter than 14 days, but discharged before 21 days. The mean duration of length of hospital stay (LOS) in this series was 8.9 days, median of 8 days with the maximum of 21 days. Complications associated with surgery accounted for 15 to 21 LOS days. This agrees with study done in Gondar University (Ethiopia) as well as other African countries [1, 2, 6, 16].

### **Limitation and strength of the Study:**

The advantages of this retrospective study include a relatively inexpensive ability to research the readily accessible existing data; easier access to conditions, allowing the study of rare occurrences; and most importantly, the generation of hypotheses that then would be tested prospectively. However, the limitations of small sample size, incomplete documentation, including missing charts, information that was unrecoverable or unrecorded, difficulty interpreting information found in patients cards and difficulty in assesing long term outcome of sigmoid volvulus patients and other limitations of the secondary data.

## **CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS:**

### **7.1. Conclusions:**

Sigmoid Volvulus is a commonly encountered condition of the surgical emergency procedures done for Intestinal Obstruction in our study. Conservative management with rectal tube deflation was associated with low mortality rate, in this series. High mortality, complication and prolonged hospital stay were observed in patients with obstruction presented 48 hours after the onset of symptoms.

### **7.2. Recommendations:**

Early diagnosis, adequate preoperative resuscitation and proper post operative care shall be done by health professionals to reduce complication and mortality due to Sigmoid Volvulus. This could be achieved by increasing public awareness on clinical features of Sigmoid Volvulus as well as by improving the knowledge of mid and lower level health professionals on the diagnosis, resuscitation and importance of early referral to higher center. For the next researchers Prospective and large sample size research should be done to reach at best conclusion which is the main limitation of this study.

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**CHAPTER NINE: ANNEX :**  
**DATA COLLECTION INSTRUMENT CHECKLIST**

Jimma University, college of public health, faculty of medical science, coordinating office of integrated emergency obstetrics and surgery, checklist format on magnitude and management outcome of sigmoid volvulus patients at Tercha General Hospital Dawro zone, SNNPR, Ethiopia. A retrospective cross sectional five years study, from Jan.1, 2012 to Dec.31, 2016 G.C.

Code.....

S.no	Variables	Category	Code
<b>1</b>	<b>Socio-demographic characteristics</b>		
1.1	Age		
1.2	Sex	Male	1
		Female	2
1.3	Residence	Rural	1
		Urban	2
<b>2</b>	<b>Clinical manifestation at presentation, x-ray findings</b>		<b>1=yes</b>
			<b>2=no</b>
2.2	Symptoms at presentation	Abdominal pain	1 2
		Vomiting	1 2
		Constipation	1 2
		Abdominal distension	1 2
2.3	Clinical findings	Dehydrated/hypovolemicshock	1 2
		Stable vital sign	1 2
		Guarding	1 2
		Bowelsound; Hypoactive	1
		Normoactive	2
		Hyperactive	3

		Digital Rectal Examination; Empty rectum Bloody discharge	1 2
2.4	Is x-ray taken at initial evaluation?		1 2
2.5	If the respond to 2 question no 2.4 is yes is the finding suggesting of sigmoid volvulus?		1
<b>3</b>	<b>Magnitude and Management Outcome of Sigmoid Volvulus</b>		<b>1=yes</b> <b>2=no</b>
3.1	Is it the first attack?		1 2
3.3	Type of sigmoid vovulus?	Non-gangrenous Gangrenous	1 2
3.3	If non-gangrenous, rectal deflation tried?		1 2
3.4	Rectal tube deflation attempt successful?		1 2
3.5	If the respond to question no 3.4 is yes; was the patient appointed for elective surgery?		1 2
3.6	If the respond to question no 3.5 is yes; patient return back		1 2
3.8	Intra operative findings	No laparatomy done Redundant,viable sigmoid colon Gangrenous sigmoid colon Others	0 1 2 3

3.9	Procedure done	No laparotomy done Milking and derotation Colostomy Resection and anastomosis others	0 1 2 3 4
3.10	Postoperative diagnosis	Same with pre operative diagnosis Different from preoperative diagnosis	1 2
3.11	Post operative complications		1 2
3.12	Management outcome	unfavorable Favorable	1 2
3.13	Length of hospital stays in weeks	<1 Week 1-2 Weeks >2	1 2 3
3.14	Outcome of the patient during discharge	Discharged alive with no complication Discharged alive with at least one complication Died in the hospital	1 2 3
3.15	If died probable cause of death	Septic shock with multiorgan failure Pulmonary embolism others	1 2 3

### ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and provision of required progress reports as per terms and conditions of the college of Public Health & Medical Sciences in effect at the time of grant is forwarded as the result of this application.

Name of the student: Getu Tadelle

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

### APPROVAL OF THE ADVISORS

Name of the first advisor: Dr. Dawit teare (MD, General surgeon)

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

Name of the second advisor: Mr. Tsegaye tewelde (BSc, MPHE, Assistant professor)

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

### APPROVAL OF THE EXTERNAL EXAMINERS

Name of the first external examiner:

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

Name of the second external examiner:

Date:

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Signature: \_\_\_\_\_