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AGESS - SBO Score: A Novel Scoring System in Predicting the Prognosis, Morbidity and Mortality in Small Bowel Obstruction at a Tertiary Care Centre in Western Rajasthan

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Abstract: ***Background: Acute small bowel obstruction (SBO) accounts for about 20 % of all surgical emergencies in Western societies. Small bowel obstruction is caused mainly by postoperative adhesions (>75 % cases).The goal of treatment is to recognize both promptly and precisely the presence of intestinal ischemia to establish an appropriate clinical plan.AGESS–SBO is a scoring system available to help us towards making an accurate diagnosis to estimate prognosis and outcome of SBO and ability to predict the hospital complications. In this study, we would like to validate this scoring system in our patients for prognosis, severity and outcome of Small Bowel Obstruction. Method: An institutional based prospective observational study including 55 subjects was performed in the Department of General Surgery at Dr S. N. Medical college, Jodhpur. All patients >18yrs of age with symptoms of SBO were included in the study after obtaining approval from the institutional ethical committee. A detailed history was taken, the AGESS-SBO score was calculated. A hypothesis regarding the management was put forward which was then further compared to the actual line of management of the patient for validation. Results: It was concluded that, out of 55 patients, 35 i.e. 63,64% underwent operative management out of which 93.10% had an AGESS-SBO score >2. A higher score of >2 was largely seen among patients >60 years of age. The most common cause of SBO was found to be adhesions (27.27%). 8 patients developed post-op complications, 7 of which had a score of >2. 9 patients died during our study all of whom had a score of >2. Conclusion: It was concluded from our study that patients with a score of ≤2, can be given a trial of non-operative management whereas patients with a score of >2 required surgical intervention. A statistically significant correlation was found between the AGESS-SBO scoring and complications, mortality and length of hospital stay.***

Keywords: Small bowel obstruction, AGESS-SBO

1. Introduction

Acute small bowel obstruction (SBO) accounts for about 20 % of all surgical emergencies in Western societies [1, 2]. The historical paradigm for surgical training around the management of SBO has been to “never let the sun rise and set” without an operation to rule out compromised bowel. Small bowel obstruction is caused mainly by postoperative adhesions (more than 75 % of all cases) [3 - 7]. The operative procedures usually associated with SBO are colectomy, hysterectomy, and appendicectomy [8]. Other causes of SBO are Crohn’s disease (7 %), neoplasm (5–10 %), hernia (2 %), or radiation - induced enteritis (1 %) [3 - 6]. In the era prior to ubiquitous CT scanning, early surgical exploration of patients was needed to rule out ischemia, closed - loop obstruction, or SBO due to tumor, hernia, or other causes. However modern cross - sectional imaging combined with lab tests allow surgeons to readily distinguish most patients that have indications for and emergency operation on presentation from those with benign non - ischemic adhesive SBO (aSBO). In the setting of a complete adhesive SBO without indications for emergency surgery on presentation, the contemporary surgeon and patient now have a choice of early operation or expectant management, allowing the chance to resolve the adhesive SBO without an operation. The goal of treatment is to recognize both promptly and precisely the presence of intestinal ischemia to establish an appropriate clinical plan. Therefore, nonoperative management, using nasogastric decompression and fluid resuscitation with close and frequent clinical reassessment, has proven to be successful in a substantial percentage of selected patients with SBO. In conservative management, regular reassessment is mandatory for early recognition of signs of bowel ischemia that would require a surgical operation. AGESS–SBO (ACUTE GENERAL EMERGENCY SURGICAL SEVERITY - SMALL BOWEL OBSTRUCTION) is the only scoring system available so far to help us towards making an accurate diagnosis to estimate prognosis and outcome of SBO and ability to predict the hospital complications. In the present study, we would like to validate this scoring system in our patients for prognosis, severity and outcome of Small Bowel Obstruction [8 - 11].

Aims and Objectives

1) To validate the role of AGESS - SBO scoring system in predicting the prognosis, morbidity and mortality in small bowel obstruction using ROC curve.
2) To study the length of hospital stay and in Hospital complications.

2. Materials and Methods

The present study is a hospital based prospective observational study conducted between January 2022 - October 2022 in all surgical units of MDM and MGH hospital affiliated to Dr Sampurnanand medical college, Jodhpur, Rajasthan after the ethical committee clearance obtained on 20th April, 2022. The sample size was calculated using SciStat area under ROC curve method. Sample size was calculated to be 52 cases of small bowel obstruction, which was enhanced and rounded off to 55 subjects. All patients above 18 years of age with symptoms of small bowel obstruction were included in the study. Pregnant patients were excluded from the study. Data was collected in a case recording Proforma pertaining to patient's particulars, proper history, clinical examinations, investigations, diagnosis & surgical procedures. Detailed history of patients presenting to the hospital was taken regarding their current symptoms (vomiting, abdominal distension, pain and not passing flatus and motion) and past history (any past surgeries or history of any similar recurrent episodes) and co - morbidities (the presence or absence of any chronic illness or any history of long - term medication intake). Patients were then subjected to a full panel of investigations which include routine blood investigations (complete hemogram, RFT, LFT, LDH) and radiological investigations (ultrasound, contrast enhanced CT, MRI). Depending on the history and all the investigation reports the AGESS - SBO scoring was calculated as given in table I; a hypothesis was put forward regarding whether patient will be managed surgically or conservatively. Depending on the patient condition the operating surgeon took decision regarding the management of the patient. Once the patient had recovered and was ready to be discharged, we then analyzed how accurate the hypothesis put forward was in comparison to the actual management given to the patient. The intraoperative findings at the same time also simultaneously validated our anatomic scoring.

Table I: Acute General Emergency Surgical Severity – Small Bowel Obstruction Scoring System

AGESS - SBO = (anatomic score) ^{2} + (physiological score) ^{2} + (comorbidity score) ^{2}	
COMPONENT	**SCALE SCORE**
ANATOMIC SCORE	
NORMAL	0
PARTIAL SBO W/O NEED OF OPERATION	1
COMPLETE SBO W/O STRANGULATION	2
COMPLETE SBO WITH STRANGULATION OR ISCHEMIA BUT VIABLE BOWEL	3
COMPLETE OBSTRUCTION WITH ISCHEMIA REQUIRING RESECTION	4
PERFORATION PERITONITIS	5
PHYSIOLOGICAL SCORE	
NORMAL	0
SIRS	1
SEPSIS	2
SEVERE SEPSIS	3
SEPTIC SHOCK	4
MODS	5
CHARLSON COMORBIDITY SCORE	
CCS O	0
CCS 1 OR 2	1
CCS 3 OR 4	2
CCS 5 OR 6	3
CCS 7 OR 8	4
CCS >9	5

3. Observations and Results

After the application of exclusion and inclusion criteria 55 patients were included in the study. Majority i. e., 20 patients (36.36%) belonged to the age group>60 years followed by 14 patients (25.45%) belonged to the age group of 41 - 60 years. Mean age of presentation was 48.51 years. Majority of the patients were males i. e., 35 patients (63.64%).26 patients (47.27%) had a cumulative AGESS - SBO score of ≤2 and 29 patients (52.73%) had a cumulative score of >2.37 patients (67.27%) underwent operative treatment. Among the 37 patients that underwent operative management; a majority 27 patients (93.10%) had an AGESS - SBO score of >2. Among the 18 patients that underwent conservative management; a majority 16 patients (61.54%) had an AGESS - SBO score of ≤2. Out of the 20 patients that belonged to >60 years of age; majority i. e., 14 patients (48.28%) had an AGESS - SBO score of >2. Among the 9 patients that belonged to<20 years of age; majority, i. e., 7 had an AGESS - SBO score of ≤2.15 patients (27.27%) had adhesion as the cause of obstruction, followed by hernias (10 patients, 18.18%), followed by tumours and inflammatory causes (8 patients each, 14.55%). Out of 55 patients, 8 patients (14.55%) developed post - operative complications. Among the 8 patients who developed post - operative complications, majority i. e., 7 patients (24.14%) had an AGESS - SBO score of >2. In 8 patients that developed post - operative complications, 4 patients i. e., 50% were found to have gut gangrene. Of the 9 patients who died during our study, all 9 patients (16.36%) had an AGESS - SBO score of >2. Patients who had an AGESS - SBO score of ≤2, the mean LOS in hospital was found to be 11.42 days and among the patients with a score of >2, it was found to be 13.06 days.

Table II: Correlation between Agess - SBO Score and Age

Age (yrs)	Total AGESS - SBO score				Total	
	≤2		>2			
	N	%	N	%	N	%
≤20	7	26.92	2	6.90	9	16.36
21 - 40	8	30.77	4	13.79	12	21.82
41 - 60	5	19.23	9	31.03	14	25.45
≥61	6	23.08	14	48.28	20	36.36
Total	26	100.00	29	100.00	55	100.00

Chi square 8.315, P value 0.039 (S)

Table III: Causes of Obstruction

Causes of obstruction	No. of patients	Percentage
Adhesion	15	27.27
Obstructed hernia	10	18.18
Inflammatory causes	8	14.55
Tumours	8	14.55
Intussusception/ Volvulus	3	5.45
Gut Gangrene	6	10.91
Paralytic ileus	2	3.64
Others	3	5.45

Table IV: Correlation of Agess - SBO Scoring With Treatment Modality

Treatment	Total AGESS - SBO score				Total	
	≤2		>2			
	N	%	N	%	N	%
Operative	10	38.46	27	93.10	37	67.27
Non operative	16	61.54	2	6.90	18	32.73
Total	26	100.00	29	100.00	55	100.00

Chi square 18.59, P value <0.0001 (S)

Table V: Correlation between Agess - SBO Scoring and Post - Operative Complications

Complications	Total AGESS - SBO score				Total	
	≤2		>2			
	N	%	N	%	N	%
Yes	1	3.85	7	24.14	8	14.55
No	25	96.15	22	75.86	47	85.45
Total	26	100.00	29	100.00	55	100.00

Table VI: Correlation between Agess - SBO Score and Mortality

Mortality	Total AGESS - SBO score				Total	
	≤2		>2			
	N	%	N	%	N	%
Yes	0	0.00	9	31.03	9	16.36
No	26	100.00	20	68.97	46	83.64
Total	26	100.00	29	100.00	55	100.00

Fisher exact test, P value 0.002 (S)

4. Discussion

A total of 55 patients admitted in Mathuradas Mathur and Mahatma Gandhi hospital attached to Dr S. N. Medical college, Jodhpur were studied. They were followed up to surgery and the operative findings were confirmed. The AGESS - SBO scoring was then correlated to the findings and analyzed.

In our study, out of 55 patients, maximum patients i. e., 35 patients (63.64%) were male and 20 patients (36.36%) were female. In a study conducted by Elisabeth Jacomine Lier et al. on Clinical adhesion score (CLAS): development of a novel clinical score for adhesion - related complications in abdominal and pelvic surgery, 34 patients (89.5%) were male and 4 patients (10.5%) were female [12].

In our study, out of 55 patients, maximum patients i. e., 20 patients (36.36%) were between the age groups of >60 years of age, followed by 14 patients (25.45%) between the age group of 41 - 60 years. Least number of patients were found to be in the age group of <20 years of age i. e., 9 patients (16.36%). In a study conducted by Deepak Thampi et al. also 22 patients i. e., 44% were >60 years of age followed by 18 patients i. e., 36% belonged to 21 - 40 years of age and only 6 patients i. e., were <20 years of age [13].

In our study, out of 55 patients, maximum patients, 37 patients i. e., 67.27% underwent operative treatment and 18 patients i. e., 32.73% underwent non - operative/ conservative management. In a study conducted by Raphael P. Meier et al., on Acute adhesive small bowel obstruction136 patients i. e., 61.54% underwent operative treatment and 85 patients i. e., 38.46% underwent conservative management [14].

In our study, out of 55 patients, 26 patients i. e., 47.27% had a score of ≤2 and 29 patients i. e., 52.73% had a score of >2. In a study conducted by Yaser Baghdadi et al., the median overall AGESS - SBO score was 6 points; higher the score higher were the chances of operative management and complications [15].

In our study, it was found that the most common cause of obstruction was adhesions. Out of 55 patients, 15 patients i. e., 27.27% had adhesions.10 patients i. e., 18.18% had obstructed hernia.8 patients i. e., 14.55% had inflammatory causes like tuberculosis.8 patients i. e., 14.55% had tumours. The least common cause for obstruction was found to be enteroliths, bezoars etc. (3 patients i. e., 5.45%). In a study conducted by Harika Tirumani et al., on Small Bowel Obstruction in the Emergency Department: MDCT Features of Common and Uncommon Causes, adhesions and obstructed hernias were found to be the most common cause of SBO [16]. In a study conducted by Farees RickyTavangari et al., on Small Bowel Obstructions in a Virgin Abdomen: Is an Operation Mandatory? Following were found to be the causes of obstruction; Idiopathic adhesions 14 (35%); Closed loop obstruction 8 (20%); Internal hernia 4 (10%); Abdominal wall hernia 4 (10%); Small bowel/mesenteric mass 4 (10%); Other causes4 (10%); Volvulus 2 (5%) [17].

In our study, out of 55 patients, maximum number of patients, 37 patients i. e., 67.27% underwent operative treatment; majority of them i. e., 93.10% had a score of >2.18 patients i. e., 32.73% underwent non - operative/ conservative management majority of which, 16 patients i. e., 61.54% had a score of ≤2. This signifies that lesser the score higher is the chance of conservative management and higher the score more are the chances of operative management. In a study conducted by Matthew C. Hernandez et al., on Application of the AAST EGS Grade for Adhesive Small Bowel Obstruction to a Multi - national Patient Population, Initially, patients with low grades were predominantly managed using nasogastric suction. Overall, NOM success rate was 58%. In a study conducted by Yaser M. K. Baghdadi et al., most SBO patients were treated

nonoperatively (206 patients, 59%). Among them the overall median AGESS - SBO anatomic score was 1 point (IQR: 1 - 2 points, range 1 - 5) [15].

In our study, a total of 8 patients i. e., 14.55% developed post - operative complications out of which 1 patient i. e., 3.85% had an AGESS - SBO score of ≤2 and 7 patients i. e., 24.14% had a score of >2. In a study conducted by Nikia R. McFadden et al., on Validity of the American Association for the Surgery of Trauma Intestinal Obstruction Grading System, of 287 patients, 165 (58%) had grade I anatomic severity, 75 (26%) grade II, 23 (8%) grade III, 15 (5%) grade IV, and 9 (3%) grade V. Compared to grade I, grades III - V [OR 12.2 (95% CI 2.26 - 66.2)] but not grade II [OR 2.04 (95% CI 0.79 - 5.28)] were associated with increased risk of a complication [18].

In our study, out of 55 patients, 9 patients i. e., 16.36% died during our study out of which all had an AGESS - SBO score of >2. In a study conducted by Matthew C. Hernandez et al., the overall rate of mortality was 1.3% (n = 8) with a complication rate of 32% (n = 205). The adjusted OR of developing any postoperative complication was associated with increasing AAST ASBO grade [19].

In our study it was found that among patients with an AGESS - SBO score of ≤2 the mean LOS was 11.42 days and among patients with AGESS - SBO score of >2 the mean LOS was 13.06 days. A statistical significance was found between the AGESS - SBO score and LOS in hospital. In a study conducted by Matthew C. Hernandez et al., increasing AAST grade was associated with increased frequency of need for ICU level care, development of acute kidney injury, postoperative pneumonia, and increased overall duration of hospital stay [20].

In our study it was found that among the patients who developed complications most patients had gut gangrene and following peritoneal contamination. Out of 55 patients.6 patients had gut gangrene among which 4 patients i. e., 50% developed post - operative complications and 2 patients i. e., 4.26 % did not develop post - operative complications. In a study conducted by William O. Barnett et al., on A Current Appraisal of Problems with Gangrenous Bowel, Gangrenous bowel most often results from hernia, adhesions and mesenteric insufficiency. The overall mortality rate for 151 cases was 37%. This figure was 20% for hernia, 23% for adhesions and 74% for mesenteric insufficiency. In the latter category where bowel resection was feasible the mortality rate was 40%.

Other causes of bowel gangrene had a mortality rate of 28% [21].

5. Conclusion

Small bowel obstruction is one of the most commonly encountered surgical emergency in a tertiary care setup today. They present as both a clinical as well as surgical challenge as it is very crucial for the treating surgeon to correctly diagnose and decide whether the patient requires a surgical intervention or not. To tackle this problem a novel scoring system, namely the AGESS - SBO scoring system was introduced which includes anatomic factors, physiologic factors and Charlson co - morbidity score.

It was concluded from our study that patients with a score of ≤2, can be given a trial of non - operative management whereas patients with a score of >2 required surgical intervention. Among the patients presenting with obstruction most common cause of obstruction was found to be adhesions, followed by hernia, tumours and inflammatory causes. It was also found that among the patients developing complications the main cause of obstruction was acute bowel ischemia resulting in gut gangrene and subsequent perforation and sepsis. A statistically significant correlation was found between the AGESS - SBO scoring and complications, mortality and length of hospital stay. It was seen that the higher the score, more were the rates of complications, chances of mortality and longer was the duration of hospital stay of the patient.

It was concluded that AGESS - SBO scoring system was an efficient tool in guiding the treatment, predicting complications and mortality and the length of hospital stay of patients.

References

[1] Team NP. The second patient report of the National Emergency Laparotomy Audit (NELA). London: The Royal College of Anaesthetists.2016.
[2] Scott JW, Olufajo OA, Brat GA, Rose JA, Zogg CK, Haider AH, Salim A, Havens JM. Use of national burden to define operative emergency general surgery. JAMA surgery.2016 Jun 1; 151 (6): e160480 - .
[3] Holzheimer RG, Mannick JA. Surgical treatment: evidence - based and problem - oriented.
[4] Gore RM, Levine MS. Textbook of gastrointestinal radiology. Saunders/Elsevier; 2008.
[5] McEntee G, Pender D, Mulvin D, McCullough M, Naeeder S, Farah S, Badurdeen MS, Ferraro V, Cham C, Gillham N, Matthews P. Current spectrum of intestinal obstruction. Journal of British Surgery.1987 Nov; 74 (11): 976 - 80.
[6] Miller G, Boman J, Shrier I, Gordon PH. Etiology of small bowel obstruction. The American Journal of Surgery.2000 Jul 1; 180 (1): 33 - 6.
[7] Richards WO, Williams Jr LF. Obstruction of the large and small intestine. Surgical Clinics of North America.1988 Apr 1; 68 (2): 355 - 76.
[8] Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II: a severity of disease classification system. Critical care medicine.1985 Oct 1; 13 (10): 818 - 29.
[9] Vincent JL, Moreno R, Takala J, Willatts S, De Mendonça A, Bruining H, Reinhart CK, Suter P, Thijs LG. The SOFA (Sepsis - related Organ Failure Assessment) score to describe organ dysfunction/failure.
[10] Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. Journal of chronic diseases.1987 Jan 1; 40 (5): 373 - 83.

[11] Charlson M, Szatrowski TP, Peterson J, Gold J. Validation of a combined comorbidity index. Journal of clinical epidemiology.1994 Nov 1; 47 (11): 1245 - 51.
[12] Lier EJ, van den Beukel BA, Gawria L, van der Wees PJ, van den Hil L, Bouvy ND, Cheong Y, de Wilde RL, van Goor H, Stommel MW, Ten Broek RP. Clinical adhesion score (CLAS): development of a novel clinical score for adhesion - related complications in abdominal and pelvic surgery. Surgical endoscopy.2021 May; 35 (5): 2159 - 68
[13] Thampi D, Tukka VN, Bhalki N, Sreekantha RS, Avinash S. A clinical study of surgical management of acute intestinal obstruction. Int J Res Health Sci.2014; 2 (1): 299 - 308
[14] Meier RP, de Saussure WO, Orci LA, Gutzwiller EM, Morel P, Ris F, Schwenter F. Clinical outcome in acute small bowel obstruction after surgical or conservative management. World journal of surgery.2014 Dec; 38 (12): 3082 - 8
[15] Baghdadi YM, Morris DS, Choudhry AJ, Thiels CA, Khasawneh MA, Polites SF, Goussous N, Jenkins DH, Zielinski MD. Validation of the anatomic severity score developed by the American Association for the Surgery of Trauma in small bowel obstruction. journal of surgical research.2016 Aug 1; 204 (2): 428 - 34
[16] Tirumani H, Vassa R, Fasih N, Ojili V. Small bowel obstruction in the emergency department: MDCT features of common and uncommon causes. Clinical Imaging.2014 Sep 1; 38 (5): 580 - 8
[17] Tavangari FR, Batech M, Collins JC, Tejirian T. Small bowel obstructions in a virgin abdomen: is an operation mandatory?. The American Surgeon.2016 Oct; 82 (10): 1038 - 42
[18] McFadden NR, Brown SK, Howard SM, Utter GH. Validity of the American Association for the Surgery of Trauma Intestinal Obstruction Grading System. Surgery in Practice and Science.2022 Jun 1; 9: 100086.
[19] Hernandez MC, Haddad NN, Cullinane DC, Yeh DD, Wydo S, Inaba K, Duane TM, Pakula A, Skinner R, Rodriguez CJ, Dunn J. The American Association for the Surgery of Trauma Severity Grade is valid and generalizable in adhesive small bowel obstruction. Journal of Trauma and Acute Care Surgery.2018 Feb 1; 84 (2): 372 - 8. Hernandez MC, Haddad NN, Cullinane DC, Yeh DD, Wydo S, Inaba K, Duane TM, Pakula A, Skinner R, Rodriguez CJ, Dunn J. The American Association for the Surgery of Trauma Severity Grade is valid and generalizable in adhesive small bowel obstruction. Journal of Trauma and Acute Care Surgery.2018 Feb 1; 84 (2): 372 - 8.
[20] Hernandez MC, Birindelli A, Bruce JL, Buitendag JJ, Kong VY, Beuran M, Aho JM, Negoi I, Clarke DL, Di Saverio S, Zielinski MD. Application of the AAST EGS grade for adhesive small bowel obstruction to a multi - national patient population. World Journal of Surgery.2018 Nov; 42 (11): 3581 - 8
[21] Hernandez MC, Birindelli A, Bruce JL, Buitendag JJ, Kong VY, Beuran M, Aho JM, Negoi I, Clarke DL, Di Saverio S, Zielinski MD. Application of the AAST EGS grade for adhesive small bowel obstruction to a multi - national patient population. World Journal of Surgery.2018 Nov; 42 (11): 3581 - 8