



Emergency hernia repairs in elderly patients

Bahadir Kulah, M.D., Arife Polat Duzgun, M.D., Munevver Moran, M.D.,
I. Hakan Kulacoglu, M.D., M. Mahir Ozmen, M.D., M.S., Faruk Coskun, M.D.*

Ankara Numune Teaching and Research Hospital, 3rd Surgical Department, Samanpazari, 05100, Ankara, Turkey

Manuscript received March 15, 2001; revised manuscript July 16, 2001

Abstract

Background: Emergency hernia repairs comprise one of the most common procedures performed in elderly patients and also carry a high risk of mortality and morbidity. The aim of this study was to examine the factors that might have an influence on the outcome of emergency hernia repairs in elderly patients.

Methods: A review was made of 189 (120 male and 69 female) patients aged more than 65 years who underwent emergency hernia repair between December 1996 and January 2001 at the surgical emergency unit of our hospital. The patients' ages ranged from 65 to 100 years (mean 72.1). Concomitant diseases were present in 86 (45.5%) patients. Of 189 incarcerated hernias, there were 145 (76.7%) bowel obstructions and 91(48%) strangulations. Necrotic bowel was resected in 36(19%) patients.

Results: While overall mortality was 5%, it was found to be 19.4% after bowel resection. Major complications were observed in 48 (25%) patients. Mortality and morbidity were clearly linked with bowel resection. Coexisting cardiopulmonary diseases, misdiagnosis, American Society of Anesthesiologists class, and late admission were also found to be responsible for unfavorable outcomes.

Conclusions: In elderly patients with external hernias early elective surgery should be preferred, and local anesthesia might be the best in order to avoid the increased risks of emergency hernia repairs. © 2001 Excerpta Medica, Inc. All rights reserved.

Keywords: Emergency; Hernia repair; Elderly

External hernias are common in elderly patients because of the weakness of the abdominal wall and conditions which increase intraabdominal pressure [1–3]. The estimated incidence of abdominal wall hernia in persons older than 65 years of age is 13 per 1,000 [4]. Incarcerated external hernia repairs represent one of the most common emergency procedures performed in elderly patients [4]. Emergency hernia repair rates increase exponentially with age in people older than 50 years [5]. Male sex predominates until age 75, after which female patients present more frequently [6,7].

More recent data indicate that incarcerated hernias are now responsible for 20% of all small bowel obstructions. Emergency repair of hernia is also associated with significant morbidity and mortality. This is largely because of bowel incarceration on presentation with up to 30% of cases requiring intestinal resection [4].

This study was carried out to examine factors which

might have some effects on the outcome of emergency repairs of external hernias in elderly patients.

Methods

The records of 189 patients aged over 65 years who underwent emergency hernia repair for incarcerated external hernia from December 1996 to January 2001 in the surgical emergency unit of Ankara Numune Hospital, which is a major teaching hospital with one of the busiest emergency department in Turkey, were reviewed.

Patient age, sex, hernia type, details of presentation, duration of symptoms, past medical history, presence of coexisting diseases such as cardiopulmonary disease, hypertension, diabetes, prostatic enlargement, American Society of Anesthesiologists (ASA) class, type of anesthesia, contents of the hernial sac, and type of surgical procedures were all noted. Their effects on postoperative complications, hospital stay, and mortality were evaluated.

The results were analyzed statistically using SPSS for Windows program (SPSS, Chicago, Illinois). Analysis of

* Corresponding author. Tel.: 0-0-90-312-2120232; fax: 0-0-90-312-3103460.

E-mail address: farukcoskun@mynet.com

Table 1
Distribution of sex and hernia types

| Type of hernia | Sex | Right | Left | Bilateral | Male/Female | Total |
|-------------------|--------|-------|------|-----------|-------------|------------|
| Direct inguinal | Male | 5 | 3 | | 4 | 8 (4.2%) |
| | Female | 1 | 1 | | | 2 (1.1%) |
| Indirect inguinal | Male | 58 | 23 | 6 | 7.9 | 87 (48.7%) |
| | Female | 7 | 4 | | | 11 (5.8%) |
| Femoral | Male | 8 | 3 | | 0.35 | 11 (5.8%) |
| | Female | 18 | 12 | 1 | | 31 (16.4%) |
| Incisional | Male | | | | 0.30 | 3 (1.6%) |
| | Female | | | | | 10 (5.3%) |
| Umbilical | Male | | | | 0.40 | 6 (3.2%) |
| | Female | | | | | 15 (7.9%) |

Femoral hernias were significantly more common in the female patients while indirect inguinal hernias were more common in male patients.

variables was made using the chi-square test with Yates' correction. *P* values less than 0.05 were considered as significant.

Results

During the last 4-year period, 433 (164 female) patients with median age of 52 years (range 15 to 100) years underwent emergency surgical operation for preoperative diagnosis of incarcerated external hernia. There were 189 (69 female) patients aged more than 65 years with a median age of 70 years (range 65 to 100) years. Bilateral inguinal hernias were encountered only in 7 (1 female) patients. There were 30 (9 female) recurrent hernias.

Type and location of hernias and their distribution according to sex are shown in Table 1. The indirect inguinal hernias were the most common at 54.5% and were followed by femoral hernias seen in 42 (31 female) patients, which was the commonest hernia type in female patients (*P* < 0.05). The male:female ratio was 7.6:1 for inguinal hernias (87/11), 1:3 for femoral hernias (11/31; *P* < 0.05). Incisional hernias and umbilical hernias were also more common in female patients (M/F ratios were 0.3 and 0.4, respectively).

The duration of hernia ranged from 10 days to more than 30 years. Fifty-one (27%) patients had hernias for more than 10 years. Thirty-nine patients (21%) were unaware of their hernia prior the emergency admission.

The most common presenting symptoms for emergency admission were an irreducible mass in the abdominal wall

and intermittent or continuous pain at the site of herniation seen in 77% of patients. Duration of symptoms before presentation varied from a few hours to 4 days. One hundred and forty-five patients were hospitalized for signs and symptoms of mechanical bowel obstruction. A total of 35% of patients presented after 48 hours of symptom onset.

Significant concomitant medical problems were observed in 86 (45%) patients (34 female and 52 male). In both sexes, cardiopulmonary disease was the commonest problem seen in 60% (31) of male and 35% (12) of female patients; that was followed by essential hypertension, congestive heart failure, and prostatic enlargement. Twenty-two patients (12%) were diabetic, 1 male patient had cirrhosis, and 1 patient had been treated previously for urinary bladder cancer.

Contents of the hernial sac were only ileum in 87 (46%) patients, only omentum in 42 (22%) patients, ileum with omentum in 20 (10%) patients, sigmoid colon in 17 (9%) patients, gangrenous appendices in 7 (4%) patients, cecum in 5 (3%) patients, transverse colon in 3 (1.5%) patients, urinary bladder (which was a tumor) in 1 patient, and preperitoneal tissue in 4 (2%) patients.

The greater proportion of incarcerated femoral hernia was noted in female patients (74%). Necrotic bowel resection was required in 17 (41%) of 42 patients with incarcerated femoral hernia. The strangulation and bowel resection rates of hernia types are detailed in Table 2.

While surgical repair was performed under general anesthesia in 182 (96%) cases, epidural anesthesia was used in 3 patients and spinal anesthesia in 4 patients.

Forty-four patients (24%) were ASA class II, 93 (49%)

Table 2
Clinical profile of the hernia types

| Hernia types | Incarceration | Strangulation | Bowel resection | Morbidity | Mortality |
|--------------|---------------|---------------|-----------------|-----------|-----------|
| Direct | 7 (70%) | 3 (30%) | 2 (20%) | 2 (20%) | 0 (0%) |
| Indirect | 58 (56%) | 45 (44%) | 11 (11%) | 23 (22%) | 4 (4%) |
| Femoral | 18 (43%) | 24 (57%) | 17 (41%) | 14 (33%) | 3 (7%) |
| Incisional | 5 (39%) | 8 (62%) | 3 (23%) | 3 (23%) | 2 (15%) |
| Umbilical | 10 (48%) | 11 (52%) | 3 (14%) | 6 (29%) | 1 (5%) |

Table 3
Surgical techniques performed for hernia repair

| Repair | No. of hernias |
|-----------------|----------------|
| Tension free | 76 (40%) |
| Bassini | 35 (19%) |
| Anatomic repair | 31 (16%) |
| McVay | 28 (15%) |
| Preperitoneal | 16 (9%) |
| Mayo repair | 3 (2%) |

patients were ASA class III, and 52 (28%) patients were ASA class IV. There was no mortality in ASA class II, only 3 (3%) in ASA class III, and 7 (14%) in ASA class IV. Although there was no relation between ASA classification and mortality rate, morbidity was significantly related to ASA classification ($P < 0.001$).

The method of repair was largely determined by the individual surgeon's preference. Tension-free hernioplasty was the most frequently preferred procedure and was applied in 76 (40%) patients. Surgical procedures performed for hernia repair are shown in Table 3.

Small-bowel resection and anastomosis was carried out in 36 (19%) patients. The other surgical procedures applied during hernia repair were hydrocele operations in 7 (4%) and appendectomies in 7 (4%) patients. The counter incision was required in 18 (10%) patients. The additional incision was found to have no significant influence on morbidity and mortality.

The overall complication rate was found to be 30% in 189 emergency operations. Intraoperative complications, which was a femoral vein laceration, occurred in 1 patient and was successfully repaired. There was no perioperative death. Major postoperative complications developed in 48 (25%) patients.

Postoperative mortality was recorded in 10 (5%) patients. There was no mortality in connection with hernia surgery. Major complications and deaths were more common in the patients with coexisting diseases. Major complication rates were also found to be increased with the ASA classification (4%, 22%, and 50% for ASA class I, II, and III, respectively; $P < 0.0001$).

Congestive heart failure was the cause of death in 4 patients and was responsible for significant postoperative morbidity in 11 others. Four patients died of adult respira-

tory distress syndrome, which occurred in another 11 patients. Pulmonary embolism was responsible for the death of 1 patient. One patient died of urinary bladder cancer. The group of patients who presented more than 48 hours after the onset of symptoms had a significantly higher rate of postoperative morbidity and mortality (Table 4). The rates of strangulation, bowel resection, and hospital stay were all found to be significantly higher in these patients ($P < 0.0001$, $P < 0.001$, and $P < 0.05$, respectively).

Local wound complications developed in 9 (4%) patients. Three patients (1.5%) had wound infections and seroma. Scrotal hematomas occurred in 6 (3%) patients. Wound infections were treated by drainage and antibiotics. Urinary retention was recorded in 2 patients only after the removal of urinary catheter. One recurrence occurred in the early postoperative period following Bassini herniorrhaphy.

The length of hospitalization ranged from 1 to 41 days (mean 5 days). Major postoperative complications were required longer periods of hospitalization (mean 11 days).

The effects of factors such as sex, type of hernia, duration of hernia, delay in presentation, coexisting medical illness, and ASA class on unfavorable outcomes were statistically analyzed and are presented in Table 5. Strangulation and bowel resection were significantly more common in female patients ($P < 0.002$), bowel resection were also found to be common in patients with femoral hernia ($P < 0.001$).

Comments

Because of the increased risk of postoperative complications in elderly patients, surgeons may be reluctant to perform elective repair of a reducible hernia. Delay often results in complications that necessitate surgery under the most adverse conditions with an increased risk of morbidity and mortality. Up to 40% of hernia repairs, mainly inguinal and femoral, are performed for incarceration or bowel obstruction in patients more than 65 years of age [1–2]. Emergency repair of hernia is associated with significant morbidity and mortality rates, with the former being more than 50% and the latter, 8% to 14% [4].

In our series we found the peak incidence in the seventh decade. Eighty percent of patients were between 60 and 80 years of age and only 8 patients were aged more than 90

Table 4
Effects of late admission on unfavorable outcomes

| Admission | Strangulation | Bowel resection | Length of stay | Morbidity | Mortality |
|-----------------|---------------|-----------------|----------------|------------|-----------|
| Within 24 hours | 13 (24.1%) | 4 (7.4%) | 4 (7.4%) | 8 (14.8%) | 1 (1.9%) |
| 24 to 48 hours | 23 (33.3%) | 10 (14.5%) | 14 (20.3%) | 18 (26.1%) | 3 (4.3%) |
| After 48 hours | 55 (83.3%) | 22 (33.3%) | 20 (30.3%) | 22 (33.3%) | 6 (9.1%) |
| Significance | $P < 0.0001$ | $P < 0.001$ | $P < 0.05$ | NS | NS |

Length of stay: longer than 7 days.

NS = not significant.

Table 5
Statistical analyses of factors responsible for unfavorable outcomes

| | Strangulation | Bowel resection | Hospital stay | Morbidity | Mortality |
|----------------------|---------------|-----------------|---------------|---------------|-------------|
| Sex* | $P < 0.002$ | $P < 0.0001$ | NS | NS | NS |
| Hernia type | NS | $P < 0.001$ † | NS | NS | NS |
| Duration of symptoms | $P < 0.05$ | NS | NS | $P < 0.001$ | NS |
| Late admission | $P < 0.001$ | $P < 0.05$ | $P < 0.05$ | NS | NS |
| Coexisting diseases | NS | $P < 0.05$ | $P < 0.001$ | $P < 0.001$ | $P < 0.001$ |
| ASA class | NS | NS | $P < 0.01$ | $P < 0.001$ # | NS |

P values with univariate analysis.

* Only significant for female sex.

† Only significant for femoral hernias.

$P < 0.01$ for ASA class III and $P < 0.001$ for ASA class IV.

NS = not significant.

years. The male to female ratios for types of hernia were similar to those in previously published reports [8]. We also found that 44% of the emergency hernia repairs were performed in elderly patients with complicated presentations. Incarcerated presentations were more common in male patients whereas strangulated presentations and bowel resections were strongly associated with female sex. Incisional, umbilical, and femoral hernias appeared to be strangulated more frequently. Femoral and incisional hernias were also associated with higher resection rates as compared with other types of external hernias. The higher resection rate of strangulated femoral hernias in elderly patients may be attributed to higher frequency of delay in diagnosis and presentation. Elderly patients are at considerable hazard of strangulation if they have to wait for surgery [7].

In previously reported studies only 10% to 15% of all incarcerated hernias were found to contain necrotic bowel [9]. The resection rate in bowel released within 24 hours was reported as 7%, but when the time increased to 48 hours or more the resection rate also increased to 27% [8]. Andrews [8] reported an 11% mortality, 7% in patients with only incarceration and 37% after bowel resection. In the present study, necrotic bowel was diagnosed in 19% of patients presented with incarceration. Although the bowel resection rate for the patients presented within 24 hours was only 7.4%, 33% of patients presenting after 48 hours required necrotic bowel resection. While overall mortality was found to be 5%, it was 2% in patients with viable bowel and 19.4% after bowel resection. Mortality and morbidity were significantly affected by bowel resection ($P < 0.0001$ and $P < 0.0001$, respectively).

Elderly patients had an increased incidence of necrotic bowel resection when compared with adult series for the same duration of irreducibility [8,10]. This could be explained by increased vulnerability of entrapped bowel to incarceration and ischemia in advanced age.

In the present study we found that bowel resection and length of hospitalization were significantly affected by the delay in admission. The delayed admission was mainly related to ignorance of the risk of strangulation. One hundred and thirty-two patients (70%) were previously aware of

their hernia, 51 (27%) patients had one to three episodes of incarceration before admission that were handled without surgery. Forty-two patients (22%) had postponed elective operation because of personal reasons. One of the causes of delayed presentations was misdiagnosis. The incarcerated femoral hernia was misdiagnosed by the general practitioners in 18 patients from rural areas. Another 39 (21%) patients were unaware of their hernia before emergency admission.

The preoperative incidence of additional pathologic conditions other than the primary surgical disease increase steadily with age and only 5% of patients had no comorbid illness by age 80. Although physiologic decline may impair the ability of the elderly patient to compensate appropriately for the additional stress of complicated or emergency surgery, the presence of coexisting diseases is the most important determinant of surgical outcome [11]. Concomitant diseases were present in 86 (34 female) patients in our series. Causes of death and serious postoperative complications were clearly linked with coexisting diseases. The majority of deaths (90%) were noted in patients with cardiopulmonary diseases. The length of postoperative hospitalization was also found to be significantly longer in patients with coexisting diseases.

While not inherently impaired, the reserve capacity of the older patient to compensate for stress, metabolic derangement, and drug metabolism is increasingly limited. Functional disability occurs faster and takes longer to remediate, necessitating early preventive interventions [12]. The effect of anesthesia on the outcome of hernia surgery in elderly patients is of major importance and was evaluated in previous studies [1,3]. In 1966, Williams and Hale reported a mortality rate of 16% in emergency hernia repair, compared with 2% in elective repairs [13]. Tingwald and Cooperman had no mortality in their elective group [14], but had 22% mortality rate in the emergency group. Nehme [3] has shown a 7.5% mortality rate after emergency operations and only a 1.3% mortality rate after elective procedures. Giustetto et al [15] reported a postoperative mortality rate of 8.8% and a postoperative morbidity rate of 40%. These researchers all

underlined the great importance of the anesthesiologic approach and perioperative intensive care. In a study comparing type of anesthesia for hernia repair, general and spinal anesthesia were reported to be associated with higher rates of serious postoperative complications [16].

In our review, most of the patients (96%) had their hernia repaired under general anesthesia. The patients with bowel obstruction or coexisting cardiopulmonary diseases seemed to be mainly in ASA class III or IV. General anesthesia resulted in severe postoperative cardiopulmonary complications especially in these group of patients. In 9 out of 10 patients mortality was due to cardiopulmonary reasons and major complications were also found to be directly related with coexisting disease and significantly increased with ASA class, suggesting that in discordance with the previous reports, general anesthesia is not one of the factors affecting morbidity and mortality in emergency repair of hernia.

Conclusions

We conclude that emergency hernia repair in patients more than 65 years of age is a serious problem and carries a high risk of complications in the presence of coexisting diseases. Female patients and all patients with femoral hernia are at significantly increased risk of complication. There is significant elevation of mortality after necrotic bowel resections. Delayed admission, misdiagnosis, and ASA class are also responsible for unfavorable outcomes. Emergency hernia repairs require longer periods of hospitalizations. In elderly patients with external hernias, early elective surgery should be preferred and local anesthesia might be best in order to avoid the increased risks of emergency hernia repairs.

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