



## Small intestinal perforations due to acquired internal herniation

Intestinal perforations due to internal herniation

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### Abstract

**Aim:** An internal hernia is a very rare cause of acute small bowel obstruction and perforation which may be difficult to diagnose. We aimed to provide a retrospective study for management and evaluated patients who underwent surgery for perforation due to intestinal internal herniation in our department. **Material and Method:** From January 2012 to April 2017, seven patients underwent surgery for a perforation due to intestinal internal herniation at our clinic. We retrospectively reviewed the patients' records, imaging modalities, and operative findings. **Results:** There were two women and five men with a mean age of  $52.50 \pm 11.22$  years. All patients were admitted to our emergency surgery unit with the complaints of acute abdominal pain, distension, and fever. All patients were urgently operated. The mean hospital stay was  $5.50 \pm 1.37$  days. In the postoperative period, two patients had wound infection, and postoperative mortality was not observed. **Discussion:** Perforation due to an internal hernia occur because of the delayed diagnosis of the internal hernia. Unfortunately, they have bad outcomes. They usually rapidly progress to bowel ischemia once strangulated and have no definitive predictors. At surgery, complete closure of the potential defects that may predispose to an internal hernia is essential for prevention. Especially in patients who had previous abdominal surgery, internal hernia should be kept in mind to prevent delay in diagnosis.

### Keywords

Acute Abdomen; Acquired Internal Herniation; Surgery

DOI: 10.4328/JCAM.5264 Received: 02.08.2017 Accepted: 18.09.2017 Published Online: 18.09.2017 Printed: 01.01.2018 J Clin Anal Med 2018;9(1): 31-3  
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## Introduction

An internal hernia (IH) is a very rare cause of acute small bowel obstruction and perforation which may be difficult to diagnose. It occurs spontaneously or as a complication of abdominal surgery. In the acute setting, symptoms occur when the bowel trapped in one of the defects leads to closed-loop obstruction with subsequent significant morbidity and mortality. Spontaneous perforation is a challenge in surgery because of its difficult diagnosis. The mortality rate is reportedly higher in acquired IHs, but the majority of these reports involved a limited number of cases [1,2]. Therefore, we aimed to provide a retrospective study for management and evaluated seven patients who underwent surgery for perforation due to intestinal internal herniation in our department.

## Material and Method

From January 2012 to April 2017, seven patients underwent surgery for perforation due to intestinal internal herniation at Health Sciences University Şanlıurfa Mehmet Akif İnan Training and Research Hospital. We reviewed the patients' records, imaging modalities, and operative findings. All patients underwent surgery; with regard to operative findings and patient history.

## Statistical Analysis

Data were evaluated with the statistical SPSS package, version 13.0 (Chicago, IL). Data were expressed as mean  $\pm$  standard deviation (SD) or median (range).

## Results

Five men and two women with a mean age  $52.50 \pm 11.22$  years were evaluated. Demographic and clinical features are shown in Table 1. All patients were admitted to our emergency surgery unit with the complaints of acute abdominal pain, distension, and fever. Physical examination showed signs of acute abdomen and intraabdominal sepsis. The interval between the development of acute symptoms and hospitalization ranged from several hours to 2 days (mean time:  $26.67 \pm 10.25$  hours). All patients had at least one abdominal plain X-ray done, which showed a bowel obstruction and free air in the peritoneal cavity in all patients (Fig. 1). Four patients underwent abdominal computed tomography (CT) scanning with intravenous contrast material. On CT; dilated intestines, intra-abdominal fluid and free air in the peritoneal cavity were detected (Fig. 2). Following correction of hemodynamic instability and electrolyte imbalance, the patients were taken to the operation room. Exploratory laparotomy was performed. In surgery, intestinal perforations were observed proximally to the internal herniation of the small bowel in all patients. On further exploration, internal herniation of the proximal ileal loop resulting in the necrosis of the involved small bowel segments with perforation was detected in four patients. Segmental intestinal resection including all diseased segments of the ileum, terminal ileostomy, and distal mucous fistula was performed in these patients. Internal herniation of the proximal ileal loop resulting in proximal intestinal perforation without necrosis was detected in the other three patients. The release of a herniated segment and primary suture of the perforation area were successfully completed. The abdomen was washed with 2000 cc warm saline then aspirated in all of the patients. After drains were placed in the abdomen, operations were terminated. Type of the internal herniations are shown in Table 1. The mean hospital stay was  $6.50 \pm 2.37$  days (range, 5-9 days). In the postoperative period, two patients

had wound infection, and postoperative mortality was not observed.

## Discussion

Internal hernias only constitute for 1.9–3% of cases of small bowel obstruction [3]. IHs are often diagnosed very late; especially in most cases diagnosis is made at the time of laparotomy.



Figure 1. Abdominal plain X-ray showed a free air in the peritoneal cavity.



Figure 2. Abdominal computed tomography (CT) scanning demonstrated dilated intestines, intra-abdominal fluid and pneumoperitoneum.

Table 1. Demographic and clinical features of the patients

Age (mean $\pm$ SD)	52.50 $\pm$ 11.22
Gender	
Male	5 (71.43%)
Female	2 (28.57%)
Type of the operation	
Primary suture	3 (42.86%)
Segmental intestinal resection with ileostomy	4 (57.14%)
Operation time, minute (mean $\pm$ SD)	107.50 $\pm$ 24.23
Blood loss (ml) (mean $\pm$ SD)	101.67 $\pm$ 65.54
Length of hospital stay, days (mean $\pm$ SD)	6.50 $\pm$ 2.37
Type of the internal herniations	
Transmesenteric	5 (71.43%)
Retroanastomotic	2 (28.57%)

my, usually following the clinical picture and plain radiographic findings of bowel obstruction. Unfortunately, IHs have a rapid progression to bowel ischemia and/or bowel perforation which is a life-threatening emergency. To date, most of these reports about IHs are case reports or studies with a limited number of patients, probably because of the low incidence of 0.2–0.9% [4–6].

Despite the limited number of cases, this report represents one of the largest series about spontaneous perforation due to acquired intestinal internal herniations. In some studies, mortality following strangulated small bowel obstruction is 3–44%, no mortality and morbidity study was found about spontaneous perforation [7,8]. In the medical histories of our patients, all patients reported that they were admitted to the emergency department due to crampy abdominal pain at least once, but they were treated medically and discharged after the relief of the symptoms. Therefore, the diagnosis of IH is essentially based on a high index of suspicion. There are no laboratory findings specific to this disease [2].

Radiologically; CT scanning is one of the best diagnostic methods, which can diagnose complete or partial obstruction and closed-loop obstruction much better than a plain abdominal X-ray. Intramural abnormalities such as mural thickening and pneumatosis intestinalis are also well verified by CT scanning [9].

In older literature, congenital internal hernias were the most frequent types of all IHs, but recent studies report the increase of the acquired types [10,11]. The surgical treatment results for congenital types were also much better than the results for acquired types [12–15]. Delayed laparotomy time (>3 days after the onset of the symptoms) and the presence of a comorbidity were related to high morbidity [16]. In acquired IHs, transmesenteric hernias are increasing in incidence, and also, they are more likely to develop volvulus and strangulation or ischemia and perforation [17–19]. The second type of IHs that occurs when the bowel prolapses through a defect in the small bowel mesentery was the most common type in this study with five patients. Defects in the small bowel mesentery should be surgically completely closed. Because incomplete closure or breakdown of the surgical sutures may occur, leading to a potential site for IHs [20].

According to our study, the most important factors affecting the prognosis of the patient is the early diagnosis and proper management, before the development of irreversible damage to the intestinal wall. Urgent surgical intervention to prevent strangulation, which is responsible for high mortality, is essential.

### Conclusion

Spontaneous perforation due to IH occurs because of the delayed diagnosis of IH. Unfortunately, they have bad outcomes. They usually rapidly progress to bowel ischemia once strangulated and have no definitive predictors. At surgery, complete closure of the potential defects that may predispose to IH is essential for prevention. Because of the difficulty with diagnosis and the potentially disastrous complication of gangrenous and even perforated bowel, symptomatic patients with signs of small bowel obstructions on a plain abdominal film should undergo a rapid evaluation for proper immediate therapy. Especially in patients who had previous abdominal surgery, internal hernia should be kept in mind to prevent delay in diagnosis. All procedures performed in this study involving human par-

ticipants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### Scientific Responsibility Statement

*The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.*

### Animal and human rights statement

*All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.*

### Funding

None

### Conflict of interest

*None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.*

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### How to cite this article:

Oter V, Kafadar MT, Oter S. Small Intestinal Perforations Due to Acquired Internal Herniation. *J Clin Anal Med* 2018;9(1): 31-3.