The Role of the Bouassida Score in Predicting Intestinal Ischemia in Patients with Adhesive Small Bowel Obstruction at H. Adam Malik General Hospital, Medan

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Abstract

Background: Adhesive small bowel obstruction (ASBO) is a frequent surgical emergency and represents the leading cause of small bowel obstruction worldwide. Intestinal ischemia is a life-threatening complication of ASBO, and delayed diagnosis significantly increases morbidity and mortality. Reliable and objective predictors of intestinal ischemia are therefore crucial for timely surgical decision-making.

Objective: This study aimed to evaluate the role of the Bouassida score as a predictor of intestinal ischemia in patients with ASBO treated at H. Adam Malik General Hospital, Medan.

Methods: An observational analytic study with a cross-sectional design was conducted using medical record data of ASBO patients admitted between June and August 2024. The Bouassida score was calculated based on six clinical and radiological variables. Intestinal ischemia was confirmed intraoperatively or radiologically. Statistical analysis was performed using Fisher's exact test, with a significance level set at $p < 0.05$.

Results: A total of 24 patients were included, of whom 11 (45.8%) developed intestinal ischemia. All patients with Bouassida scores >16 experienced intestinal ischemia, while none with scores ≤6 developed ischemia. A statistically significant association was found between Bouassida score categories and intestinal ischemia ($p < 0.001$).

Conclusion: The Bouassida score is a strong and reliable predictor of intestinal ischemia in patients with ASBO and may serve as a valuable clinical tool to guide early surgical intervention.

Keywords: adhesive small bowel obstruction; intestinal ischemia; Bouassida score

Introduction

Adhesive small bowel obstruction (ASBO) is one of the most common causes of emergency surgical admissions, accounting for approximately 60–70% of all cases of small bowel obstruction[1]. Postoperative intra-abdominal adhesions remain the predominant etiology, often resulting in prolonged hospitalization, recurrent obstruction, and substantial healthcare costs[2]. One of the most serious complications of ASBO is intestinal ischemia, which can progress rapidly to necrosis, perforation, sepsis, and death if not promptly identified[3]. Clinical decision-making regarding emergency surgery in ASBO remains challenging, as symptoms and radiological findings may be nonspecific, particularly in the early stages of ischemia[4]. Delayed operative intervention increases

the risk of bowel resection and postoperative mortality, whereas unnecessary surgery may promote new adhesion formation[5].

In 2020, Bouassida et al. developed a simple clinico-radiological scoring system to predict intestinal ischemia in ASBO patients, demonstrating excellent diagnostic performance with an area under the curve (AUC) of 0.92[6]. Despite these promising results, external validation of the Bouassida score in different populations remains limited. This study was conducted to assess the applicability and predictive value of the Bouassida score in identifying intestinal ischemia among ASBO patients treated at a tertiary referral center in Indonesia.

Methods

Study Design and Setting

This was an observational analytic study with a cross-sectional design conducted at H. Adam Malik General Hospital, Medan, Indonesia, after approval from the institutional ethics committee.

Study Population

The study population consisted of adult patients (≥18 years) diagnosed with ASBO and managed either conservatively or surgically between June and August 2024. Diagnosis was established based on clinical presentation, history of previous abdominal surgery, and radiological findings in accordance with the Bologna Guidelines[1].

Inclusion and Exclusion Criteria

Inclusion criteria were: age ≥18 years, history of laparotomy, and radiological confirmation of ASBO. Exclusion criteria included incomplete medical records, bowel obstruction due to malignancy, inflammatory bowel disease, internal hernia, or laparotomy within one month prior to admission.

Data Collection

Data extracted from medical records included demographic characteristics, clinical presentation, laboratory findings, CT scan results, Bouassida score components, and the presence or absence of intestinal ischemia.

Bouassida Score

The Bouassida score consists of six variables: age >67.5 years (9 points), pain duration >72 hours (4 points), body temperature >37.8°C (2 points), WBC >10×10^9/L (2 points), reduced bowel wall enhancement on CT scan (5 points), and segmental mesenteric fluid on CT scan (2 points). Total scores range from 0 to 24[6].

Statistical Analysis

Descriptive statistics were used to summarize patient characteristics. The association between Bouassida score categories and intestinal ischemia was analyzed using Fisher's exact test. Statistical significance was defined as $p < 0.05$.

Results

Demographic Characteristics

Table 1. Demographic Characteristics of Study Participants (n = 24)

Variable	Frequency (n)	Percentage (%)
Age (mean ± SD)	56.2 ± 12.4 years	—
Sex		
Male	15	62.5
Female	9	37.5
Ethnicity		
Batak	13	54.2
Javanese	6	25.0
Malay	3	12.5
Others	2	8.3
Body weight (mean ± SD)	61.8 ± 9.5 kg	—
Height (mean ± SD)	162.7 ± 7.8 cm	—
Previous surgery (<5 years)	17	70.8
Type of previous surgery		
Midline laparotomy	18	75.0
Pararectal/Pfannenstiel	6	25.0

Table 1 presents the demographic and baseline clinical characteristics of the study population. The mean age of patients was 56.2 ± 12.4 years, with a predominance of male patients (62.5%). The majority of patients were of Batak ethnicity (54.2%), followed by Javanese (25.0%). The mean body weight and height were 61.8 ± 9.5 kg and 162.7 ± 7.8 cm, respectively. Most patients had undergone abdominal surgery within the previous five years (70.8%), with midline laparotomy being the most common surgical approach (75.0%).

Table 2. Clinical and Radiological Characteristics Associated with Intestinal Ischemia

Variable	Ischemia Present n (%)	Ischemia Absent n (%)
Pain duration >72 hours	9 (81.8)	4 (30.8)
Body temperature >37.8°C	7 (63.6)	2 (15.4)
WBC >10×10⁹/L	8 (72.7)	3 (23.1)
Reduced bowel wall enhancement	8 (72.7)	1 (7.7)
Segmental mesenteric fluid	9 (81.8)	2 (15.4)

Table 2 summarizes the distribution of clinical and radiological variables associated with intestinal ischemia. Among patients with intestinal ischemia, prolonged abdominal pain exceeding 72 hours was observed in 81.8% of cases. Elevated body temperature (>37.8°C) and leukocytosis (WBC >10×10⁹/L) were present in 63.6% and 72.7% of ischemic patients, respectively. Radiological findings showed that reduced bowel wall enhancement and segmental mesenteric fluid on CT scan were significantly more frequent in patients with intestinal ischemia compared to those without ischemia.

Table 3. Association Between Bouassida Score and Intestinal Ischemia

Bouassida Score Category	Intestinal Ischemia n (%)	No Ischemia n (%)	p-value
≤6 (Low risk)	0 (0)	8 (100)	<0.001
7–15 (Moderate risk)	5 (50)	5 (50)	
>16 (High risk)	6 (100)	0 (0)	
Total	11 (45.8)	13 (54.2)	

Table 3 demonstrates the association between Bouassida score categories and the occurrence of intestinal ischemia. All patients classified as high risk (Bouassida score >16) developed intestinal ischemia, whereas none of the patients in the low-risk group (score ≤6) experienced ischemia. In the moderate-risk group (score 7–15), intestinal ischemia occurred in 50% of patients. Statistical analysis revealed a significant association between Bouassida score category and intestinal ischemia (Fisher's exact test, $p < 0.001$), indicating that higher Bouassida scores are strongly correlated with increased risk of intestinal ischemia.

Discussion

This study demonstrates that the Bouassida score is strongly associated with intestinal ischemia in patients with ASBO. Nearly half of the patients developed intestinal ischemia, a proportion higher than that reported in previous studies, which may reflect delayed presentation or referral bias in this tertiary care center[2,7]. Consistent with prior reports, prolonged abdominal pain, fever, leukocytosis, and CT scan findings such as reduced bowel wall enhancement and segmental mesenteric fluid were significantly more frequent in patients with ischemia[6,8]. The Bouassida score integrates these parameters into a structured and objective assessment tool, improving diagnostic accuracy compared to individual predictors. All patients with Bouassida scores >16 developed intestinal ischemia, confirming the high predictive value of the score, as originally reported by Bouassida et al.[6]. These findings support the routine use of the Bouassida score in emergency surgical settings to facilitate early operative decision-making. Limitations of this study include its retrospective design, small sample size, and single-center setting, which may limit generalizability. Prospective multicenter studies with larger populations are recommended to further validate these findings.

Conclusion

The Bouassida score is a reliable and effective predictor of intestinal ischemia in patients with adhesive small bowel obstruction. Its implementation in clinical practice may assist surgeons in identifying high-risk patients and determining the need for early surgical intervention.

References

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