

VALIDATION OF AGESS-SBO SCORING SYSTEM FOR THE PROGNOSIS AND OUTCOME OF SMALL BOWEL OBSTRUCTION

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Abstract

Background: Small bowel obstruction (SBO) is a medical emergency that requires immediate surgery and early diagnosis. The only grading system currently available to make an accurate diagnosis is AGESS (ACUTE GENERAL EMERGENCY SURGICAL SEVERITY) -- SBO. The study aimed to test the validity of the AGESS rating system for the prognosis, severity, and outcome of small bowel obstruction in our patients. **Materials and Methods:** This eight-month hospital-based observational research was conducted at the Rajiv Gandhi Government General Hospital and the Institute of General Surgery at Madras Medical College. Fifty patients (older than 15 years) with SBO symptoms were included. Following the patient and ethics committee's permission, the preoperative and intraoperative AGESS-SBO score was computed, and the result was established. **Result:** 50 patients (54% male) with a mean age of 52 (+/- 5) years received SBO treatment during the research period. Adhesion was the most frequent cause of SBO, accounting for 46% (23 patients), followed by an obstructed hernia (10). The mean average Length of Hospital stay was 11.5 6 days. The average AGESS SBO SCORE was 1.2 (interquartile range: 1-2). A greater risk of morbidity and death was linked to late presentation, delayed intraoperatively diagnosis, intestinal gangrene and an AGESS-SBO >2. The most commonly encountered postoperative complications were gastrointestinal - ileus and SSI, followed by Pneumoninfection and Electrolyte imbalance. **Conclusion:** The validation of SBO through the AGESS-SBO scoring system helped develop a multidisciplinary strategy for planning and carrying out diagnostic and treatment interventions in this patient population.

INTRODUCTION

Intestinal obstruction is described as a restriction in the transit of intestinal content and can be intrinsic or extrinsic, partial or total, proximal, intermediate, or distal (depending on location).^[1] Small intestinal blockage is responsible for roughly 3% of emergency laparotomies. Among patients hospitalised with intestinal blockage, nonoperative therapy resolves 85% of partial small intestine obstructions. In contrast, operative intervention is performed for those who fail conservative management and have indications of vascular compromise, strangling, or perforation.^[2] Mechanical blockage was detected in 5 to 15% of patients with acute severe stomach

discomfort necessitating hospitalisation. Small intestinal blockage caused 80% of these instances of acute mechanical obstruction, with 6 to 13% having strangulated small bowel.^[3] The prognosis of non-ischemic patients with small intestinal blockage is favourable, with mortality rates as low as 2%, but those with ischemia have a 25% mortality risk.^[4] Small bowel obstruction (SBO) is a major source of healthcare costs. Numerous studies have been conducted to standardise treatment protocols. However, consensus on best practice has eluded researchers due to the high degree of variability in disease severity and presentation and extreme heterogeneity in terminology and management paradigms.^[5] The comparison of treatment procedures and evaluation of their results remains

difficult. At the time of presentation, a systematic tool that integrates anatomic variables and measurements of physiology and patient concomitant illness is crucial. The capacity to reliably evaluate results to assure optimised outcomes is hampered in the absence of such a system.^[6] Bowel blockage accounts for 12 to 16% of acute abdomen in the emergency department. Bowel blockage causes 2.1 fatalities per 100,000 patients worldwide, 3.5 deaths per 100,000 in affluent nations, and 1.8 in developing countries. Bowel blockage can be diagnosed in patients with a history of abdominal distention, constipation, past abdominal surgery, and abnormal bowel sounds.

Before widespread CT scanning, patients required early surgical exploration to rule out ischemia, closed-loop blockage, or SBO caused by tumours, hernia, or other reasons.^[7] However, using contemporary cross-sectional imaging and lab testing, surgeons may easily identify most patients who have indications for an emergency procedure from those who have benign non-ischemic adhesive SBO (aSBO).^[8] In the case of a full adhesive SBO with no indications for emergency surgery at presentation, the modern surgeon and patient now have the option of an early operation or expectant treatment, which allows the adhesive SBO to be resolved without surgery.^[9]

Mechanical and neurogenic SBO are the two types. Adhesion, hernia, bands, stricture, tumour, volvulus, intussusception, stones, and bolus are all causes of mechanical SBO. The diagnosis is based on the history and clinical examination; radio imaging confirms it.^[10] The severity of SBO must be determined to anticipate early treatment, prognosis, and results. Therapy aims to detect intestinal ischemia quickly and accurately to develop an effective therapeutic plan.^[11] As a result, nonoperative therapy with nasogastric decompression and fluid resuscitation, as well as attentive and regular clinical evaluation, is effective in a significant percentage of chosen patients with SBO. Regular evaluation is required in conservative therapy for early detection of indications of intestinal ischemia that would need surgery.^[12] AGESS-SBO (Acute general emergency Surgical severity - small bowel obstruction) is the only scoring system now available to assist us in obtaining an accurate diagnosis, estimating prognosis and outcome of SBO, and predicting hospital complications. Because the scoring method for small bowel obstruction is not widely used, we intend to investigate and validate it.^[13]

Aim

This study aimed to validate the AGESS-SBO score system in the prognosis and outcome of Small Bowel Obstruction in patients presenting with acute abdomen at the Institute of General Surgery, Rajiv Gandhi Government General Hospital, Chennai.

MATERIALS AND METHODS

This hospital-based observational research was conducted for eight months (February – September 2017) at the Rajiv Gandhi Government General Hospital and the Institute of General Surgery at Madras Medical College. Informed consent and ethical approval were obtained before the start of the study.

Inclusion and exclusion criteria: Fifty patients (older than 15 years) with SBO symptoms were included, and paediatric and pregnant patients were excluded. Following the patient and ethics committee's permission, the preoperative and intraoperative AGESS-SBO score was computed, and the result was established. A proforma (CRF) containing patient particulars, appropriate history, clinical exams, investigations, diagnosis, and surgical procedures was employed for data gathering from patients. Anatomic, physiological, and co-morbidity score-based factors were investigated and established to determine the AGESS-SBO score. AGESS-SBO = Anatomic score + physiological score + co-morbidity score.

Anatomic, physiological and Comorbid scoring

Components	Score
Anatomical	
Normal	0
Partial SBO without the need for operation	1
Complete SBO without strangulation	2
Complete obstruction, Bowel strangulations but viable	3
Complete SBO with strangulation with local peritoneal contamination	4
Strangulation & perforation with diffuse peritoneal contamination	5
Physiological (SIRS)	
Present two or more criteria Hyperthermia > 38°C or Hypothermia < 36°C Tachycardia > 90 Tachypnea > 20 per mits Leukocytosis > 12000 or Leukopenia < 4000	1
Infection with the presence of SIRS - Sepsis	2
Sepsis concurrent with organ dysfunction, hypoperfusion, or hypotension (systolic blood pressure < 90 mmHg) – Severe sepsis	3
Sepsis in the presence of hypoperfusion or hypotension unresponsive to fluid resuscitation – Septic shock	4
Presence of two or more organ system dysfunction in the presence of sepsis – multi-organ dysfunction syndrome	5
Comorbid scoring - Charlson Co-morbidity factors	
Normal	0
MI, CCF, CVA, Dementia, COPD	1 or 2
Hemiplegia, Moderate or severe Renal Disease, Diabetes with Organ damage, Leukemia, Lymphoma	3 or 4
Moderate or Severe Liver Disease	5 or 6
Metastatic Solid Tumor / AIDS	7 or 8

The anatomic score was calculated based on preoperative abdominal and pelvic computed tomography (CT) imaging (e.g., evaluating symptoms of strangulation and characteristics suggesting the need for rapid operational

exploration). CT imaging was utilised to assess these anatomic criteria. We also used ratings based on physiology and co-morbidities. The physiological score was calculated using established Systemic Inflammatory Response Syndrome (SIRS) standards: 0 for normal physiology and 1 for severe physiology. The key outcome of the AGESS JBO scoring system measures Length of Hospital Stay (LOS), In Hospital complication, Causes of SBO and Hospital Mortality and Morbidity. AGESS-SBO Score of 2 or greater is considered an unfavourable outcome of SBO.

Statistical Analysis

Means (standard deviation) and medians were used to present continuous variables. Categorical variables were denoted by the letter n (percentage). Chi-square tests and two-sample t-tests were performed when suitable to compare patient groups. At a P value of 0.05, all statistical tests were considered significant.

RESULTS

During the research period, 50 patients were treated with SBO, with a mean age of 52 (± 5) years. Women accounted for 46% of the patients, while males accounted for 54%. A total of 46 individuals (92% were addressed surgically), whereas the remaining 4 cases (8% were managed conservatively) [Table 1]. Adhesion was the most prevalent cause of small bowel obstruction, accounting for 46% (23 cases). The second most prevalent cause of small intestinal blockage was obstructed hernia (20% of cases), followed by ileocaecal TB (18% of cases), intussusception/volvulus (10% of cases), and tumours (6% of cases) [Table 2]. The average AGESS SBO SCORE is 1.2 (range 1-2) (Table 2). Complications in the hospital were defined as occurrences that occurred during the index hospital stay and resulted in patient morbidity. The average hospital stay for complicated patients is 12.50 days, and 11.61 days for uncomplicated cases. These occurrences frequently include gastrointestinal ileus, SSI, pneumonia, and electrolyte imbalance [Table 3].

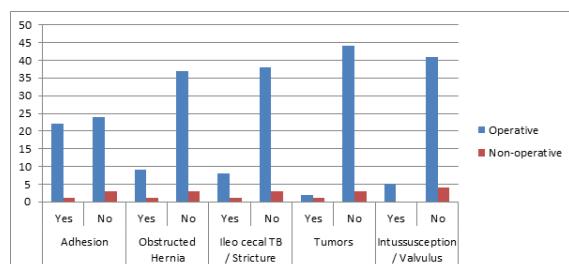


Figure 1: SBO Treatment frequency

Correlation between AGESS SBO score and LOS days revealed a significant association (Pearson Correlation, 0.659) [Table 4]. Operative cases were high in all the cases of SBO, with a higher number of SBO caused by tumors, Intussusception / Valvulus, followed by ileocecal TB/Stricture and obstructed hernia [Figure 1]. Complications encountered in operative cases were 12, and no complications were observed in patients in nonoperative cases.

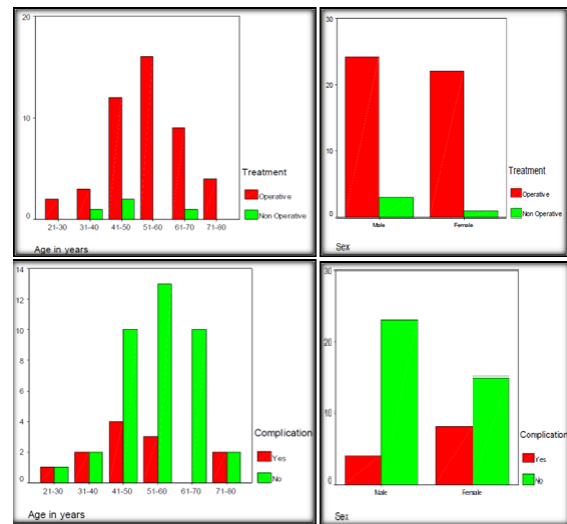


Figure 2: Age groups and gender-based A) Treatment type B) Complications

Also, depending on the type of treatment, operative cases were high in the age group 51-60, followed by 41-50 and 61-70, as well as in a higher proportion of males. The highest complication rate was observed among males aged 41-50 and higher [Figure 2].

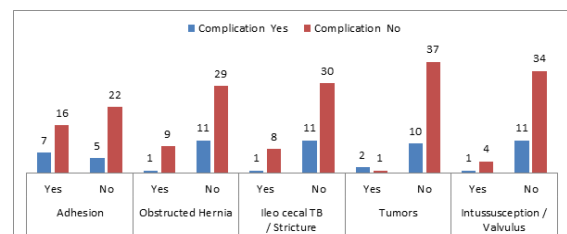


Figure 3: Complications based on SBO cause

The overall frequency of complications was low [Figure 3]. A higher complication rate was observed in patients with SBO caused by adhesion and tumors. Correlation between AGESS SBO score and LOS days revealed a significant association (Pearson Correlation, 0.659) [Table 4]. Despite LOS and complications, mortality significantly correlated with the AGESS score [Table 5].

Table 1: Patient baseline characters

Parameter	Frequency	Percentage
Age		
21-30	2	4
31-40	4	8
41-50	14	28
51-60	16	32
61-70	10	20

71-80	4	8
Gender		
Male	27	54
Female	23	46
Treatment Type		
Operative	46	92
Nonoperative	4	8
Causes		
Adhesion		
Yes	23	46
No	27	54
Obstructed Hernia		
Yes	10	20
No	40	80
Ileo cecal TB / stricture		
Yes	9	18
No	41	82
Tumors		
Yes	3	6
No	47	94
Intussusception/ Valvulus		
Yes	5	10
No	45	90

Table 2: The Distribution of Patients Scores across the Scales of AGESS-SBO Scoring System

Preoperative scores		Frequency	Percentage
Anatomical	0	9	18
	1	26	52
	2	11	22
	3	4	8
Physiological	0	31	62
	1	15	30
	2	2	4
	3	1	2
	4	1	2
Charlson's Score	0	24	48
	1	19	38
	2	6	12
	3	1	2
AGESS-SBO total score	0	1	2
	1	16	32
	2	12	24
	3	10	20
	4	8	16
	5	2	4
	8	1	2

Table 3: Postoperative parameters

Preoperative scores		Frequency	Percentage
LOS days			
8	3	6	
9	7	14	
10	6	12	
11	6	12	
12	9	18	
13	4	8	
14	11	22	
16	4	8	
Complication			
Yes	12	24	
No	38	76	
AGESS SBO Total Score			
Complication			
Yes	12	24	
No	38	76	

Table 4: Los days comparison in Agess-SBO total score

Age	Frequency	LOS days		AGESS SBO Total Score	
		Mean	Range	Mean	Range
21-30	2	13.50	11 - 16	4	4 - 4
31-40	4	11.25	9 - 14	2.25	1 - 4

41-50	14	10.71	8 - 14	2	0 - 5
51-60	16	12.56	8 - 16	2.81	1 - 8
61-70	10	11.70	9 - 16	1.9	1 - 4
71-80	4	12.75	9 - 14	2.75	1 - 4
Total	50	11.82	8 - 16	2.4	0 - 8

Table 5: Prognosis and Outcome of SBO

Outcome	AGESS – SBO Score	P value
Extended LOS	0.73 (0.68-0.78)	0.83
Hospital complication	0.7 (0.67-0.77)	0.38
Hospital Mortality	0.80 (0.75-0.84)	0.03

DISCUSSION

A bowel blockage is a mechanical or physiological intestine obstruction that inhibits regular digestive product movement. It arises due to partial or total obstruction of the forward movement of tiny or big intestinal contents. When necessary, high-quality surgical competence, strong clinical judgement, and early surgery will significantly enhance survival. Age, sex, duration of sickness before treatment, length of hospital stay, co-morbidity, operation done, and intraoperative findings are all risk factors for patients with BO who are surgically treated. Various types of research have been conducted throughout history to control SOB. Mortality following surgical treatment of intestinal blockage varies from area to area, changes with time, and age plays a key role in bowel obstruction mortality; thus, repeated investigations for the treatment result of bowel obstruction are required. As a result, the study was carried out to verify the AGESS rating system in our patients for the prognosis, severity, and outcome of small intestinal obstruction.

A higher frequency of SBO was observed in the age group 51-60 years, with a higher prevalence among males. Similarly prevalent mean age and gender for SOB were reported previously by Baghdadi et al.^[14] The AGESS-SBO Score showed an adequate relationship with small bowel obstruction. This AGESS-SBO Score is recognisable and may be utilised in the acute abdomen for SBO. Ensured widespread adoption in physiology, anatomy, co-morbidities, prolonged length of hospital stay, SBO complications, and in-hospital mortality was observed. Most patients had AGESS scores <3, and 24 were observed with scores ≤ 2. Likely predominance in patients with scores ≤ 2 was reported by both Baghdadi et al.^[14] The median total AGESS - SBO score in their study was 6 points; the higher the score, the greater the likelihood of operational management and complications.

Intra-operative findings such as viable small bowel was found statistically significant about management results. Mechanical SBO constituted the most common kind of obstruction in our study, while adynamic obstruction was less common. In our investigation, adhesion was shown to be the most prevalent cause of blockage (46%). Intraoperative adhesion release and hernia reduction statistically correlated with management outcome. According to this study, the most prevalent causes of SBO were

postoperative adhesion and blocked hernia. Tumours such as ileocecal TB and volvulus were less common. These findings were comparable to the research of Tirumani et al. and Tavangari et al.^[15,16]

Our study also observes 92% of patients undergoing operative treatment. The lower the score, the greater the likelihood of cautious management; the higher the score, the greater the likelihood of operative management. This was consistent with our findings, as most AGESS scores were more than 2, and this was also following the reports of Baghdadi et al.^[14] Our study reports 12% of patients have postoperative complications, and this could also be attributed to higher AGESS scores of our patients in the study.^[17] The duration of sickness before surgical intervention has a statistically significant relationship with patient management results. Individuals who present within 24 hours of the onset of their disease have a lower risk of developing an unfavourable outcome than individuals who attend after 24 hours which was in agreement with the data proposed by Simachew et al.^[18] Our research also found that patients who stayed for fewer than ten days were less likely to have unfavourable outcomes than those who stayed longer, and this was also following the results published in a previous study.^[18]

The result of a laparotomy may be influenced by various factors, including the source of the blockage, the duration of the disease, age, the existence of peritonitis, and the time it takes to diagnose complications. Monisha et al. also predicted these associative factors for considering treatment values or effective SBO management.^[13] The AGESS - SBO score and hospital LOS were determined to have statistical significance. Increasing AAST grade was related to greater frequency of requirement for ICU level care, development of acute renal damage, postoperative pneumonia, and increased total duration of hospital stay in research done by Hernandez et al.^[19]

CONCLUSION

Our study found that patients with a score of 2 might be offered a trial of nonoperative care, but patients with a score of >2 needed surgical intervention. Adhesions were shown to be the most prevalent cause of blockage among individuals presenting with obstruction, followed by hernia, tumours, and inflammatory reasons. It was also shown that the most common cause of obstruction among patients

who developed problems was acute intestinal ischemia, which resulted in gut gangrene and subsequent perforation and infection. The AGESS - SBO score was found to have a statistically significant relationship with complications, death, and length of hospital stay. The AGESS - SBO score was found to have a statistically significant relationship with complications, death, and length of hospital stay. It was discovered that the higher the score, the greater the rates of complications, the risks of mortality, and the length of the patient's hospital stay. The AGESS-SBO scoring system was an effective tool for directing therapy, predicting complications and death, and determining the length of hospital stay of patients.

Limitations

The trial will last only eight months, with only 50 patients included. Data collection, including earlier material from each patient, was challenging. AGESS-SBO did not improve the AAST-SBO predictions of prolonged hospital stay and in-hospital complications.

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