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ORIGINAL ARTICLE

MAGNITUDE AND MANAGEMENT OUTCOME PREDICTORS OF MECHANICAL LARGE BOWEL OBSTRUCTION

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ABSTRACT

***Background**: Mechanical large bowel obstruction (MLBO) contributes a sizable portion of surgical emergency admissions.*

***Objective**: To determine the magnitude of Mechanical large bowel obstruction and outcome predictors for morbidity and mortality in Debre Tabor General Hospital Northcentral Ethiopia, 2020.*

***Method**: The study was conducted at Debre Tabor General hospital- located at Debre Tabor city in South Gondar Zone, Amhara regional state in Northcentral Ethiopia. A hospital-based retrospective study was employed. All patients from age 15years and above whom presented with clinical or/and radiological diagnosis of mechanical large bowel obstruction from Jan1, 2016-Dec31, 2019 at Debre Tabor General Hospital were included. Data were collected with a pre-tested and structured questionnaire which was developed by the English language after review different literature. The final collected data checked manually its consistency, and coded and entered to SPSS version 23 for processing and analysis. Normal distribution of quantitative values was presented as mean ± standard deviation and skewed quantitative values were presented median ± Interquartile range. A cross-tabulation analysis was employed.*

***Result**: Mechanical large bowel obstruction (MLBO) was accounted for 33.1 %(N=135) of mechanical bowel obstruction. Almost all mechanical bowel obstruction cases were male (N=129, 95.6%) and rural residents (N=123, 91.1%). The age ranged from 19-88years with mean and median ages were 56.56(SD=±14.58) and 58 (IQR±18) respectively. The leading etiologies of mechanical large bowel obstruction were sigmoid volvulus (N=124, 91.9%) and colorectal cancer (N=7, 5.2%). The pattern of bowel viability 65.2 %(N=88) was a simple bowel obstruction and 34.8% (N=47) was a gangrenous bowel obstruction. The overall complication rate was 21.5 %(N=29) and the mortality rate was 8.9 %(N=12*

***Conclusion:** Large bowel obstruction commonly occurred in males and elders. Sigmoid volvulus was a leading etiology of large bowel obstruction.*

***Keywords**: Large bowel obstruction, Ethiopia, Sigmoid volvulus*

INTRODUCTION

Mechanical Large Bowel Obstruction (MLBO) constitutes approximately 25% of mechanical bowel obstruction in the western (1) and accounting for approximately 15-36.5% in the developing world (2-7). It is accounting for approximately 2-4% of surgical admissions (8). Colorectal carcinoma, colonic volvulus, and diverticulitis covered more than 90% of mechanical large bowel obstruction (MLBO) in the western (9).

Colorectal cancer has been contributed to 60% of large bowel obstruction (10). Colorectal cancer is the third most prevalent large bowel malignancy worldwide in both morbidity and mortality following breast and lung cancer in females and prostatic and lung cancer males (15).

The incidence and mortality decreased through time (15) but the predicated colorectal cancer worldwide will be 2•5 million new cases in 2035 due to the increase of the population size (16). Colorectal cancer has been accounted for 10% morbidity and 9% mortality worldwide (17). Approximately, 20% of colorectal cancer patients present with malignant large bowel (9), and 7-29% presented with acute bowel obstruction (8).

Colonic volvulus and diverticular disease are accounting 30% of Mechanical Large Bowel Obstruction in western (10). Colonic volvulus refers to the torsion of the bowel around its mesentery. In Western sigmoid volvulus is accounting nearly 60-75%, cecal volvulus nearly 25-30% and Transverse colon volvulus is extremely rare and accounts for 5% of all cases of colonic volvulus (8).

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Sigmoid volvulus is a common cause of large bowel obstruction in the volvulus belt area which covers regions of South Asia Middle East, South America, and Africa.

This may due to their stable food of higher fiber diet those results in redundant and long sigmoid volvulus (11). Sigmoid volvulus is the third cause of large bowel obstruction in developed countries. (12). It accounts for 3.4% of large bowel obstruction following cancer and diverticular disease in the USA (13). In contrast to this, sigmoid volvulus is much higher in volvulus belt countries; Ethiopia, Brazil, India, Nigeria, and Iran where sigmoid volvulus has been handled 50% to 85% of large bowel obstruction (11, 14, 23). Another rare cause of large bowel obstruction is including fecal impaction, Ischemia, Inflammatory bowel disease, and intussusception (8).

METHODS AND MATERIAL

Study area and period

The study was conducted at Debre Tabor General hospital- located at Debre Tabor city in South Gondar Zone, Amhara regional state in Northcentral Ethiopia. It is one of the oldest hospitals in the country and gives service for approximately 80,000 outpatients and 900 patients each year from the catchment area of population 3.5milion. Medical chart review included from Jan1, 2016-Dec31, 2019.

Study Design

A hospital-based retrospective cross-sectional study was employed. All patients from age 15years and above who presented with clinical or/and radiological diagnosis of mechanical large bowel obstruction from Jan1, 2016-Dec31, 2019 at Debre Tabor General Hospital were included in the study whereas below 15years of age and functional obstruction were excluded from the study.

Data collection and analysis

Data was collected by a pre-tested and structured questionnaire which was developed in the English language after review different literature. The structured questionnaire contained demography, clinical presentation and duration of illness, causes, diagnosis, intraoperative finding, procedures, postop complications, and outcome of large bowel obstruction. The final collected data checked manually for its consistency, and coded and entered to SPSS version 23 for processing and analysis Normal distribution was evaluated with the Q-Q plot test and histogram diagram. Normal distribution of quantitative values was presented as mean ± standard deviation and skewed quantitative values were presented median ± Interquartile range.

A cross-tabulation analysis was employed.

Ethical consideration

The Ethical issue was approved by the Ethical Review Committee of Debretabor University. Data collection was started after obtaining permission from Debre Tabor hospital. All information obtained from patients' medical charts was kept confidential.

RESULT

During the study period, there were 408 bowel obstruction admissions. Mechanical Large bowel Obstruction (MLBO) was accounted for 33.1 %(135) of mechanical bowel obstruction. Almost all mechanical bowel obstructions were males (N=129, 95.6%) and rural residents (N=123, 91.1%). The age ranged from 19-88years and the peak age ranged from 56-65. The mean and median ages were 56.56(SD=±14.58) and 58(IQR±18) respectively (Table 1).

The clinical presentations were abdominal pain 99.3%, failure to pass faces/flatus 95.6%, and abdominal distention 83.7%, vomiting 47.4%, and rectal bleeding 3.7%. The most common clinical findings were abdominal tenderness 96.2%, visible peristalsis 68.9%, and Hypo/hyper bowel sound 64.4 %(Table 2). The overall mean of hospital stay was 8.65 (SD±4.8) days and the median was 8 (IQR±5) days. The mean of hospital stay for elective admission was 10.98(SD±4.33) days and the median was 11 (IQR±5) days. The mean of hospital stay for emergency admission (excluding death and Leave against medical advice) was 8.25 (SD±4.16) days and the median was 8 (IQR±2) days.

The leading etiologies of mechanical large bowel obstruction were sigmoid volvulus (N=124, 91.9%) and colorectal cancer (N=7, 5.2%). The pattern of bowel viability 65.2 %(N=88) was a simple obstruction and 34.8% (N=47) was gangrenous obstruction. The overall complication rate was 21.5 % (N=29) and the mortality rate was 8.9 %(N=12). Wound infection 27.58% and anastomosis leak and wound dehiscence 17.24% were the most common complications. (Table 3).

Table1: The Demographic and Characteristics of the Patients with Mechanical Large Bowel Obstruction, Debre Tabor Hospital, Northcentral Ethiopia, 2020.

Item		Frequency	Percent (%)
Age	15-25	4	3.0
	26-35	8	5.9
N=135	36-45	19	14.1
	46-55	30	22.2
	56-65	40	29.6
	>66	34	25.2
	Total	135	100.0
Sex	M	129	95.6
N=135	Female	6	4.4
	Total	135	100.0
Residence	Rural	123	91.1
N=135	Urban	12	8.9
	Total	135	100.0

Table2: The Clinical presentation of Patients with Mechanical Large Bowel Obstruction, Debre Tabor Hospital, Northcentral Ethiopia, 2020

Item		Frequency	Percent
Clinical Symptoms	Abdominal Pain	134	99.3
	Vomiting	64	47.4
	Abdominal Distention	113	83.7
	Constipation	129	95.6
	Rectal bleeding	5	3.7
Clinical Sign	Drainage Vital sign	22	16.3
	Abdominal Tenderness	125	92.6
	Hypo/Hyperactive bowel sound	87	64.4
	Visible peristalsis	93	68.9
Duration of Illness	<48hr	84	62.2
N=135	48-72hr	22	16.3
	72-96hr	15	11.1
	>96hr	14	10.4
	Total	135	100.0
Mode of presentation	Elective	46	34.1
N=135	Emergency	89	65.9

Cross tabulation analysis showed that complications was less common in male 20.9%% vs. 33.3%, (p= 0.384, OR for male=0.529), rural resident 19.5% vs. 41.7% (P=0.084, OR of rural=0.339), Simple LBO 13.6%% vs. 36.2%%, $\chi 2$ (1, N=135) = 8.857, p =0.003, OR Simple LBO=0.279). Hospital stay >7days 20.0%vs. 22.2% $\chi 2$ (1, N=135) = 0.096, p =0.757, OR of Hospital stay <=7days =1.143), Sigmoid volvulus=20.2%vs. colorectal cancer 42.9% vs. colocolonic intussusception=100% ($\chi 2$ (4, N=135) = 6.259, p =0.181), Resection and primary anastomosis 17% vs. stoma 50% $\chi 2$ (2, N=135) = 16.024, p <0.001. Multiple variable repressions were morbidity rate done for residency, bowel viability, etiology and surgical procedure but there is no statistical significance. Cross tabulation analysis showed that mortality rate was less common in male 8.5% vs. 16.7% (p= 0.434, OR for male=0.446), age >50 years 7.9% vs.10.9% (p=0.387, OR of age</=50years =1.429), rural resident 8.1% vs.

Table3: The Pattern, Etiology and Outcome of Patients with Mechanical Large Bowel Obstruction, Debre Tabor Hospital, Northcentral Ethiopia, 2020

Item		Frequency	Percent
LBO N=135	Simple LBO	88	65.2
	Gangrenous LBO	47	34.8
Etiology of LBO N=135	Sigmoid Volvulus	124	91.9
	Colorectal Cancer	7	5.2
	Intussusception	1	.7
	Cecal volvulus	2	1.5
	Angagliomegacolon	1	.7
Outcome	Improved	100	74.1
	complicated and Improved	17	12.6
	leave against medical advice	6	4.4
	Death	12	8.9
	Total	135	100
Complicated case (N=29)	Wound Infection	8	27.58
	Anastomosis Leak	5	17.24
	Fistula	1	3.45
	Paralytic illness	1	3.45
	others	2	6.89
	Death	12	41.38

16.1% (P=0.289, OR of rural=0.442), Hospital stay >7days 2.5%vs. 16.2%p=0.005, OR of Hospital stay <=7days =7.8),Simple LBO 3.4%% vs. 19.1%%, (p=0.004, OR of Simple LBO=0.149). Sigmoid volvulus=6.5%, colorectal cancer 42.9%%, colocolonic intussusception=100% ($\chi 2$ (4, N=135) = 12.1, p =0.017), Resection and primary anastomosis 3% vs. stoma 37.5% $\chi 2$ (2, N=135) = 22.286, p <0.001. Multiple variable repressions for mortality rate were done for bowel viability, etiology, hospital stay and surgical procedure but there is no statistical significance.

DISCUSSION

We found that mechanical large bowel obstruction contributed to a sizable proportion of surgical emergency visits and admissions. We found that mechanical large bowel obstruction (MLBO) was accounted for 33.1 % of bowel obstruction. It constitutes 25% of mechanical bowel obstruction in the western world (1) and accounting for approximately 15-36.5% in the developing world (2-7).

We found that the most common etiologies of mechanical large bowel obstruction were sigmoid volvulus 91.9% and colorectal cancer 5.2%. Colorectal carcinoma, colonic volvulus, and diverticulitis covered more than 90% of Mechanical Large Bowel Obstruction (MLBO) in the western (9). Colorectal cancer is accounting 60%, and colonic volvulus and diverticular disease are accounting 30% of mechanical large bowel obstruction in the western (10).

Sigmoid volvulus is the third cause of LBO in developed countries (12). It accounts for 3.4 % of large bowel obstruction following cancer and diverticular disease in the USA (13). A study conducted in the different countries reported that sigmoid volvulus constituted for large bowel obstruction approximately 58.62- 73% in Ethiopia, (18-19), 53.57% in Somalia (20), 72% in Nigeria (21), and 52% in India (22). Sigmoid volvulus is a common cause of large bowel obstruction in the Volvulus belt, which covers regions of the Middle East, South America, Africa, and South Asia (23) where low incidence of colorectal cancer. This may due to their stable food of higher fiber diet those results in redundant and long sigmoid volvulus (11).

Most large bowel obstruction occurs in the elderly. A report from New Orleans, 77% of the patient were over 50s years of age (24). Byrne1960 reported that with 94 percent being over fifty and 48 percent over seventy (25). Reports from different countries revealed that the mean age of occurrence of large bowel obstruction varied; 51(SD ±13.53) with a range between 28 – 78 years in India (22) and median age 49yeas with age range 20-80years in Nigeria (21). This study found that male predominance (95.6%), the mean and median age were 56.56(SD=±14.58) and 58(IQR±18) respectively with age range 19-88years.

This finding is similar to findings in developing countries (21-22) but lowered age from developed countries (24-25). This difference may be mainly the etiology of large bowel obstruction where sigmoid volvulus for developing countries and colorectal cancer for developed countries.

Our study finding noted that the mean and median of elective hospital stay were 10.98(SD±4.33) and (IQR±5) days respectively while mean and median of emergency hospital stay(excluding death and Leave against medical advice) were 8.25 (SD±4.16) and 8 (IQR±2) days respectively. As compared to a study conducted in India stated that the average hospital stay was 14.52 +/- 4 days, which is higher than our study finding. The elective admission stayed longer may be due to bowel preparation and cancellation. The mortality rate of large bowel obstruction varied from geography to geography due to the health-seeking behavior of the community and the availability of health service delivery institutions. The mortality rate reported 12% in a study done by AZ Sule et al. (2011) (21) and 24% in a study by A. Bansod et al. (2013) (22).

Our study showed the overall complication rate was 21.5 % and the mortality rate was 8.9 %.

Conclusion

Large bowel obstruction commonly occurred in the male and elderly population. Sigmoid volvulus was a leading etiology of large bowel obstruction.

Competing of Interest

Authors declared that no conflict of interest.

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