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Original Research Article

Etiologies, patterns and management outcomes among adult patients with intestinal obstruction: a 5 years' retrospective observation at a regional referral level hospital, Eastern Zone, Tanzania

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ABSTRACT

Background: Despite having centuries of existence, intestinal obstruction is still the commonest culprit among the existing causes of surgical admissions especially on emergency bases. Its persistence and piling up nature of the risk factors with the untoward management outcomes are great concerns considering the negative impacts brought down to the individual and the existing health care system.
Methods: This was a retrospective hospital based observational study of patients with intestinal obstruction for over a period of five years from January 2015 to January 2020. A standardized checklist was used to secondarily collect data from the health management information system (HMIS) books. We relied on the descriptive statistics, univariate analysis was done to check for statistical association to the outcomes of interest.
Results: We enrolled 423 patients, 23 excluded as per criteria and 400 recruited for the study. Males were more than females at a ratio of 2:1 with the mean age of 45 years (16 SD). Obstructed or strangulated abdominal wall hernia was the commonest etiology (43.4%) followed by intraperitoneal adhesions (22.1%). Patient's age, diagnosis and management modality all influenced occurrence of the outcomes of interest with the p values of 0.03, 0.04 and <0.001 respectively.
Conclusions: Most patients in our study had complicated abdominal wall hernia followed by intraperitoneal adhesions. Given their modifiability, we recommend for an early elective intervention to patients with abdominal wall hernia but also encouraging the use of all necessary adhesion prevention strategies in all abdominal and pelvic surgeries.

Keywords: Etiology, Pattern, Intestinal obstruction, Retrospective study, Drip and suck

INTRODUCTION

Intestinal obstruction is the mechanical or functional obstruction to the flow of the gastrointestinal contents at the level of small or large bowel. It is one of the major diagnoses among acute abdomen admissions that culminates to abdominal surgeries in both regional and global settings.[1] In USA alone, it accounts for about 15% of acute abdomen admission having great morbidity, mortality rate of up to 10% with a sizeable financial implication to both individual and the healthcare system.[2] It has different etiologies which are classified by either being extrinsic, intrinsic and intraluminal. The extrinsic causes may include intraperitoneal adhesions, abdominal wall hernias and malignancies. Intrinsic conditions like Inflammatory bowel diseases (IBD) affects the integrity of the wall thereby causing thickening and formation of stricture that impedes flow of the contents. Intraluminal

causes include neoplasia, polyps, intussusception and foreign body especially when arrested at the ileocecal valve.[3]

Clinical presentation depends upon the level of obstruction; for those obstruction occurring proximally at the level of small bowel; the patient present with a slight abdominal distension but a serious frequent emesis which is greater in volume and billions in nature. When compared to distal (colonic) obstruction; the distension is very gross with an initial minor recurrent emesis that is feculent in nature. Pain in small bowel obstruction is usually described as being random but colicky that is alleviated by vomiting whereas that of colonic obstruction tends to be constant. It is important to note that, the peculiarity of these presentation can be affected by incompetent ileocecal valve and in primary or secondary delays where the small bowel obstructions look like large bowel obstruction with generalized advanced presentation respectively. Systemically, the predicaments of such obstruction are fluid and electrolytes imbalances, sepsis and even muti-organ failure when confined to the pathology's natural history.[3-6] Plain abdominal X-ray has been used with the sensitivity of up to 80% having little ability to differentiate closed loop and strangulated obstruction hence prompting the use of more sophisticated tools like a computed tomographic scan.[7]

Definitively, approach to management is normally guided by the etiology and patient's clinical presentation, it can involve non-operative management (NOM) as in most intraperitoneal adhesions and fecal impactions, pneumatic and hydrostatic reduction in uncomplicated intussusception and sigmoid volvulus. Most of the complicated obstruction ends up with major surgical intervention(s).[3]

Despite its centuries of existence, intestinal obstruction still poses as a diagnosis of surgical importance, considering its persistence and piling up nature of the risk factors and untoward management outcomes that impacts not only the individual but the healthcare system as a whole.[8] Moreover, considering its regional and global impact, we then present the findings from our study that aimed at exploring different etiologies, patterns and management outcomes among adult patients with intestinal obstruction as admitted and managed at St. Francis Regional Referral Hospital, a facility serving the Eastern Zone of Tanzania and also as the teaching hospital for St. Francis University College of Health and Allied Sciences (SFUCHAS).

METHODS

Study design and setting

This was a retrospective hospital based observational study of patients with intestinal obstruction who were admitted and managed at St. Francis Regional Referral Hospital (SFRRH) for a period of five years from January 2015 to January 2020. SFRRH is the Referral health facility serving over 800,000 populations in the Eastern Zone of Tanzania, it also serves as a teaching hospital for St. Francis University College of Health and Allied Sciences (SFUCHAS), it has a capacity of 370 beds (90 from surgical department) with over 85% bed occupancy rate.

Study participants and data collection

The record of patients admitted with the diagnosis of intestinal obstruction from January 2015 to January 2020 were reviewed using the health management information system (HMIS) books and preserved manual patients' files. All patients with the age of 18 years and above were included in the study, patients with incomplete record of information and those with the diagnosis of polytrauma were excluded from the study. Cochran's formula for finite population was used with the minimum sample size of 382 patients. We enrolled 423 patients, excluded 23 who failed to meet inclusion criteria, and hence remained with 400 patients for the study. A standardized pre tested checklist was used to collect the secondary data from the HMIS books and the preserved patients' files.

Data analysis

Data from the coded checklists were first entered into an excel sheet, cleaned and then transferred to STATA version 15. Qualitative data were solely presented by frequency and proportions, quantitative data with mean and standard deviation. Univariate analysis was done to measure degree of association between variables where the p value of <0.05 was considered to be significant.

RESULTS

Patients' demographic characteristics

Majority of patients included in the study were on their 6th decade of life and above with the mean age of 45 years (16 SD). Males were more than females at a ratio of 2:1.

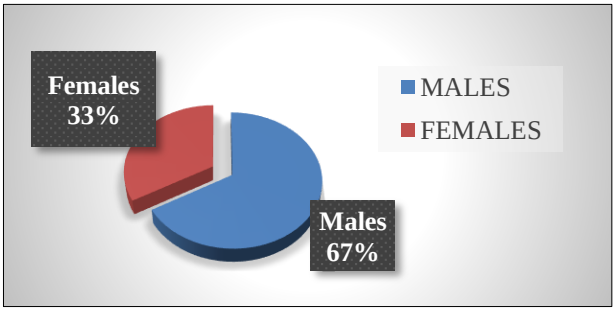

Figure 1: Distribution of patients by sex.

Pattern and distribution of intestinal obstruction

Abdominal wall hernia was an overall leading diagnosis by 35.25% followed by intraperitoneal adhesion (25.25%).

However, intraperitoneal adhesion was the commonest among females (31.6%) as compared to males where Abdominal wall hernia was the leading etiological pattern (43.4%). The sex and age diagnoses distributions areas depicted in Tables 2 and 3 respectively.

Table 1: Distribution of patients by age.

Age (years)	Frequency (N)	Percentage
<40	66	16.5
41-60	125	31.25
>60	209	52.25
Total	400	100

Outcomes of management and associated factors

Factors associated with surgical site infection

Age and specific diagnosis pattern were found to be significantly associated with development of surgical site infection, advancement in age especially from 60 years and patients with Sigmoid volvulus were 1.2 and 0.79 times at risk to develop Surgical site infection at a p value of 0.03, 0.04 respectively. Additionally, the type of surgical intervention done predetermined this particular outcome as the chances were 2.08 times higher for those who underwent resection and primary anastomosis (RPA) or resection with stoma formations (RSF), Table 4 below portrays the findings.

Factors attributed to re-laparatomy(s)

10 (14.93%) patients with sigmoid volvulus underwent re-laparatomy. 5 (3.55%) with abdominal wall hernia and 2 (6.06%) with colorectal malignancies also underwent re-opening. The chances for relaparatomy were 3.82 times in those with the former diagnosis as compared to the other diagnoses patterns (p=0.01). Also, being treated with surgical intervention markedly in any bowel resection with or without anastomosis predisposed the patient to 4.12 times risk of undergoing another laparatomy (p<0.001). Table 5 abridges the findings.

Factors associated with prolonged length of hospital stay

Among the 284 patients who underwent surgery, 3.52% of them had a PLoHS (more than 2 weeks). Having undergone surgery predisposed the patient to 3.03 times risk for PLoHS as compared to those who had non operative management (NOM) (p=0.04) (Table 6).

Table 2: Diagnoses distribution by sex.

Diagnosis	Frequency (N)/percentage (%)		Total (N)/percentage (%)
	Males	Females	
Sigmoid volvulus	34 (12.70)	33 (24.80)	67 (16.75)
Intraperitoneal adhesion	59 (22.10)	42 (31.60)	101 (25.25)
Abdominal wall hernia	116 (43.40)	25 (18.80)	141 (35.25)
Fecal impaction	16 (6.00)	17 (12.80)	33 (8.25)
Colorectal malignancies	25 (9.40)	8 (6.00)	33 (8.25)
Others	17 (6.40)	8 (6.00)	25 (6.25)
Total	267 (100)	133 (100)	400 (100)

Table 3: Diagnoses distribution by age.

Diagnosis	Frequency (N)/percentage (%)			Total (N)/percentage (%)
	<40 years	41-60 years	>60 years	
Sigmoid volvulus	8 (12.10)	34 (27.00)	25 (12.01)	67 (16.75)
Intraperitoneal adhesion	25 (37.90)	59 (46.80)	17 (8.20)	101 (25.25)
Abdominal wall hernia	25 (37.90)	33 (26.20)	83 (39.90)	141 (35.25)
Fecal impaction	0 (0.00)	0 (0.00)	33 (15.86)	33 (8.25)
Colorectal malignancies	0 (0.00)	0 (0.00)	33 (15.86)	33 (8.25)
Others	8 (12.10)	0 (0.00)	17 (8.17)	25 (6.25)
Total	66 (100)	126 (100)	208 (100)	400 (100)

Table 4: Factors associated with surgical site infection.

Factor	Surgical site infection. N/%		Univariate analysis		
	Yes	No	OR	95% CI	P value
Age (years)					
<40	4 (6.06)	62 (93.94)			
41–60	10 (8)	115 (92)	1.2	0.99–1.27	0.03
>60	40 (19.14)	169 (80.86)			

Continued.

Factor	Surgical site infection. N/%		Univariate analysis		
	Yes	No	OR	95% CI	P value
Sex					
Males	28 (10.50)	239 (89.50)	0.80	0.57–1.49	0.42
Females	26 (19.55)	107 (80.45)			
Patient's diagnosis					
Sigmoid volvulus	48 (71.64)	19 (28.36)	0.79	0.73–1.11	0.04
Intraperitoneal adhesion	0 (0.00)	101 (100)			
Abdominal wall hernia	0 (0.00)	141 (100)			
Fecal impaction	0 (0.00)	33 (100)			
Colorectal malignancies	1 (3.03)	32 (96.97)			
Others	5 (20)	20 (80)			
Management modality					
Operative	54 (19.01)	230 (80.99)	2.08	0.24–5.11	<0.001
Non operative	0 (0.00)	116 (100)			

Table 5: Factors attributed to re-laparatomy (s).

Factor	Re-laparatomy, N/%		Univariate analysis		
	Yes	No	OR	95% CI	P value
Age (years)					
<40	2 (3.03)	64 (96.97)	0.87	0.45–2.41	0.70
41–60	10 (8.00)	115 (92.00)			
>60	6 (2.87)	203 (97.13)			
Sex					
Males	10 (3.75)	257 (96.25)	0.97	0.93–1.32	0.57
Females	8 (6.02)	125 (93.98)			
Patient's diagnosis					
Sigmoid volvulus	10 (14.93)	57 (85.07)	3.82	1.61–7.61	0.01
Intraperitoneal adhesion	0 (0.00)	101 (100)			
Abdominal wall hernia	5 (3.55)	136 (96.45)			
Fecal impaction	0 (0.00)	33 (100)			
Colorectal malignancies	2 (6.06)	31 (93.94)			
Others	1 (4.00)	24 (96.00)			
Management modality					
Operative	18 (6.34)	266 (93.66)	4.12	1.21–5.89	<0.001
Non operative	0 (0.00)	116 (100)			

Table 6: Factors attributed to prolonged length of hospital stay.

Factor	Prolonged length of hospital stay, N/%		Univariate analysis		
	Yes	No	OR	95% CI	P value
Age (years)					
<40	2 (3.03)	64 (96.97)	0.30	0.14–0.43	0.60
41–60	3 (2.40)	122 (97.60)			
>60	5 (2.39)	204 (97.61)			
Sex					
Males	6 (2.25)	261 (97.75)	0.98	0.90–1.00	0.07
Females	4 (3.01)	129 (96.99)			
Patient's diagnosis					
Sigmoid volvulus	5 (7.46)	62 (92.54)	0.23	0.01–1.41	0.06
Intraperitoneal adhesion	0 (0.00)	101 (100)			
Abdominal wall hernia	3 (2.13)	138 (97.87)			
Fecal impaction	0 (0.00)	33 (100)			
Colorectal malignancies	1 (3.03)	32 (96.97)			

Continued.

Factor	Prolonged length of hospital stay, N/%		Univariate analysis		
	Yes	No	OR	95% CI	P value
Others	1 (4.00)	24 (96.00)			
Management modality					
Operative	10 (3.52)	274 (96.48)	3.03	1.70–4.32	0.04
Non operative	0 (0.00)	116 (100)			

Factors associated with mortality

Among the 33 patients diagnosed with colorectal malignancy, 3% of them succumbed, and 4 patients among the 54 with SSI (7%) also died on the course of management. However, none of the studied factors were found to be statistically significant for mortality among the patients (p=0.8, p=0.2 for colorectal malignancy and SSI respectively).

DISCUSSION

Intestinal obstruction is one of the common causes of surgical admissions commonly presenting with small followed by large bowel obstruction. The luminal flow impediment caused by the obstruction manifest with both local and systemic presentations. Locally there will be a bowel dilatation proximal to the point of obstruction due to building up of ingested air and intestinal fluid which in turn causes the gross distension as noted during abdominal inspection.[9] Apart from impaired absorption as a result of obstruction, Vomiting contributes to the dehydration and electrolytes imbalances; more potassium, chloride ions and hydrogen are lost on emesis making dehydration severe to the point of inciting the proximal convoluted tubule to absorbs more bicarbonate by further allowing the escape of chloride ion and hence a precipitated metabolic alkalosis. Furthermore, there will be an increase in the number of gut flora of which due to impaired mucosal integrity, they will translocate complicating to a systemic sepsis, and with perforation peritonitis is the natural course.[3,10]

In this study, males were twice the number of females showing that they were more affected by intestinal obstruction among the studied patients. This observation is in agreement with the study of Arlene et al done in East Africa where more males were admitted and treated due to intestinal obstruction in Mulago National Hospital.[11] It was also observed the same in one of the studies done in India of which the ratio of males to females was exactly as in our study.[12] This observation is different from one of the United Kingdom's Intestinal obstruction audit where the number of males were almost equal to that of females by 2:1.2. This discrepancy might have been contributed to the nature of the diagnoses studied, they included only patients with obstruction due to abdominal wall hernia and novelty; femoral hernia is known to be more common to females than males whilst midline hernias, incisional and parastomal hernia has no sex predilection rendering both males and females to have an equal chance of being affected.[13] We observed the same age trend as in the study of Bankole et al, however there is a gross difference to the study of Mathew et al of which the mean age was 67 years.[14,15] This might be because of the improved life expectancy and the nature of the diagnoses given that about half their patients were managed conservatively.

Abdominal wall hernia was the commonest among all etiological pattern followed by intraperitoneal adhesion and sigmoid volvulus. Two studies conducted in East Africa region depicted obstructed abdominal wall hernia as the commonest among the causes conquering with observations from this study.[11,16] In Nigeria, Irabor et al and Adisa et al had obstructed abdominal wall hernia as the leading cause of intestinal obstruction admissions.[17,18] In contrary, Ibrahim et al and Emegeakor on their observations on the changing pattern of intestinal obstruction reported peaked cases of intraperitoneal adhesions as the leading pattern in intestinal obstruction as supported by another systematic review in America by Srinivas et al.[19-21] This pattern change might be explained by the raised number of abdominal and pelvic surgeries which mainly predispose liable patients to intraperitoneal adhesions formation.

Depending on the etiological pattern and clinical presentation, patients with intestinal obstruction can be approached by either conservative (NOM) or surgical management.[3] Neri in his review of four years' management for patients with clinical presentation of intestinal obstruction; he observed the successful use of both management modalities.[22] Shelly and Yuktansh et al stressed on the utilization of conservative management to the indicated patient putting emphasis on the "drip and suck" phenomenon.[23,24] In "drip and suck" - patient is kept on nil per oral, initiated and maintained in intravenous fluids and electrolytes as per the requirements, broad spectrum antibiotics together with injectable analgesics are also given. The role of three tubes must well be observed whereby the nasogastric tube is always placed so as to minimize vomiting and aspiration upshot.[24] 38% of patients with small bowel obstruction in the study of Raphael et al were non-operatively managed and the rest attained recovery with surgery.[25]

Further speculations have shown a significant lowered risk of recurrence in intraperitoneal adhesions for patients managed by surgery, though this observation did not underrate the usefulness of conservative management in the same studied population.[26]

In this particular study, the outcomes of interests were SSI, PLoHS, relaparatomy and mortality where factors such as age, patient's diagnosis and management modality used were found to the determinants for their occurrences. One study in North western Ethiopia; found patient's diagnosis and type of surgical procedure used to be associated with SSI.[27] As it is the case in our study where patients who underwent bowel resection with or without primary anastomosis had an increased risk to acquire the named complications. Another study by Girma et al agrees with this study finding where SSI was mostly experienced by those patients who underwent bowel resection and had a PLoHS.[28] However, they went further to explore on the influence of different cor-mobid conditions to the outcome of interest of which it had significance.

This study observed age to be a significant factor in occurrence of complications, as those from 6th decade of life was more prone to complications such as SSI. This observation can be explained by "immunosenscence phenomenon" where there is a decline in immunological response with aging. This is in accordance to another study by Derseh et al which had the same observation.[29] In a systematic review on magnitude and predictors of unfavorable management outcome in intestinal obstruction; Fentahun et al found most of the outcomes to be determined by patient's diagnosis and type of surgery done as in our study.[30] However, in contrary to our observation, they found Sex to be significantly associated with the studied outcome of interest. This might be because of the profound large number of males than females as they were almost 2.5 times the latter sex.

CONCLUSION

Intestinal obstruction affected more males than females at the mean age of 45 years. Complicated abdominal wall hernia with either obstruction or strangulation was the commonest etiology followed by intraperitoneal adhesions. The factors that influenced the premeditated outcomes include age, initial patient's diagnosis and management modality especially in the surgical resection with or without anastomosis. We therefore recommend an early elective intervention in all adult's patients with abdominal wall hernias at risk of complications. Furthermore, we recommend employment of all necessary "adhesion preventive strategies" in all surgeries involving the abdominal and pelvic regions.

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