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Etiology, Clinical Manifestations, and Imaging Evaluation of Intestinal Obstruction in Adults at Tertiary Hospital in Mogadishu, Somalia: A Retrospective Study

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Background: Intestinal obstruction (IO) is a surgical emergency with high morbidity and mortality. The leading causes in adults include adhesions, incarcerated hernias, and tumors.

Methods: This three-year retrospective study reviewed adult patients with IO treated at Mogadishu Somalia Turkey Training and Research Hospital from June 1, 2019, to June 1, 2022.

Results: Of the patients studied, 67% were male, with a male-to-female ratio of 2:1. The most common symptoms were nausea and vomiting (93.2%), abdominal distension (90.2%), and inability to pass stool or gas (70.8%). Surgical management was required for 95.1% of patients, with only 4.9% managed conservatively. The most frequent postoperative complication was surgical site infection. Hospital stays for 52% of patients ranged from 8 to 14 days. The overall mortality rate was 4.9%.

Discussion: IO remains a critical surgical emergency worldwide, requiring urgent intervention. Aggressive treatment of hernias and timely surgical intervention for mechanical obstruction are essential to reduce complications and mortality. Delayed presentations contribute to higher mortality rates.

Conclusion: Small bowel obstruction was more frequent than large bowel obstruction, with fibrous adhesions and incarcerated hernias as the leading causes. Adhesiolysis and bowel resection with anastomosis were the most common surgical procedures. Further research using prospective study designs is recommended to improve understanding and outcomes.

Keywords: intestinal obstruction, strangulation, morbidity, mortality, colon cancer

Core Tip

Intestinal obstruction is an emergency surgical condition in day-to-day surgical field. This research article will field information gap related to this burden, so far no single research was done in the country and this will be a fundamental study related to this topic and was done in the largest referral hospital in the country having all proper facilities in diagnosis and well-established general surgery department dealing emergency cases in 24 hours and proper pre and post-operative care. Including the ICU and dialysis unit.

Such meaningful research, authors discussed choosing a renowned and prestigious journal in the field of surgery to create a platform to share our knowledge and experiences related to intestinal obstruction to the world.

Background

Acute intestinal obstruction, a common surgical emergency, is the interruption of the forward passage of intestinal contents anywhere from the mouth to the anal canal. It often manifests as a variety of clinical symptoms depending on

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the level of obstruction.[1] It is a potential surgical emergency condition with a high rate of morbidity and mortality.[2] The term "emergency operation" refers to those procedures that must be carried out urgently within 24 hours of a patient's admission or within 24 hours of the emergence of a particular complication.[3]

Following the Bologna Guidelines, ASBO is a common surgical emergency that can result in significant morbidity or even death. Surgeons should be aware that the adhesions causing such bowel obstructions are typically the footprints of previous abdominal surgical procedures or disease and CT scan to be the preferred technique for diagnosis of ASBO.[4] It is one of the most prevalent acute abdominal disorders that necessitate admission for emergency surgery and is frequently associated with high mortality of 3–30% worldwide.[5]

According to previously published research, 12% of patients with primary conservative treatment will experience a repeat Intestinal Obstruction, and 8% to 32% of patients with adhesion bowel obstruction will require surgery.[6]

Early detection and surgical treatment reduce disproportionate death, mechanical intestinal obstruction (IO) is among the pathologies that call for urgent surgical procedures, in many parts of the world.[7]

The most prevalent causes of intestinal obstruction in adults are adhesions, which are followed by incarcerated hernias and tumors. In Africans, hernias and volvulus are the most common causes of intestinal obstruction, in childhood intussusceptions and adhesion.[8,9]

Our current study aims to explore the etiology, clinical manifestations, and Imaging Evaluation of Intestinal Obstruction in Adults at Tertiary Hospital in Mogadishu, Somalia.

Materials and Methods

Study Design and Period

A three-year retrospective study of adult patients treated with IO at the hospital between June 1, 2019, and June 1, 2022.

Study Setting and Population

Mogadishu Somalia Turkey, Recep Tayyip Erdogan Training and Research Hospital is one of the country's primary referral hospitals, located in the capital city of Mogadishu.

Pediatric cases and patients whose records were either incomplete (missing critical information on causes and management) or lost were excluded from the study.

Data Collection Methods

The data were collected using standardized checklists. A checklist in English was created to collect critical information such as age, sex, clinical presentation, laboratory data, previous operation history, and etiology, site of obstruction/ pathology, radiological findings, surgical methods, complications, and hospital stay. The data was collected by both radiology and general surgery team.

Data Processing, Statistical Analysis

The data was cleaned and coded before being imported to SPSS version 27 for analysis.

Ethics Approval

The approval was obtained from the Mogadishu Somali Turkish Training and Research Hospital research advisory and ethical committee (MSTH/10896) and this study was performed in accordance with the tenets of the declaration of Helsinki.

Results

In our study, the decision to undergo surgical intervention was made urgently for patients exhibiting signs of bowel compromise or as a later intervention when non-operative management fails. History-taking, physical examination, and imaging might also reveal clues about the etiology of the obstruction.

Demographic Characteristics and Clinical Presentation of Intestinal Obstruction

In our study, 103 adult patients who had been admitted to the general surgery department for intestinal obstruction were reviewed, Two-thirds of the patients were in the younger age group (< 60 years), and only one-third (32%) were more than 60 years old. A majority (67%) of our study were male showing the male predominance of the disease with a male-to-female ratio of 2:1. The patients demonstrated a variety of signs and symptoms, but the most prominent manifestations were nausea and vomiting (93.2%), abdominal distention (90.2%), failure to feces /flatus (70.8%), leukocytosis (44.7%), and uremia (10.7%). See in Table 1.

Our study reveals that 24 (23.3%) had a previous history of abdominal surgery.

Related to the level of obstruction site, small bowel obstruction was identified in the vast majority of 71(68.9%) of the patients whereas large bowel obstruction was attributed to 32(31.2%) of the patients.

According to the etiological categories of intestinal obstruction patients, non-oncological causes accounted for 79 patients (76.6%) with intestinal obstruction, while the oncological causes contributed to 27 patients (26.2%).

Fibrous adhesions and obstructed hernia were the two most common causes of intestinal obstruction, while colon cancer was the leading cause of large bowel obstruction.

The majority of the patient 98(95.1%) with intestinal obstruction was treated under operative management, whereas conservative management (ie, nasogastric tube decompression, intravenous antibiotics, and intravenous fluid resuscitation) were applied in 4.9% of cases. See in Table 2. This might be explained many patient of ileus patient were admitted by other medical departments for dehydration, electrolyte imbalance and acute renal insufficient.

Radiological Evaluation of Intestinal Obstruction

In this study, computed tomography (CT) scans were performed in 87% of cases. For patients with a high clinical suspicion of intestinal obstruction, CT is recommended as the initial imaging modality, in accordance with the guidelines of the American College of Radiology.

Our study found that the most common radiological findings were the presence of a distinct transition point (92.2%), where the bowel caliber changes from normal to abnormal, and Proximal dilatation/Distal collapse (98%).

Table 1 Socio-Demographic Characteristics, Clinical Presentation and Laboratory Data Among Intestinal Obstruction Cases

Variables		Frequency (n=103)	Percent %
Age	18–25	25	24.3%
	26–35	13	12.6%
	36–45	20	19.4%
	46–60	12	11.7%
	>60	33	32.0%
Sex	Male	69	67.0%
	Female	34	33.0%
Clinical presentation and laboratory data	Nausea & vomiting	96	93.2%
	Constipation / Obstipation	73	70.8%
	Abdominal distension	93	90.2%
	Leukocytosis	46	44.7%
	Uremia	11	10.7%

Table 2 Risk Factors, Etiology, Management, and Site of Pathology Among Intestinal Obstruction Cases

Variables		Frequency (n=103)	Percent %
History of previous operation	Yes	24	23.3%
	No	79	76.7%
Site of obstruction	Large bowel	32	31.1%
	Small bowel	71	68.9%
Etiology	Non- Oncological	76	73.8%
	Oncological	27	26.2%
Oncological	Colon cancer	18	17.5%
	Rectal cancer	3	2.9%
	Small bowel cancer	6	5.8%
Non- Oncological	Fibrous adhesions	34	33.0%
	Abdominal hernia	12	11.7%
	Inflammation/infection (IBD, TB, E gastroenteritis)	2	1.9%
	Intussusception	4	3.9%
	Small Bowel Volvulus	3	2.9%
	Large Bowel Volvulus	5	4.9%
	Diverticulitis	3	2.9%
	Bowel ischemia (Closed loop)	3	2.9%
	Necrosis and perforation	10	9.7%
	Duodenal stricture	8	7.8%
	Abscess	2	1.9%
	Other (bezoars, gallstone ileus, SMA S)	1	1.0%
Management	Non operative management	5	4.9%
	Operative management	98	95.1%

A mesenteric fat stranding (18.4%) was also identified in our study, which was more common in patients with necrosis or perforations (such as appendiceal perforation and ischemic bowel perforation). Several dilated, U- or C-shaped fluid-filled dilated bowel loops (18.4%) were found in closed-loop obstructions caused by adhesions or abdominal hernias. When there was volvulus, the mesentery twisted (Whirlpool sign) (6.8%), and when there was intussusception, the Target sign (3.9%) appeared. See in Figure 1.

As evidenced by the delayed presentation of cases until bowel viability had been compromised and CT showed signs of perforations, pneumoperitoneum (11.7%) and bowel ischemia (5.8%) were the most prominent intestinal obstruction complications seen radiologically. See in Table 3.

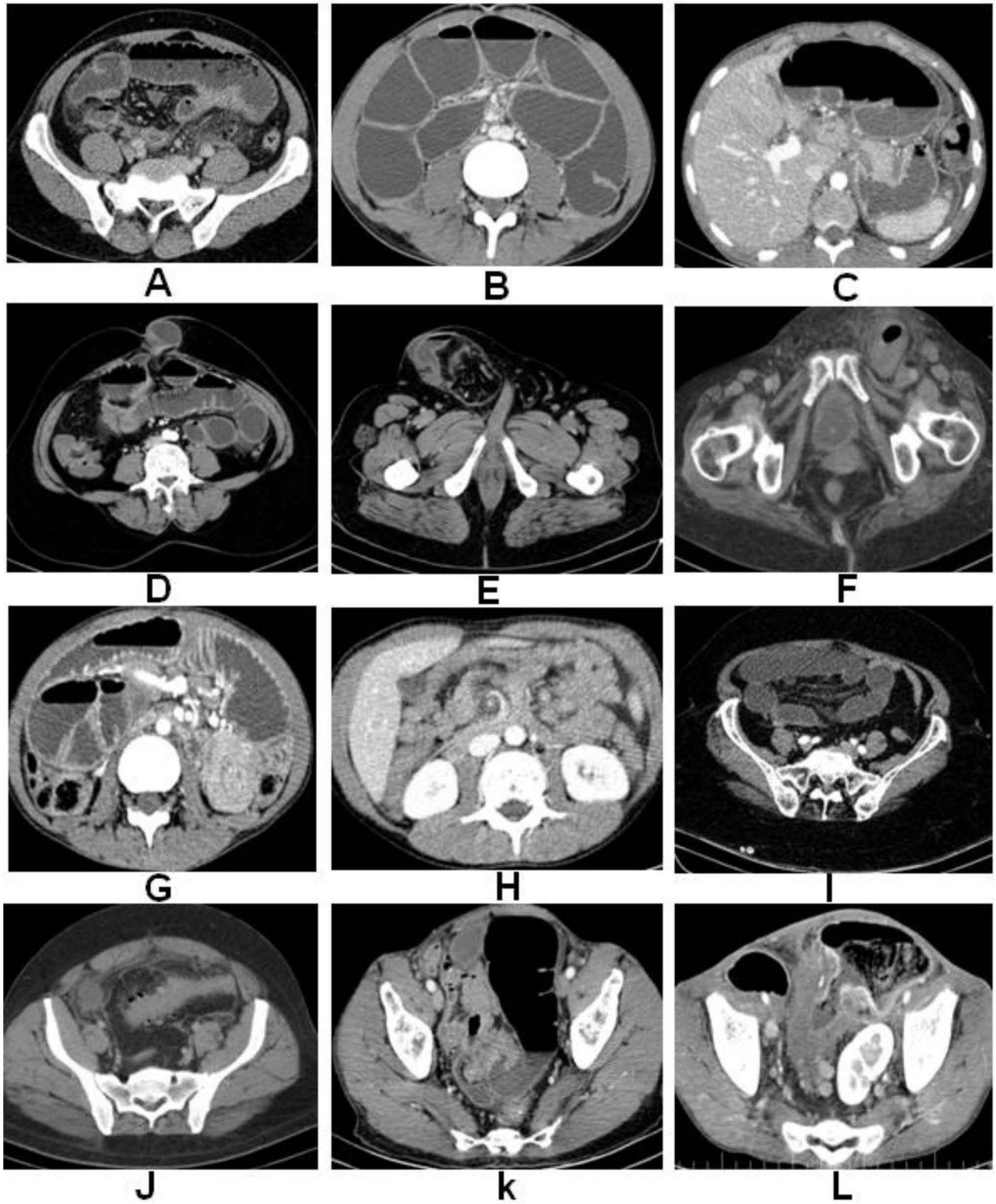

Figure 1 Illustrates various radiological characteristics observed in cases of intestinal obstruction: Axial contrast-enhanced abdominal CT demonstrating intestinal obstruction due to (**A**) Perforated appendicitis, (**B**) Fibrous adhesion in a patient with a previous history of operation, (**C**) Incarcerated diaphragmatic hernia, (**D**) Incarcerated umbilical hernia, (**E**) Incarcerated inguinal hernia, (**F**) Strangulated inguinal hernia, (**G**) Intussusception with typical target sign, (**H**) Mid gut volvulus with typical whirlpool sign, (**I**) closed loop obstruction with non-enhancing bowel loops indicating bowel ischemia, (**J**) Diverticulitis showing a long segment of diffuse sigmoid wall thickening and mesenteric fat stranding, (**K**) Rectal cancer (**L**) Sigmoid Colon Cancer.

Table 3 Procedures for the Evaluation, Radiological Finding and Associated Complications Among Intestinal Obstruction Cases

Variable		Frequency (n=103)	Percent %
Procedures for the evaluation	X-ray	99	96.1%
	Ultrasound	28	27.1%
	CT scan	90	87.3%
Radiological finding	Proximal dilatation/Distal collapse	101	98.1%
	Transition point	95	92.2.0%
	Surrounding mesenteric fat stranding	19	18.4%
	U-shaped or C-shaped-loop	19	18.4%
	Twisting of the mesentery (whirlpool sign)	7	6.8%
	Target sign	4	3.9%
	Pneumoperitoneum	12	11.7%
	Bowel ischemia	6	5.8%

Management Outcome of Intestinal Obstruction

The surgical management for the present study resection non-viable bowel and enterostomy were subjected about one-third of the patients due to severe bowel contamination or tissue factors.

Second most common surgical technique was resection anastomosis was performed in 32% of the patients, followed by adhesiolysis was done in 31%.

Intestinal obstruction caused by perforated appendicitis was not uncommon and accounts 7.8% of the cases. Perforated appendix causing multiple inter-loop abscesses and thus causing obstruction.

Intestinal obstruction secondary to perforated appendicitis, was not uncommon, accounts for approximately 7.8% of the cases. This complication arises when a perforated appendix leads to the formation of multiple inter-loop abscesses, which in turn cause mechanical obstruction of the bowel.

Surgical site infections accounted for the majority of postoperative complications (16.5%) in these patients followed by intra-abdominal abscess (5.8%) and post-operative ileus (7.7%), respectively, and leak from anastomosis was documented in 4 patients (3.8%).

The duration of hospitalization for patients with intestinal obstruction was distributed as follows: 40% of patients had a hospital stay of 1 to 7 days, 52% had a stay of 8 to 14 days, and 8.7% remained hospitalized for more than 14 days.

The overall mortality rate in this study was 5 (4.9%), among a total of 103 evaluated cases that underwent operative management. See in Table 4

Discussion

Intestinal obstruction is one of the most common life-threatening emergencies all over the world, particularly countries with low or middle incomes, presenting as acute abdomen and requiring surgical admission and management.[10,11]

Male predominance was observed in our research aligning with research findings in the region[12] and Nausea & vomiting (93%) abdominal distension (90%) were the most common complaint in our study which is consistent with the general clinical presentation of intestinal obstruction. In a study done in East India, abdominal distension was found to be the commonest presentation of IO (93%) followed by vomiting (91%) and constipation (82%).[13]

Similar studies revealed that abdominal distension, bilious vomiting, absolute constipation and abdominal pain were the main signs and symptoms.[14]

Table 4 Operative Procedures and Complications Among Intestinal Obstruction Cases

Variable		Frequency (n=103)	Percent %
Operative procedures	Appendectomy	8	7.8%
	Loop colostomy	5	4.9%
	Lysis of adhesions	32	31.1%
	Lysis of adhesions + resection	7	6.8%
	Lysis of adhesions + enterostomy	7	6.8%
	Hernia repair	6	5.8%
	Hernia repair + resection	4	3.9%
	Resection + anastomosis	22	21.4%
	Enterotomy repair	8	7.8%
	Resection + Enterostomy	34	33.0%
	Abscess drainage	6	5.8%
Complications	Iatrogenic bowel injury	6	5.8%
	Surgical site infections	17	16.5%
	Early period ileus	8	7.7%
	Leakage from anastomosis	4	3.9%
	Intra-abdominal abscess	6	5.8%
	Incisional hernia	3	2.9%
	Evisceration	4	3.8%
	Mortality	5	4.9%
Hospital stay	1–7 days	40	38.8%
	8–14 days	54	52.4%
	> 14 days	9	8.7%

In evaluating the radiological findings, the presence of a distinct transition point were noted 92.2% of the cases which is a crucial diagnostic indicator for surgical management, reflecting the significant number of our patients managed surgical intervention and a substantial number required emergency surgery. Similar findings were found in these studies.[14,15] In controversy where most of the patients were successfully treated non-operatively.[16,17] This highlights the variability in the management approaches to intestinal obstruction, possibly reflecting differences in patient populations, delayed presentation of the cases, or surgeon preference.

In this study, computed tomography (CT) scans were performed in 87% of cases. For patients with a high clinical suspicion of intestinal obstruction, CT is recommended as the initial imaging modality, in accordance with the guidelines of the American College of Radiology.

In this study, the vast majority of patients—71(68.9%)—were found to have a small intestinal obstruction, whereas 32 (31.2%) were revealed to have a large bowel obstruction. Comparative results were noted in studies done in Ethiopia, Nigeria, and India.[7,13,18]

The leading etiologies of small intestinal obstruction were fibrous adhesions (33%) and obstructed hernias (11%) followed by Bowel Volvulus 8(7.7%), Many African nations still exhibit this trend, particularly in the rural areas.[19,20] While colon cancer was the most frequent large intestinal obstruction with oncological cause[19] 11.7% of all cases with intestinal obstruction had radiologic signs of intestinal ischemia, and pneumoperitoneum indicating perforation. This pattern mirrors that seen in many African nations where limited access to surgical care may result in delayed presentations.[21–23]

Surgeons should keep up their aggressive approach to the elective treatment of all abdominal hernias and prompt surgical intervention in patients who have acute mechanical intestinal obstruction caused by incarcerated hernias. According to Mr. Hamilton Bailey "The sun should not rise and set on an unresolved case of intestinal obstruction".[24]

In this study, surgical management for intestinal obstruction involved resection of non-viable bowel and enterostomy in approximately one-third of patients due to severe bowel contamination or tissue factors. Resection and anastomosis was the second most common surgical technique, performed in 32% of cases, followed by adhesiolysis in 31%. Intestinal obstruction caused by perforated appendicitis was also notable, accounting for 7.8% of cases, often due to perforated appendices leading to multiple inter-loop abscesses.

Surgical site infection was the most common postoperative complication, occurring in 17 of these patients (16.5%). A similar result of 20.8% was found in research conducted in Nigeria.[25] The high incidence of infection may be attributed to the frequent occurrence of intestinal perforation, peritonitis, and bowel gangrene in patients presenting with delayed presentation.

The majority of patients with intestinal obstruction had a hospital stay of 8 to 14 days, accounting for 52% of the cases. The prolonged duration of hospitalization for patients with intestinal obstruction can be attributed to several factors that affect the complexity and management of the condition. These include the severity of the obstruction, the need for surgical intervention (eg, in cases of strangulated or complicated obstructions), the occurrence of postoperative complications, and the presence of comorbid conditions.

In our study, the mortality rate related to intestinal obstruction was 4.9%, and the mortality rate associated with the late presentation was reported in a study done in Rwanda where the overall mortality rate was 6.7%.[26] Mortality is influenced by a number of factors, including intestinal viability, patient age, and the cause for the obstruction or delayed presentation and surgical intervention. These findings emphasize the need for early diagnosis and intervention to reduce the burden of morbidity and mortality associated with this condition.

Limitations

Due to the retrospective nature of this study's design and the potential for missing data in the patient's medical records, the findings are difficult to compare because there were no similar published data from the country.

Being a hospital-based, single-center study with small sample size and the findings may not accurately represent the disease's state in the general population. However, our findings provide insight into the scope of intestinal obstruction in the country. Further prospective and multicenter research involving patients from other regions are required.

Conclusion

This study demonstrates that fibrous adhesions and incarcerated hernias being the leading causes of small bowel obstruction, surgical management for intestinal obstruction involves resection of non-viable bowel and enterostomy in one-third of cases, followed by resection and anastomosis in 32% of cases. Perforated appendicitis accounts for 7.8% of cases. Postoperative complications are common, with surgical site infection occurring in 16.5% of cases. The majority of patients have a hospital stay of 8–14 days, with a mortality rate of 4.9%. The study emphasizes the need for early diagnosis and intervention to reduce morbidity and mortality associated with intestinal obstruction.

Further research using prospective study designs is recommended.

Abbreviations

IO, Intestinal Obstruction; CT, Computed Tomography; SPSS, Statistical Package for the Social Sciences.

Data Sharing Statement

The data that support the findings of this study are available in Mogadishu Somali Turkey, Recep Tayyip Erdogan Training and Research Hospital information system. Data are, however, allowed to the authors upon reasonable request and with permission of the education and research committee.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

This article did not use any AI or AI-assisted technologies.

Institutional Review Board Statement

Ethical approval for the study was obtained from the Hospital Ethical Committee (MSTH/10896) and this study was performed in accordance with the tenets of the declaration of Helsinki, Informed consent was obtained from all participants.

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The authors have read the CARE Checklist (2016), and the paper was prepared and revised according to the CARE Checklist (2016).

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation. AMA and YGM critically revised the manuscript; all authors read and approved the final version of the manuscript. All authors give substantial contributions to the conception or the design of the manuscript.

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Disclosure

The authors declare that they have no conflict of interest to disclose.

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