TMJ
Original research **Published by** OJS
Doi: 10.4314/tmj.v32i4.455.g280

OPEN ACCESS JOURNAL

Managing 'Adhesive Small Bowel Obstruction' in Tanzania: A Single Center Retrospective Review of Treatment Approach and its Outcomes

Larry O. Akoko[1]*, Sirili H. Alloyce[2], Masumbuko Y. Mwashambwa[3]

[1]Department of Surgery, School of Medicine, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania
[2]Department of Surgery, Muhimbili National Hospital, Dar es Salaam, Tanzania
[3]Department of surgery, School of Medicine, University of Dodoma, Tanzania

***Corresponding author:**

Dr. Larry O. Akoko,

P. O. Box 65001,

Muhimbili University of Health and Allied Sciences

Dar es Salaam, Tanzania

Email: akokole12@gmail.com

Published by OJS
Doi: 10.4314/tmj.v32i4.455.g280

Abstract

Background
The management of adhesive small bowel obstruction has evolved significantly in high income countries with improvements in diagnosis and treatment, from conservative to minimally invasive approaches. In Tanzania, like in many low and middle income economies, these developments have not been herald. Addressing adhesive small bowel obstruction in this setting is therefore vital to improve outcomes. This study aimed to explore current treatment modalities and their outcome among patients with 'adhesive small bowel obstruction' at Muhimbili national hospital.

Methodology
A descriptive retrospective, cross-sectional study was conducted at Muhimbili National Hospital covering the period 2014 to 2016. Patients with a documented diagnosis of adhesive Small Bowel Obstruction were sought from medical records. Using a predefined data capture sheets, age, sex, type of management, complications, mortality and time to feeding (among patients who were managed conservatively) were captured. The study had 80% power to detect a mortality rate of 8.7% at 95% confidence interval. Descriptive statistics were populated and summarized as proportions while mortality between the operated versus the conservative group compared using chi square test with significant value set at p value of <5%.

Results
A total of 127 patients with diagnosis of adhesive small bowel obstruction were identified. The mean age was 40.5±17.6 and a slight male predominance at a ratio of 1.6:1. Operative approach was predominant over conservative at ratio of 1.7:1. One third of the surgical group had bowel resection and anastomosis performed. In 18.8% of the operated cases, a complication was reported with Enterocutaneous fistula and surgical site infection being the most common. Overall mortality was 8.7% being higher in the operated group at 10%.

Conclusion
Open surgical approach is the predominant management approach in patients with Adhesive Small Bowel Obstruction. One in three of surgically managed required bowel resection signifying late presentation. Managing adhesive small bowel obstruction carries high morbidity and mortality. There is no standardized protocol for the management of these patients at the tertiary level.

Recommendation
Locally adoptable protocol for diagnosis and treatment of adhesive small bowel obstruction is needed. This should maximize on resources that are available even at district level facilities with much consideration of the role of surgery.

Key words*: Adhesive small bowel obstruction, Conservative management, Non-surgical approach, Surgical approach, Outcome of treatment.*

Published by OJS
Doi: 10.4314/tmj.v32i4.455.g280

Background

Adhesive small bowel obstruction (ASBO) is one of the leading causes of surgical emergency requiring emergent surgery globally (1, 2). It accounts for 20% of emergency surgical admissions and 70% of all cases presenting with small bowel obstruction (3, 4). The high prevalence with which it is met makes it a global public health issue. At the same time, ASBO utilizes significant health care resources due to recurrences and the high frequency of associated morbidity and mortality in centers with significant amounts of resources (5). In countries with fewer resources, the burden of ASBO is estimated to be on the rise (6). Patients with ASBO have a significant effect on quality of life due to recurrent abdominal pain and hospitalization (7).

While thought to be common, the burden of ASBO is not accurately known at Muhimbili National Hospital (MNH). With current management practices having evolved away from surgery first approach in many developed centers with promising results (8, 9), the practice in Tanzania remains unknown. Likewise, the outcome is unknown but speculated to be mirrored with high morbidity and mortality. This study therefore sought to investigate the management practice in patients presenting with ASBO at MNH and to depict its outcome. The findings from this study will inform necessary studies needed to inform changes in the practice of ASBO.

Materials and Methods

Design and setting

This was a 36 months' retrospective cross-sectional study covering patients managed with ASBO between 2014 and 2016 at MNH. The hospital serves as a national referral hospital and a teaching hospital for Muhimbili University of Health and Allied Sciences (MUHAS) and other paramedical staff. It is located in the Eastern Coast of Tanzania which has a population of 5 million residents. The hospital handles significant portion of surgical emergency for this geographical location and few referrals from outside the region. Imaging investigations necessary to diagnose ASBO including digital fluoroscopy, digital x-ray machines and CT scan are readily accessible 24/7. Ethical approval was obtained from MUHAS Senate Research and Publications Committee and a separate permission from MNH consultancy and research bureau.

Subjects identification

The diagnosis of ASBO is usually based on a high index of suspicion following presence of risk factor, especially previous laparotomy, and only in those that subsequently undergo surgery it can be confirmed without any doubt. Patients managed conservatively as ASBO and subsequently recovered are assumed to have been correctly labeled as such by the managing physician. Diagnosis was further supported by the presence of a radiological report suggesting ASBO with characteristic features of small bowel obstruction. To identify these patients, we checked the inpatient registry for a preoperative diagnosis of ASBO and got the hospital registration details. Further check was performed in the operating room for those operated. The two lists were reconciled by deleting duplicates and the final list was sent to the medical records department for retrieval of individual patient's case notes.

Study variables

Using a data collection spreadsheet, the following information was abstracted: age in years; sex as either male or female; treatment modality as surgery or conservative; what was done during surgery as resection and anastomosis or adhesions release; mortality rate as proportion dying overall and per treatment modality; complications recorded as Enterocutaneous Fistula (ECF) or Surgical Site Infection (SSI) or excessive bleeding. Additionally, patients who were conservatively managed were considered to have resolution of symptoms if they resumed oral feeding.

Sample size

With 127 patients to be studied, the study had the power of 80% to detect a mortality rate of 8.7% at 95% confidence interval.

Data analysis

The collected data was entered into Statistical Package for Social Scientists (SPSS) version 25 for analysis whereby continuous variables were summarized into means and standard deviations and categorical variables into frequency with proportions. For comparison of outcome, chi square test was used to compare mortality rates between the two groups with significant p-value set at <5% at 95% confidence interval.

Results

During the study period, 127 patients with a diagnosis of ASBO were identified and studied. All patients had relied on plain abdominal x-rays, supine and erect, for the diagnosis of ASBO. Neither of the patients had contrasted gastrointestinal study series nor CT scan done to correctly make a diagnosis.

Table 1 below shows patients demography (age and sex), treatment approach as surgical or conservative and treatment related mortality. Most of the patients with aSBO were male at 76(62.2%) representing a ratio of male to female of 1.7:1. The mean age of the patients was 40.5±17.6 (12 – 85) years with most of the patients in the age group between 31 – 60 years at 67(52.8%). Most patients had operative intervention compared to those that had conservative approach at 80(63%) giving a ratio of operative to conservative 1.7:1. In overall, 11(8.7%) deaths were recorded with most deaths occurring among those that had surgical intervention 2.7:1. An overall mortality of 8.7% was observed with patients who had operative intervention for their aSBO experiencing 3.6% excess mortality compared to the conservative group, a finding that failed to reach significant levels (p=0.48). Fifteen (15.8%) of the operated patients had reported complications of which Enterocutaneous fistula (ECF) was the most commonly reported in 7(46.7%) followed by surgical site infection (SSI) in 5(33.3%).

In Figure 1, we display procedures that were done among patients who had surgery as their treatment of choice for aSBO. Most of the patients had adhesiolysis without mention of release of obstructing band as was the case in 61(76 %) and only 19(24%) had serious intestinal problems warranting a resection and anastomosis.

In Figure 2, we show the time in hours it took for patients to be initiated on oral feed when managed conservatively for ASBO by the physician. Majority of the patients had initiation of oral feeds within 24 hours of admission 23(62%), followed by those initiated between 24 and 36 hours of admission in 9(24%) with the least having food initiation beyond 36 hours of admission as was the case in 5(14%).

Published by OJS
Doi: 10.4314/tmj.v32i4.455.g280

Table 1: Showing age, sex, treatment modality and mortality among patients managed with aSBO at MNH between 2014 and 2016 (n=127)

Variables	N (%)
Sex	
Male	79 (62.2)
Female	48 (37.8)
Age	
11 – 30	41 (32.3)
31 – 60	67 (52.8)
> 60	19 (15)
Treatment options	
Conservative	47 (37)
Operative	80 (63)
Mortality (8.7%)	
Overall	11 (8.7)
Operative	8 (10)
Conservative	3 (6.4)
Complications (18.8%)	
ECF	7 (46.7)
SSI	5 (33.3)
Bleeding	3 (20.0)

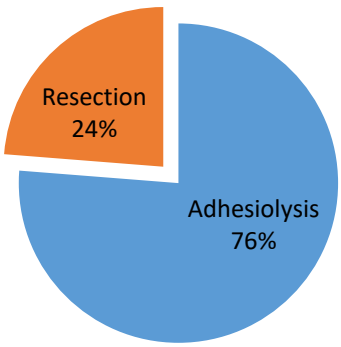

Figure 1. Pie chart showing treatments offered to patients with a diagnosis of aSBO at MNH from 2014 – 2016. (n=127)

Published by OJS
Doi: 10.4314/tmj.v32i4.455.g280

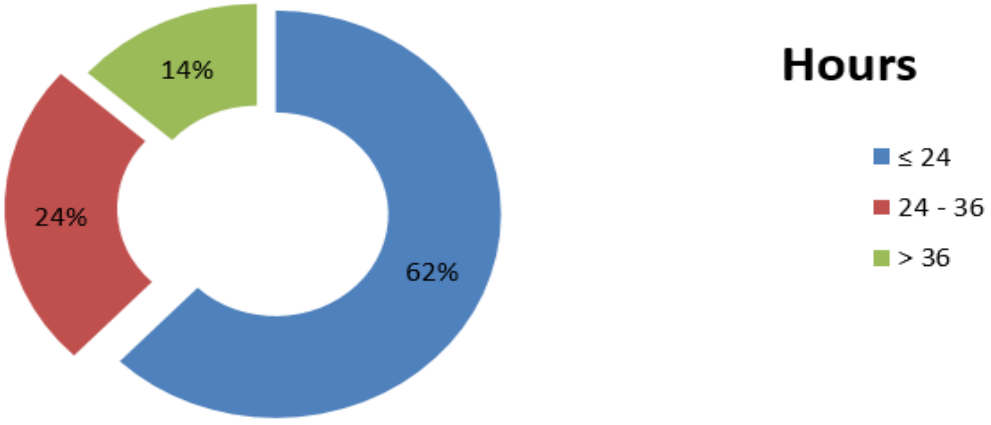

Figure 2. A doughnut showing time to oral feeds in hours among 37 patients with ASBO managed conservatively at MNH between 2014 and 2016

Discussion

This was an initial study to look at ASBO management and its outcome at the largest public hospital in Tanzania. Patients managed at this facility are believed to be receiving the best locally available surgical services and care due to availability of both human and infrastructure resources. Being retrospective in nature, limitations of the design could not be avoided. Exact management protocol for ASBO and end points for the conservative approach could not be obtained. Therefore, cases reported as having been managed conservatively were those that were discharged without surgery. Understanding most of the limitations cited here requires execution of a prospective study in patients suspected of having ASBO at MNH and if possible a multicenter study for ease and rapid recruitment of cases.

Managing only 127 patients, about 3 – 4 cases per month, with ASBO over a three-year period might be difficult to compare with other settings. But this seemingly low number of cases would be attributed to the referral nature of the hospital, as most such cases would be managed at peripheral hospitals. However, this is a similar picture in other centers in sub-Saharan Africa (8, 9). This study highlights on patients' characteristics, treatment modality as operative or conservative and outcome of ASBO at MNH. It forms a basis for addressing ASBO in Tanzanian hospitals with aim of improving its management practices and hence outcome.

About two thirds of patients presenting with ASBO at MNH were managed surgically and one third of patients treated surgically will need resection and anastomosis for their management. The rest of the surgically managed patients had adhesiolysis without mention of having identifiable obstructing bands released. It is important to identify factors predicting resection and anastomosis as they carry higher morbidity and mortality. Likewise, identifying patients who did not have identifiable obstructing bands from patients who had adhesiolysis is important to avert surgery in a subset of these patients. Computed Tomography (CT) scan and Magnetic Resonance Imaging use demonstrated high sensitivity in the diagnosis of ASBO (10-12). In addition, CT can reliably diagnose the cause and site as well as closed loop bowel obstruction. The use of these imaging modalities in the absence of clear features of bowel obstruction on plain abdominal films would avert some of the surgeries.

Worth noting is that there is no solid foundation for conservative approach as newer arguments are emerging in favor of operative approach to ASBO (13). This is especially due to the development of commercial products believed to aid in atraumatic adhesiolysis and the fact that both recurrence and readmission are faster in the conservative group compared to the operative group (14). The coming of laparoscopic techniques has also driven the change towards favoring operative approach to conservative approach to patients with ASBO (15). But surgical management of ASBO carries a complication rate of 1: 5 and a mortality risk of 1:10. It is known that extensive release of adhesions would result in high comorbidities (16) as were witnessed here with both ECF and bleeding high on the log. Extensive adhesions release would cause inadvertent enterotomies some of which might miss being repaired and serosal tears with their associated bleeding and fistula formation.

Gastrografin use, for its therapeutic role owing to a high osmolality hence reducing bowel edema and stimulating motility, has become common among patients with ASBO (17). However, the use of gastrografin should be preceded by contrast enhanced CT scan to rule out closed loop obstruction or other cause of small bowel obstruction other than ASBO (18). Resolution following gastrografin administration should be demonstrated by contrast reaching the colon within 4 – 24 hours with no signs of bowel ischemia. The use of gastrografin has also been linked to reduced duration of hospital stay as decisions on resolution of ASBO are made within 24hours of observation (19). Our study utilized time to oral feeds as an indicator of resolution of the obstruction as was judged by the treating surgeon. This might explain the

death as return to oral feeding is not a reliable marker of resolution and severity of the adhesion related complications.

There were three deaths reported in the non-operative group which was alarming as this approach should have been reserved to hemodynamically stable patients with no danger signs (20). MNH needs to refine the conservative approach strategy among its patients with ASBO by adopting the use of CT scan followed by oral gastrografin use. Simply relying on resolution of pain in bowel obstruction might signify gangrene of bowel (21). The recommendations on how to approach a patient with bowel obstruction suspected to be due to adhesions has been made very clear by the Bologna committee (22) and should be easy to adopt in our setting.

Conclusion

ASBO is a common condition at MNH with predominance of open surgical approach, about 2 in 3 patients undergoing surgery of which one third had bowel resection and anastomosis and the rest having adhesiolysis. It carried a higher morbidity and mortality with overall mortality rate of 8%. The mortality was higher in the operated group compared to the conservative group. The basis of selection of patients to either of the groups was not clear and similarly was the end point of conservative approach. Prospective outcome studies on ASBO are urgently needed locally, through a multicenter within country collaboration, to address the higher morbidity and mortality.

Ethical approval and consent to participate

Ethical approval to conduct this study was obtained from MUHAS Senate Research and Publications Committee and MNH research, education and consultancy bureau. Since no patients were involved, waiver of a written informed consent was granted. Confidentiality was maintained by de-identifying all the study data at the end of data collection. Additionally, authors have no competing interests to declare.

Authors' contributions

LA and SH were involved in the conception and design. SH did data acquisition and first draft writing. MM and LA did data analysis. LA performed final manuscript revision. All authors have approved the manuscript for publication.

Published by OJS
Doi: 10.4314/tmj.v32i4.455.g280

Acknowledgements

The authors acknowledge all final year surgical residents' class of 2018 and the surgical staff at MNH. Likewise, our gratitude to all patients and their relatives who were managed with ASBO.

Abbreviations

ASBO	Adhesive Small Bowel Obstruction
ECF	Enterocutaneous Fistula
IRB	Institutional Review Board
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences
SPSS	Statistical Package for Social Scientists
SSI	Surgical Site Infection

Published by OJS
Doi: 10.4314/tmj.v32i4.455.g280

References

1. Sastry A, Grigoreva M, Leitman IM. **Risk Factors for the Development of Adhesive Small Bowel Obstruction after Abdominal and Pelvic Operations.** Open J Gastroenterol (Internet). 2008 (cited 2019 Feb 16);5:11–6.
2. Ten Broek RP, Issa Y, vanSantbrink EJ, Bouvy ND, Kruitwagen RF, Jeekel J, et al. **Burden of adhesions in abdominal and pelvic surgery: systematic review and meta-analysis.** BMJ, 2013; 347:f5588.
3. Halis N, Sogut O, Guloglu C, Ozgonul A, Gokdemir MT, Durgun HM. **Factors Associated with Morbidity and Mortality in Patients with Mechanical Bowel Obstruction.** J Acad Emerg Med. 2012;11:1–5.
4. Tabchouri N, Dussart D, Giger-pabst U, Michot N, Marques F, Khalfallah M, et al. **Only Surgical Treatment to Be Considered for Adhesive Small Bowel Obstruction: A New Paradigm.** Gastroenterology Res Pract. 2018;2018.
5. Krielen P, van den Beukel BA, Stommel MWJ, Goor H van, Strik C, ten Broek RPG**. In-hospital costs of an admission for adhesive small bowel obstruction.** World J Emerg Surg (Internet). World Journal of Emergency Surgery; 2016;11(1):1–8.
6. Kimuli T. **The causes and outcome of non-traumatic acute abdominal pain in Mulago Hospital** (MMED (Surgery) dissertation) Makerere University; Kampala: 2006
7. Hershlag A, Diamond MP, DeCherney AH. **Adhesiolysis.**Clin Obstet Gynecol. 1991 Jun; 34(2):395-402.
8. Ngim OE, Udosen J, Essiet A, Efem SEE, Bassey OO. **Acute Intestinal Obstruction from Post-Operative Adhesions in a Tertiary Health Facility, South-South, Nigeria : A one year prospective study** . IOSR J Dent Med Sci. 2013;7(2):40–3.
9. Soressa U, Mamo A, Hiko D, Fentahun N. **Prevalence, causes and management outcome of intestinal obstruction in Adama Hospital, Ethiopia.** BMC Surg (Internet). BMC Surgery; 2016;16(1):1–8.
10. Zielinski MD, Eiken PW, Bannon MP, Heller SF, Lohse CM, Huebner M, et al. **Small bowel Obstruction-Who needs an operation? A multivariate prediction model.** World J Surg. 2010;34(5):910–9.
11. Chen SC, Lee CC, Hsu CY, et al. **Progressive increase of bowel wall thickness is a reliable indicator for surgery in patients with adhesive small bowel obstruction.** Dis Col Rect, 48 (2005), pp. 1764-1771

12. Daneshmand S, Hedley CG, Stain SC. **The utility and reliability of computed tomography scan in the diagnosis of small bowel obstruction.** Am Surg, 65 (1999), pp. 922-926
13. Assenza M, De Gruttola Ivan I, Rossi D, Castaldi S, Falaschi F, Giuliano G. **Adhesions small bowel obstruction in emergency setting: Conservative or operative treatment?** G di Chir. 2016;37(4):145–9.
14. Yang KM, Yu CS, Lee JL, Kim CW, Yoon YS, Park IJ, et al. **The long-term outcomes of recurrent adhesive small bowel obstruction after colorectal cancer surgery favor surgical management.** Med (United States). 2017;96(43).
15. Al Otaibi MS, Saleh SMR, Sabbahi ME. **Laparoscopic versus Open Adhesiolysis in Patients with Bowel Obstruction.** Egypt J Hosp Med (Internet). 2018;70(8):1341–5.
16. Ten Broek RPG, Strik C, Issa Y, Bleichrodt RP, Van Goor H. **Adhesiolysis-related morbidity in abdominal surgery.** Ann Surg. 2013;258(1):98–106.
17. Burge J, Abbas S, Roadley G, et al. **Randomized double blind controlled trial of the therapeutic effect of oral Gastrografin in adhesive small bowel obstruction.** ANZ J Surg, 2005 ;75 :672-674
18. van Loevezijn AA, Smithuis RHM, van den Bremer J. **Gastrografin als prognostisch en therapeutisch medium (Gastrografin as a prognostic and therapeutic medium; use for small bowel obstruction, but not for closed loop obstruction).** Ned Tijdschr Geneeskd. 2018 May 4;162:D2408. Dutch. PMID: 30040276.
19. Abbas S, Bissett IP, Parry BR. **Oral water soluble contrast for the management of adhesive small bowel obstruction.** Cochrane Database Syst Rev. 2005 Jan 25;(1):CD004651. doi: 10.1002/14651858.CD004651.pub2. Update in: Cochrane Database Syst Rev. 2007;(3):CD004651. PMID: 15674958.
20. Catena F, Di Saverio S, Coccolini F, Ansaloni L, De Simone B, Sartelli M, et al. **Adhesive small bowel adhesions obstruction: Evolutions in diagnosis, management and prevention?** World J Gastrointest Surg (Internet). 2016;8(3):222.
21. Branco BC, Barmparas G, Schnüriger B, Inaba K, Chan LS, Demetriades D. **Systematic review and meta-analysis of the diagnostic and therapeutic role of water-soluble contrast agent in adhesive small bowel obstruction.** Br J Surg. 2010;97(4):470–8.
22. Ten Broek RPG, Krielen P, Di Saverio S, Coccolini F, Biffl WL, Ansaloni L, et al. Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2017 update of the evidence-based guidelines from the world society of emergency surgery ASBO working group. World J Emerg Surg. 2018;13(1):1–14.