Internal Herniation as a Major Cause of Intestinal Obstruction

Ahmet Tekin    Tevfik Küçükkartallar    Faruk Aksoy    Celalettin Vatansev
Metin Belviranlı    Sakir Tekin    Serdar Yol    Mustafa Sahin    Sakir Tavlı    Adil Kartal

Department of General Surgery, Meram Medical Faculty, University of Selcuk, Konya, Turkey

Introduction

Herniation of the intestine and its mesentery into openings or pouches in the visceral peritoneum is referred to as internal herniation. Intestinal obstruction due to internal herniation is rare, reported as 1% in the literature [1]. It may be congenital or acquired, but must be differentiated from internal hernias due to postoperative mesenteric defects or to postoperative adhesions.

Internal hernias may develop at different abdominal locations. They are generally in the paraduodenal area (50%), but may also be seen at transmesenteric, pericecal, intersigmoid and supravesical areas [2]. Herniations to the foramen of Winslow, omentum, terminal mesoileum and broad ligament, or herniations to mesenteric defects caused iatrogenically, are also possible [3–7]. Internal herniations may cause chronic digestion disorders, pain after feeding and repetitive bowel obstructions. Vomiting and constipation are common symptoms. Sensitivity and abdominal distention may be detected during physical examination [8]. Patients are generally hospitalized in the emergency service due to acute abdomen. Rarely, a mass may be palpated. Laboratory findings mostly pertain to ileus, but diagnosis is usually made during the surgical exploration.

Key Words
Internal herniation, treatment · Ileus

Abstract

Objectives: To evaluate internal herniation as a rare cause of intestinal obstruction. Materials and Methods: Files of 18 cases, operated due to internal herniation between 2000 and 2006 at Selcuk University, Meram School of Medicine, General Surgery Department, were reviewed retrospectively. Sixteen patients (88.8%) were male (mean age: 58.2 years; range: 42–67) and 2 were female (mean age: 56.5 years; range: 52–61). Cases were grouped according to the location of internal herniation, and the clinical findings and applied treatment strategies were evaluated. Results: All patients were taken into surgical operation after preoperative preparations were completed. Findings were as follows: 6 cases of paraduodenal internal herniation, 4 of internal herniation through a defect in the terminal mesoileum, 2 of herniation through a defect in the falciform ligament, 2 of herniation through a defect in the omentum majus, 1 of herniation to the recessus over the bladder, 2 of herniation through a defect in the transverse mesocolon and 1 iatrogenically caused internal herniation through a defect in the mesojejenum. Conclusion: In an adult patient with findings of intestinal obstruction, diagnosis is difficult. Most cases presented to date are incidental findings during laparotomy, and surgical treatment is necessary.
Subjects and Methods

Eighteen patients operated for internal herniations between 2000 and 2006 at the General Surgery Department, Meram School of Medicine, Selcuk University, were reviewed retrospectively.

Cases were divided according to the location of internal herniation; the clinical findings and treatment strategies used in each case were examined. As the radiological diagnostic tool in the preoperative period, only direct abdominal X-rays taken in the emergency department were used. All of the patients were hospitalized with prediagnoses of ileus and laboratory findings that supported ileus and acute abdomen. Fluid-electrolyte treatment was applied to patients preoperatively. Supra-infraumbilical median incisions were performed on all patients after preparations for the operation were completed. Penrose drainages were placed in all patients in whom resection was performed. In addition, cephamezine and ornidazole were administered parenterally in the early and orally in the late postoperative periods. End-to-end enterenterostomy was performed following resection in all resected patients.

Results

All patients were taken into surgical operation after preoperative preparations were completed. Findings were as follows: in 6 patients (33.33%) paraduodenal internal herniation (fig. 1a), in 4 (22.22%) internal herniation through a defect in the terminal mesoileum (fig. 1b, c), in 2 (11.11%) herniation through a defect in the falciform ligament, in 2 (11.11%) herniation through a defect in omentum majus, in 2 (11.11%) herniation through a defect in the transverse mesocolon (fig. 1d), in 1 (5.55%) herniation to the supravesical recessus over the bladder and in 1 case (5.55%) iatrogenically caused internal herniation through a defect in the mesojejunum (table 1).

Necrosis was observed in the herniated intestinal loops in all cases except one, who had a defect in the transverse mesocolon. In this case, the defect was primarily closed after herniated bowel loop was reduced. In cases with necrosis, a small intestinal resection was performed as necessary, according to the length of the affected bowel. Anastomosis leakage was observed on the 4th and 5th postoperative days in 2 cases with resection. These patients were reoperated and double-barrel ostomy was applied. Two patients with incisional infections, in

Table 1. Sites of internal herniation

<table>
<thead>
<tr>
<th>Site of herniation</th>
<th>n</th>
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</thead>
<tbody>
<tr>
<td>Paraduodenal</td>
<td>6</td>
</tr>
<tr>
<td>Terminal mesoileum defect</td>
<td>4</td>
</tr>
<tr>
<td>Falciform ligament defect</td>
<td>2</td>
</tr>
<tr>
<td>Omentum majus defect</td>
<td>2</td>
</tr>
<tr>
<td>Supravesical recessus</td>
<td>1</td>
</tr>
<tr>
<td>Transverse mesocolon defect</td>
<td>2</td>
</tr>
<tr>
<td>Iatrogenic mesojejunum defect</td>
<td>1</td>
</tr>
</tbody>
</table>
whom superficial infection of soft tissues occurred in the postoperative period, were treated with antibiotics and dressings. One patient died on the 6th postoperative day and showed respiratory (chronic obstructive pulmonary disease) and cardiac (congestive heart failure) pathologies. The remaining cases were discharged following various durations of hospitalization.

**Discussion**

The most common reasons for intestinal obstructions are adhesions due to previous abdominal operations, hernias at the anterior abdominal wall and obstructions due to malignancy [9]. Other common causes are invagination, inflammatory bowel diseases, trauma, congenital atresia, cholelithiasis, Meckel’s diverticulum and internal herniations [10].

Internal herniation is the protrusion of intra-abdominal organs through peritoneal or mesenteric openings [11]. Although extremely rare, a diagnosis of acute small bowel obstruction in the absence of external hernias or previous surgery should prompt one to think about an internal hernia. Paraduodenal hernias are the most common among internal hernias. These account for nearly 50% of internal hernias, and they are mostly observed on the left side [12]. In accordance with the literature, paraduodenal hernia was observed in 6 cases (33.33%) in our series. Another common internal hernia is herniation of a mobile caecum through the foramen of Winslow at the omentum minus. Herniations of intra-abdominal organs may occur through defects in the omentum majus, and 2 such cases were in the present study. These herniations mostly occur after trauma or due to a congenital defect. Rarely, internal herniations may occur through defects in the intestinal mesentery. In such herniations, there is no herniation pouch, and as the defect is narrow, it generally occurs with strangulation. Prior to this study, we had 4 such internal herniation cases, which we presented as a case report, and in all cases intestinal resection was necessary due to strangulation [13]. More rarely, internal herniation cases due to defects in the ligamentum latum and ligamentum falciforme have been reported [9].

Internal herniations may cause chronic digestion disorders, postprandial pain and repetitive intestinal congestion. The disease may mimic peptic ulcer disease, biliary pathologies or abdominal angina [11]. Tightness in the abdomen and distention are the most common physical examination findings. Laboratory and radiological findings generally support intestinal obstruction [14]. Acute abdomen may occur following strangulation of herniated intestinal loops [15].

It is usually difficult to diagnose internal herniation in the preoperative period in those patients hospitalized in general surgery wards with the diagnosis of ileus. After clinical examination, ultrasonography and computed tomography (CT) features of an internal hernia include an abnormally located cluster of bowel loops with or without evidence of bowel obstruction. CT plays an important role in the diagnosis of acute intestinal obstruction and the planning of surgical treatment [16]. Of the patients reported here, CT scans were reported to show abnormalities in 56%. Exploratory laparoscopy has been shown by several studies to solve this therapeutic challenge. Diagnostic laparoscopy, with an accuracy of more than 90%, has been demonstrated to be superior to other diagnostic tools and may lead to the correction of an erroneous preoperative diagnosis in up to 40% of patients, or it may be used to exclude other pathologies. A result of the application of diagnostic laparoscopy is the potential for therapeutic manipulation during the same intervention [17].

In the preoperative period, we did not consider internal herniation as the cause of intestinal obstruction in any of our cases. In elderly patients, the decision for a laparotomy was made on the assumption that acute abdomen may be due to acute mesentery ischemia or to malignancy, and in younger patients laparotomy was decided due to the existence of acute abdomen signs.

Compressed internal hernias may cause strangulation and immediate gangrene [18]. Thus, early surgical intervention may decrease the gravity of the operation. Cases in which there is no impairment in blood supply are rare. For cases with impairment in the blood supply, the defect should be primarily repaired after segmentary resection and anastomosis. In our 1 internal herniation case with a defect in the transverse mesocolon without an impairment in blood supply, the defect was mainly repaired after reduction. The other 17 cases with impairments in blood supply and necrosis were treated with segmentary intestinal resection, anastomosis and primary repair of the defect. Anastomosis leakage was observed on the 4th and 5th postoperative days in 2 cases with resection. These patients were reoperated and double-barrel ostomy was applied.
**Conclusion**

In an adult patient of an appropriate age, upon finding an intestinal obstruction, the medical practitioner should first consider the presence of adhesions due to a previous surgical approach, hernias of the anterior abdominal wall or malignancy. However, in patients for whom these factors do not apply, internal herniation should be kept in mind as the cause of obstruction.

**References**