



# Acute mechanical intestinal obstructions

## Akut mekanik intestinal tıkanıklıklar

Hasan Fehmi KÜÇÜK, Hasan Ediz SIKAR, Hüseyin UZUN,  
Fırat TUTAL, Levent KAPTANOĞLU, Necmi KURT

### BACKGROUND

In this study, we evaluated our treatment modality and timing of surgery in acute mechanical intestinal obstruction (AMIO) patients who were admitted to the emergency room.

### METHODS

Only patients with the diagnosis of AMIO were included in this study. Surgery was performed in patients with hemodynamic instability despite fluid resuscitation and peritoneal signs upon physical examination. Patients were divided into two groups. Adhesion cases were assigned to Group 1, while non-adhesion cases were assigned to Group 2. The decision to provide surgical or medical therapy was assessed 24 hours (h) after admission.

### RESULTS

Twenty-two patients in Group 1 and 53 patients in Group 2 underwent surgical procedures. The difference between the groups was statistically different ( $p<0.05$ ). The mean monitoring time after admission to the hospital was  $128.3\pm 24.85$  h and  $43.1\pm 15.51$  h in Groups 1 and 2, respectively ( $p=0.0001$ ). In Group 2, 76.6% of the patients who were monitored for over 24 hours required surgery. In contrast, this rate was only 36% in Group 1 ( $p<0.05$ ).

### CONCLUSION

Our clinical experience shows that medical therapy and monitoring over 24 hours is not a good substitute for surgical treatment of AMIO when the obstruction is not due to an adhesion.

**Key Words:** Acute mechanical intestinal obstruction; adhesions; ileus; medical therapy; surgery.

### AMAÇ

Acil cerrahi polikliniğine başvuran akut mekanik intestinal tıkanıklık saptanan hastalardaki tedavi modaliteleri ve cerrahi işlemlerin zamanlaması ele alındı.

### GEREÇ VE YÖNTEM

Bu çalışmaya, acil polikliniğe başvuran ve akut mekanik intestinal tıkanıklık tanısı konan tüm hastalar dâhil edildi. Sıvı resüsitasyona rağmen hemodinamik olarak stabil olmayan hastalar ve fiziksel incelemede peritoneal irritasyon saptanan hastalar acil ameliyat edildi. Hastalar, yapışıklığa bağlı olanlar Grup 1 ve diğer nedenlere bağlı olanlarda Grup 2 olarak iki gruba ayrıldı. Yirmi dört saat sonraki medikal ve cerrahi uygulamaları gruplar arasında değerlendirildi.

### BULGULAR

Grup 1'deki 22 ve Grup 2'deki 53 hastaya cerrahi tedavi uygulandı. Gruplar arasında cerrahi uygulananlar arasında istatistiksel olarak fark vardı ( $p<0,05$ ). Hastaneye başvurduktan sonra ortalama takip süreleri Grup 1 ve Grup 2 için sırasıyla  $128,3\pm 24,85$  ve  $43,1\pm 15,51$  saattir ( $p=0,0001$ ). Grup 2'deki hastaların %76,6'sına 24 saatteki takipleri sırasında cerrahi girişim uygulandı. Oysa ki bu oran Grup 1'de %36 idi ( $p<0,05$ ).

### SONUÇ

Bu çalışmadan edindiğimiz klinik deneyim yapışıklık dışında akut mekanik intestinal tıkanıklık tespit edilen hastaların medikal tedavisi ve takibi ilk 24 saat içinde yapılmamalıdır.

**Anahtar Sözcükler:** Akut mekanik intestinal tıkanıklık; yapışıklıklar; ileus; medikal tedavi; cerrahi.

Acute mechanical bowel obstruction is frequently seen among surgical emergencies. Its morbidity and related hospital expenses are very high throughout the world.<sup>[1,2]</sup> Immediate diagnosis and effective therapy are necessary.<sup>[3-5]</sup>

Intestinal strangulation, resulting in bowel ischemia, necrosis and perforation, is dangerous and sometimes difficult to distinguish from simple obstruction. Early recognition of intestinal strangulation in patients with mechanical bowel obstructions helps toward deciding whether to perform surgery or use a more conservative approach. Physical examination, laboratory data and radiological studies are not sufficient to make a proper diagnosis.<sup>[6-8]</sup>

Clinically, there are an enormous number of variables to consider.<sup>[9,10]</sup> Some key variables include the etiology of the obstruction,<sup>[1,11,12]</sup> the probability of strangulation, and the appropriate course of treatment (which can be controversial).<sup>[13,14]</sup> Therefore, we conducted this prospective study to identify and analyze the clinical presentation of patients with acute mechanical bowel obstruction in our department, the etiology of the obstruction and the management and outcome of these patients. Moreover, we evaluated the incidence and causes of bowel ischemia, necrosis and perforation.

## MATERIALS AND METHODS

This is a prospective observational study of all adult patients admitted to the 3rd General Surgery Clinic at Kartal Training and Research Hospital in Istanbul between January 2004 and December 2007. The enrollment of the patients in the study was approved by the ethics committee of our hospital. Only patients with the diagnosis of acute mechanical intestinal obstruction (AMIO) were included in this study. Data collection commenced immediately upon the patient's arrival at the Surgical Emergency Department and was continued on a daily basis.

Physical examination, abdominal scans and hemogram parameters were used to monitor these patients after admission to the hospital. Intravenous fluid replacement and nasogastric decompression were performed in all patients. Serial clinical examinations to evaluate patient progress were performed in each patient every 6 hours (h) by the same attending surgical team. All patients underwent white blood cell (WBC) testing and plain abdominal X-rays every 12 h and received electrolytes, blood urea nitrogen (BUN), creatinine and glucose every 24 h. Vital signs were non-invasively measured every 4 h. Computerized tomography was used as the imaging technique for the diagnosis of the presence of tumors.

Surgery was performed in patients with hemodynamic instability despite fluid resuscitation and peritoneal signs upon physical examination. Intraopera-

tive findings were also recorded, with great emphasis placed on the etiology of each obstruction.

Patients were divided into two groups according to AMIO etiology. Adhesion cases were assigned to Group 1, while non-adhesion cases were assigned to Group 2. The decision to provide surgical or (continued) medical therapy was assessed 24 h after admission.

For each group, a decision regarding the need for medical or surgical therapy was made after 24 h. The chi-square test and t-test were used in the statistical analysis between the groups, and  $p < 0.05$  was defined as statistically significant.

## RESULTS

One hundred and thirty-four patients were included in this study, with a male/female ratio of 73/61 (54.4%/45.6%). The mean age was 56.2 years. The etiologies of AMIO are depicted in Table 1. Seventy-five patients (56%) needed and received surgical procedures, while 59 patients (44%) were treated medically (Table 2).

Twenty-two patients (36%) in Group 1 and 53 patients (72.6%) in Group 2 underwent surgical procedures. The difference between the groups was statistically different ( $X^2=31.87$ ,  $p < 0.05$ ). The mean time after the onset of symptoms and before admission to the emergency room was  $4.7 \pm 1.38$  days in Group 1 and  $9.7 \pm 2.64$  days in Group 2. Our mean monitoring time after admission to the hospital was  $128.3 \pm 24.85$  h and  $43.1 \pm 15.51$  h in Groups 1 and 2, respectively (Table 3). These values were statistically different between the two groups ( $p=0.0001$ ). The mean number of previous operations was 1.72 (total operations: 105) in Group 1.

We monitored 47 patients in Group 2 for more than 24 hours and only 11 (23.4%) were discharged without any operation, while 36 (76.6%) required surgery.

**Table 1.** Etiologies of acute mechanical obstructions in the groups

Cause	Group 1	Group 2
Adhesion/Brid	61 (45.5%)	
Colon tumor		29 (21.6%)
Sigmoid colon volvulus		10 (7.4%)
Carcinomatous peritonea		9 (6.7%)
Bezoar		5 (3.7%)
Strangulated hernia		4 (2.9%)
Mesenteric ischemia/emboli		4 (2.9%)
Small intestine tumor		4 (2.9%)
Intraabdominal tumor		3 (2.2%)
Invagination		3 (2.2%)
Intraabdominal abscess		2 (1.5%)

**Table 2.** Distribution of patients according to treatment modality in the first 24 hours

	Surgical treatment	Medical treatment	Total
Group 1	22 (36%)	39 (64%)	61
Group 2	53 (72.6%)	20 (27.4%)	73
Total	75 (56%)	59 (44%)	134

**Table 3.** Time interval between the appearance of symptoms and hospital admission, and time followed in the hospital

	Time before admission (day)	Time followed (h)
Group 1	4.7±1.38	128.3±24.85
Group 2	9.7±2.64	43.1±15.51

**Table 4.** Distribution of patients according to treatment modality after 24 hours

	Medical therapy	Surgery	Total
Group 1	39 (64%)	22 (36%)	61
Group 2	11 (23.4%)	36 (76.6%)	47
Total	50	58	108

Twenty-two (46.8%) of these patients were diagnosed with cancer, while the remaining 14 (29.7%) had benign conditions such as abscesses, strangled hernias, bezoars, and mesenteric ischemia (Table 4). Four of the 11 patients discharged without any operation were also diagnosed with cancer on routine follow-ups. Three of them suffered from the same complaints within a week.

In Group 2, 76.6% of those patients who were monitored for over 24 hours required surgery. In contrast, this rate was only 36% in Group 1. The clinical outcome showed a significant difference between the two groups ( $X^2=17.44$ ,  $p<0.05$ ). Strangulation of the intestines was encountered in 12 patients during operation and 11 of them were in Group 2. Three patients in Group 1 and 6 patients in Group 2 died, and in 3 of them strangulation was encountered.

Surgical wound site infection was seen in 1 patient in Group 1, while the total number of complications in Group 2 was 20. In Group 2, the complication rate in patients who underwent surgery after 24 hours was

higher than in those operated within 24 hours after admission ( $p=0.038$ ), and the details are depicted in Table 5.

## DISCUSSION

Acute mechanical bowel obstruction is frequently seen among surgical emergencies.<sup>[2]</sup> Its morbidity and related hospital expenses are high throughout the world.<sup>[1,2,6]</sup> The majority of our study group presented with acute mechanical small bowel obstruction. This correlates with studies indicating that small bowel obstruction accounts for about 80% of all obstruction cases.<sup>[4,15]</sup> The most common causes of AMIO are adhesions, incarcerated hernias and large bowel cancer.<sup>[1,2,4,11,13,15-18]</sup> In our study, the three most common causes were adhesions (45.5%), colon tumors (21.6%) and sigmoid colon volvulus (7.4%) (Table 1). Moreover, adhesions were the most prevalent etiology of obstruction in both the small bowel obstruction group and the total study group. They were the second most common etiology in the large bowel group. Several studies state that adhesions are responsible for 32-74% of bowel obstructions and are the leading cause of small intestinal obstruction, representing 45%-80% of cases.<sup>[2,4,7,11,17,18]</sup> The vast majority (65-90%) of patients with adhesive obstruction have undergone previous abdominal operations.<sup>[10,11,14,19]</sup> In our study, patients had been operated on an average of 1.72 times (105 total operations) before admission to our clinic with the diagnosis of AMIO. The increasing role of adhesions as a cause of acute intestinal obstruction indicates a greater need for routine preventive measures against adhesion formation.<sup>[11]</sup> Large bowel cancer was also observed in our study and is the most common etiology of obstruction in patients with large intestinal obstruction, with a prevalence of 40-90%.<sup>[4,5,11]</sup> In general, it is very difficult to apply appropriate treatment for acute mechanical bowel obstruction and to decide the timing of the surgical procedure.<sup>[3,5,14]</sup>

Careful assessment should be performed on an individual basis.<sup>[5,14]</sup> There are no specific factors to help in the decision-making for surgery or conservative therapy.<sup>[14]</sup> Postoperative adhesions, particularly in patients with numerous previous abdominal procedures, often benefit from a trial of non-operative management.<sup>[1,4,18,19]</sup> Several studies indicate that 35-75% of these patients can be treated safely and effectively

**Table 5.** Complication rates in Group 2 according to the timing of operations

Complications	Operation performed within 24 hours	Operation performed after 24 hours	p
Surgical site infection	3 (5.7%)	9 (17%)	0.55
Abscess	–	2 (3.8%)	0.322
Fistula	–	3 (5.7%)	0.22
Wound dehiscence	–	3 (5.7%)	0.22
Total	3 (5.7%)	17 (32.1%)	0.038

with non-operative management (as was also shown in our patients).<sup>[6,9,14,18,19]</sup> In our study, we tried to determine the correct time to operate according to each etiology. Sixty-four percent of the patients in Group 1 (adhesion group) benefited from being monitored over 24 hours and were treated medically. On the other hand, 76.6% of Group 2 required surgery, and the difference between the two groups was statistically significant. Four of the 11 patients in Group 2 who were discharged without any operation were diagnosed with cancer on routine follow-ups, and three of them suffered from the same complaints within a week. The complication rates were also observed to increase when operations were performed after 24 hours, as seen in Table 5.

In case of strangulation ileus, both venous and arterial circulation of the intestines could be disturbed. Mucosal bleeding and thrombosis leads to ischemia, which easily causes bacterial translocation and leakage of the metabolites of ischemia into the circulation and the abdominal cavity. Such a situation can lead to sepsis and multiple organ failure.<sup>[20]</sup> In our study, the strangulation rate was 33% (3/9) in the exitus patients. Therefore, early diagnosis and prompt surgical treatment are important. However, there is no specific method to diagnose strangulation and differentiate from simple ileus. Physical examination, laboratory findings and radiological studies are essential for the diagnosis and effective therapy of patients with acute mechanical bowel obstruction.<sup>[21]</sup> Special care should be taken to distinguish intestinal strangulation from simple obstruction.<sup>[4,7]</sup>

In conclusion, adhesions, large bowel cancer and sigmoid volvulus are the most common causes of acute mechanical obstruction. Although a substantial percentage of these patients, particularly those with adhesive obstruction, can be safely and effectively treated with conservative methods, medical therapy should be discontinued in favor of surgery after 24 hours.

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