

Presentation and outcome of incarcerated external hernias in adults

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Abstract

Background: Incarcerated external hernias are the second most common cause of small-intestinal obstructions. The purpose of this study was to examine the presentation and management of incarcerated external hernia.

Methods: The records of 385 consecutive patients undergoing emergency surgical operation for incarcerated external hernias in a large volume teaching hospital between August 1996 and October 1999 were analyzed. The patients' ages ranged from 15 to 100 years (mean 55.1). There were more men than women (250 and 135, respectively), and 165 (42.9%) patients were over 60 years of age. Inguinal and umbilical hernias were encountered most frequently, in 291 (75.5%) and 48 (12.5%) patients, respectively. The intestine was resected in 53 patients, 31 of whom were over 60 years of age (58.5%). Two hundred fifty-two (84.9%) patients presented 48 hours or more from the onset of symptoms. Significant concomitant diseases were noted in 52 men and 19 women.

Results: The overall complication rate amounted to 19.5%, major complications 15.1%. The most serious postoperative complications were pulmonary and cardiovascular. Adult respiratory distress syndrome developed in 10 patients, and congestive heart failure developed in 14 patients. Postoperative mortality was 2.9%. Nine (81.8%) of the dead patients were older than 60. Nine (81.9%) of the dead patients were admitted to hospital more than 24 hours after incarceration. Mortality was high in patients with serious coexisting diseases whereas morbidity was linked with the duration of symptoms prior to admission.

Conclusions: Older age, severe coexisting diseases, and late hospitalization were the main causes of unfavorable outcomes of the management of incarcerated hernias. © 2001 Excerpta Medica, Inc. All rights reserved.

Keywords: External hernia; Inguinal hernia; Incarceration; Strangulation

Incarceration is the state of an external hernia which can not be reduced into the abdomen. Implying an increased risk of obstruction and strangulation, incarceration has great importance [1]. Incarcerated external hernias are the second most common cause of small intestinal obstructions [2]. Roughly 5% of all patients having an operation for external hernia are explored as an emergency. Strangulated external hernia is a relatively common and serious surgical emergency and accounts for most of the deaths from this condition [3].

This study concerns 385 adult patients who initially presented with incarcerated external hernias. It was our aim

to evaluate the presentation and outcome of incarcerated external hernias in adults.

Methods

The records of all adult patients who underwent emergency surgical operation for preoperative diagnosis of incarcerated external hernia between 1996 and 1999 were retrospectively analyzed. Observations recorded for each patient included the type of presentation, age, sex, type of hernia, past medical history, duration of symptoms, coexisting diseases, contents of the hernial sac, type of anesthesia, surgical procedure, complications, length of hospitalization, and mortality.

The results were analyzed statistically with the chi-square test using SPSS 9.0 Advanced Program for Windows. A *P* value of less than 0.05 was considered as significant.

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Table 1
Distribution of sex, incidence, and location of 385 incarcerated external hernias

Type	Sex	Right	Left	Total	Right/ Left	Male/ Female
Inguinal	Male	129	67	196	1.92	10.75
	Female	12	14	26	0.85	
Femoral	Male	17	8	25	2.12	0.56
	Female	30	14	44	2.14	
Umbilical	Male			12		0.33
	Female			36		
Incisional	Male			11		0.44
	Female			25		
Epigastric	Male			6		1.50
	Female			4		

Results

A total of 3,010 hernia repairs were performed in our hospital throughout the above mentioned period. In all, 2,625 of them (87%) were elective hernia repairs and 385 (13%) were emergency operations for incarcerated external hernias.

Patient sex and age characteristics, and hernia types are detailed in Table 1. Two hundred fifty-two (84.9%) patients presented 48 hours or more from the onset of symptoms. The most common presenting symptoms were a mass in the abdominal wall and localized pain, 149 (39%) of which had strangulation. Two hundred forty-three (63%) patients were hospitalized for mechanical bowel obstruction.

The patients' ages ranged from 15 to 100 years (mean 55.1). One hundred sixty-five (42.9%) patients were over 60 years of age. There were 250 (65%) men and 135 (35%) women. There were 31 male and 19 female patients with recurrent hernias. The duration of the hernia ranged from 1 day to more than 30 years. The majority of patients had hernias for 10 to 20 years.

Most frequently inguinal and umbilical hernias were encountered, 291 (75.5%) and 48 (12.5%), respectively. Incarcerated inguinal hernias predominated in patients of both sexes. Incarcerated femoral hernias had a higher ratio in women than in men. The strangulation and bowel resection rates of hernia types is detailed in Table 2.

Significant concomitant diseases were noted in 52 men and 19 women. Congestive heart failure, previous myocardial infarction, and chronic obstructive pulmonary diseases

Table 2
Strangulation and bowel resection ratios in hernia types

Type	Incarceration	Strangulation	Bowel resection
Inguinal	222 (57.6%)	66 (29%)	17 (7%)
Femoral	69 (17.9%)	32 (46%)	20 (28%)
Umbilical	48 (12.5%)	29 (60%)	9 (18%)
Incisional	36 (9.4%)	18 (50%)	5 (13%)
Epigastric	10 (2.6%)	4 (40%)	1 (10%)

Table 3
Methods of hernia repair used in the study

Technique	No of hernias
Tension Free	138
Bassini	90
McWay	57
Anatomic repair	55
Preperitoneal	32
Mayo repair	10

were more frequent coexisting problems in men whereas essential hypertension was more common in women. Diabetes mellitus was diagnosed in 34 patients. Prostatic enlargement or a history of prostatectomy was reported in 48 patients. Cirrhosis was recorded in 3 men. Urinary bladder tumor was observed in 1 male patient.

Contents of hernial sac were only ileum in 153 patients, only omentum in 104 patients, ileum with omentum in 42 patients, transverse colon in 5 patients, sigmoid colon in 28 patients, cecum in 8 patients, appendix in 9 patients, testis in 5 patients, urinary bladder (of which one was tumor), and preperitoneal fatty tissue in 31 patients.

Of 385 emergency operations, there were 74 laparotomies and 311 groin explorations. Local anesthesia was used in the management of 10 hernias, spinal anesthesia was used in 1 patient, and general anesthesia was applied in the rest. Small bowel resection and anastomosis was carried out in 53 patients. Thirty-one (58.5%) of the patients were over 60 years of age. Seven gangrenous appendices were removed from 180 incarcerated right inguinal hernias.

The method of repair was largely determined by the individual surgeon's preference. The type of hernia was a secondary determinant. Tension-free hernioplasty was the most frequently used and was applied in 138 (35.8%) repairs. The rest of hernias were repaired by a variety of methods as outlined in Table 3. Concomitant hydrocelectomies were recorded in 7 patients. Intraoperative complication was reported in one patient suffering from a laceration of the femoral vein that was recognized and successfully repaired.

In the patients operated upon postoperative complications were noted in 75 patients (19.5%). Major complications observed in 58 patients (15.1%). Postoperative mortality was recorded in 11 (2.9%) patients, 9 (81.8%) of whom were older than 60 years of age. The most serious complications were cardiovascular and pulmonary. Adult respiratory distress syndrome developed in 10 patients, of whom 2 died. Pulmonary embolism was responsible for the death of 1 patient. Thirty patients suffered from lobar pneumonia, which was fatal in 2. Congestive heart failure and cardiac arrhythmias developed in 14 patients, of whom 3 died. Cirrhotic liver diseases were the causes of deaths in 2 young patients. Another patient with urinary bladder tumor died on the postoperative day 2. Table 4 shows the distribution of unfavorable outcomes in relation to age in pa-

Table 4
Unfavorable outcomes of advanced age

Age	Strangulation	Bowel resection	Morbidity	Mortality	Cases
Older than 60	75 (45.5%)	30 (18.2%)	44 (26.7%)	9 (5.5%)	165
60 and younger	74 (33.6%)	22 (10%)	14 (6.4%)	2 (0.9%)	220

Advanced age was found to be a significant risk factor for unfavorable outcomes.

tients. The relationship between factors such as advanced age, sex, hernia type, duration of symptoms, late hospitalization and coexisting disease, and unfavorable outcomes were also statistically analyzed and results shown in Table 5.

Local wound complications developed in 15 patients, of whom 13 had wound infections and seroma. The rest had scrotal swelling due to effusion or hematoma. Wound infections were successfully treated by drainage and administration of systemic antibiotics. Urinary retention was observed in 2 patients. One hundred and three elderly patients were already catheterized in the preoperative period, thus the rate of urinary retention was 0.8%. The length of hospitalization ranged from 1 to 41 days (mean 4). The length of stay was extended by postoperative complications to an average of 11 days.

Comments

Incarceration is an important finding that should urge the surgeon to undertake operation sooner rather than later [1]. Bekoe [4], in his prospective review of 118 patients with incarceration/strangulation, stated that he could find “no definite criterion” to differentiate incarcerated hernia with viable contents from that nonviable contents. Incarceration and strangulation are clinically obvious and correlate better with the ultimate viability of entrapped bowel.

Although it was previously reported that only 5% of all external hernias will need emergency operation, 13% of all cases explored as an emergency in our series [3]. The large number of incarcerations in our series may be related to delay in elective repair of hernias as there were patients with hernias of more than 10 years.

Only 10% to 15% of all incarcerated hernias contain necrotic bowel [4,5]. Among our 385 patients with incarcerated external hernia, we encountered necrotic bowel that required resection in 53 cases (13.7%). The average age in the patients with strangulated hernia was greater than 60 compared with 65 years in another study [6].

Sex ratios in our study were consistent with previous descriptions [6]: for strangulated inguinal hernias, male:female ratio was 7.5:1; for umbilical hernias, it was 1:3, but was different for femoral hernias, 1:2 compared with 1:4 in another study [6]. Right-sided groin hernias were more common, with a ratio of 1.5:1. This ratio was lower than the other series: 3:1, 2.9:1 [5,6].

Femoral hernias comprise 2.3% of elective hernias [7]. The diagnosis of femoral hernias in men and women and of inguinal hernias in women is not so unambiguous. They are responsible for up to 35% of strangulating hernias [8]. In our series, femoral hernias comprised 21% of strangulating hernias. The highest resection rate was observed in this group.

Late hospitalization was considered to be an important factor determining resection rate and subsequent morbidity and mortality. Andrews [3] found a mortality rate of only 1.4% when the patients were hospitalized within first 24 hours of the incarceration. This rate reached 10.0% and even 21.0% if there was a delay in hospitalization (24 to 47 hours and 48 hours or longer, respectively). Ashirov and Melavannyi [9] also stated that all the patients who died were admitted to the hospital more than 2 days after incarceration. The resection requirement in the Andrews' series was also affected by late hospitalization (7.0%, 11.0%, and 27.0% respectively) [3]. In the present series, the intestine was resected in 52 patients. Twenty-seven (51.9%) of those patients admitted to the emergency clinic 48 hours after the incarceration occurred.

Postoperative complications might be linked with duration of hernia. Patients with hernia more than 10 years, as seen in the present series, had slightly more encountered postoperative complications. In contrary, Rai and coworkers [10] reported that short duration carried higher risk for complications.

The cause of delay in hospitalization is mostly patient's fault, but physician errors are sometimes responsible.

Table 5
Statistical analyses of factors responsible for unfavorable outcomes

	Strangulation	Bowel resection	Length of hospitalization	Morbidity	Mortality
Advanced age	$P < 0.05$	$P < 0.002$	$P < 0.01$	$P < 0.01$	$P < 0.02$
Sex	$P < 0.05$	$P < 0.02$	$P < 0.02$	NS	NS
Hernia type	$P < 0.001$	$P < 0.001$	NS	NS	NS
Duration of symptoms	NS	NS	NS	$P < 0.04$	NS
Late hospitalization	$P < 0.001$	$P < 0.001$	$P < 0.008$	$P < 0.001$	NS
Coexisting diseases	$P < 0.009$	$P < 0.001$	$P < 0.001$	$P < 0.001$	$P < 0.001$

NS = Nonsignificant.

McEntee and coworkers [11] reported that groin swelling had not been detected in 30% of their patients with strangulated hernias. Askew and colleagues [12] also stated that strangulated hernias were misdiagnosed by the general practitioner in 33% of the patients and by their hospital registrar at a rate of 15%. Similarly, Nesterenko and Shovskii [13] found that the cause of late hospitalization was physician error in the prehospital stage in 12.1% of the patients with incarcerated inguinal hernia. Our hospital serves a patient population mostly coming from rural areas of the central part of Turkey. This was the main reason why the vast majority of the patients in the present series were admitted to the hospital 48 hours or more from the onset of symptoms. The other cause of delayed hospitalization was lower public awareness of the risk of hernia strangulation. Not surprisingly, this delay caused high rates in strangulation, bowel resection, morbidity, and mortality.

Another important factor for undesirable outcomes of the patients with incarcerated hernia is advanced age. The physiologic reserve of the elderly patient is ultimately affected by the aging process and by concomitant diseases [8]. Andrews [3] reported a peak incidence in the eighth decade. Takuev and colleagues [14] found age as a significant factor for morbidity after operations for incarcerated hernias. Twelve of their 13 patients died were older than 60. Oishi and associates [8] also observed that all the mortalities were recorded in patients older than 68. In our series, the patients presenting with bowel obstruction were over 60 years of age. The advanced age completely affected strangulation rate, bowel resection requirement, hospital stay, morbidity, and mortality.

Strangulated presentations are associated with a significantly higher proportion of women. Necrotic bowel resections were required more frequently in female patients. Women and all patients with femoral hernias were at significantly increased risk. Strangulation was more common in femoral and umbilical hernia types.

Management of incarcerated external hernias is certainly not free from mortality. Past series recorded an overall mortality of 10.4% and postoperative complications 19.6% [11]. Nesterenko [13] noted an 13.4% mortality. In our series mortality rate was 2% in patients with viable bowel, and 6% in strangulated hernias requiring bowel resection. These figures are obviously unacceptable for hernia surgery, and emphasize the value of elective repairs before encountering incarceration.

Conclusions

We conclude that the mortality rate after repair of incarcerated external hernias continues to be associated with advanced age and serious coexisting disease. Female patients and all patients with femoral hernia are at significantly increased risk of complication. Delayed presentation is also responsible for unfavorable outcomes. Patients with external hernia should be prepared carefully in preoperative period, and closely monitored during and after the operation. Elderly patients, particularly, should be warned of the potential dangers of a lump in their abdominal wall.

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