

## Papers

### Incarcerated direct inguinal hernias: a three-year series at a large volume teaching hospital

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**Summary:** It is believed that direct hernias are less likely to strangulate because, in contrast to an indirect inguinal hernia, the neck of the direct hernia is wide. For this reason, some surgeons do not repair direct hernias in elderly patients. We analyzed all incarcerated hernias repaired on an emergency basis during a 3-year period in order to discover the extent of incarcerated direct hernias in our practice. A total of 293 patients with incarcerated hernia were evaluated; of these, 222 were inguinal (193 indirect -86.9%- and 29 direct -13.1%-). The strangulation rate for inguinal hernias was found to be 29.7%. There was a significant difference between indirect and direct inguinal hernias in respect to strangulation rate (32.6% vs 10.3%  $p = 0.014$ ). However, we did not find any difference between bowel resection rates in incarcerated-strangulated indirect and direct hernias (14/193 -7.3%- vs 2/29 -6.9%-,  $p = 0.95$ ). Hospitalization time was significantly longer for the patients who developed strangulation than those who did not. The side of direct hernia had no effect on strangulation (10.5% for right-sided vs 10.0% for left-sided,  $p = 0.97$ ). The only prognostic factor for strangulation and resection in regression analysis was the age-group of the patients (<60 vs. 60 or older). At operation the average diameter of the defect in the transversalis fascia was 23.8 mm. The diameter of the defect had no effect on strangulation.

**Key words:** Hernia – Strangulation – Prognosis

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Approximately 75% of all external hernias occur in the inguinal region [Eubanks 1997]. One third of those are direct hernias. This type of hernia is usually seen after 35 years of age [Donahue 1998]. It is believed that direct hernias are less likely to strangulate [Devlin

1988], because, in contrast to an indirect inguinal hernia the neck of the direct hernia is wide [Donahue 1998]. Devlin states that “if the hernia is direct and easily reducible and the patient is elderly, surgery is not mandatory”. In contrast, in Nehme’s large series it was

concluded that groin hernia in elderly patients should be repaired under elective conditions in the properly prepared patient with a low complication rate [Nehme 1983]. In our practice, we prefer repairing direct inguinal hernias on an elective basis. On the other hand, we

encounter some incarcerated direct hernias in the emergency department. Here, 29 consecutive patients who were operated for incarcerated direct hernia on an emergency basis in a three year period were analyzed.

### Patients and methods

The patients operated on for incarcerated external hernias in the Ankara Numune Teaching and Research Hospital Emergency Department between 1997-1999 were retrospectively studied. Those with an incarcerated direct hernia were analyzed in respect of age, sex, side of hernia, other pathology, contents of hernial sac, type of anesthesia, strangulation and bowel resection rates, and postoperative complications.

The chi-squared test was used for univariate analysis. Logistic regression analysis was applied to determine the prognostic factor for strangulation and bowel resection.

### Results

Three hundred and eighty-five patients with an incarcerated external hernia were operated on an emergency basis during the above mentioned period. Of these hernias, 222 were inguinal (193 indirect -86.9%- and 29 direct -13.1%). The overall strangulation rate for incarcerated inguinal hernias was 29.7%. There was a significant difference between indirect and direct inguinal hernias with respect to strangulation rate (32.6 % vs 10.3%,  $p = 0.014$ ). The mean age of the patients with incarcerated direct hernia was 56.0 (S.E.: 3.1, median: 55.5, S.D.: 16.3, range: 18-92). There were 23 men (79.3%) and 6 women (20.7%). Nineteen of the direct hernias (65.5%) were located on the right side. There was only one recurrent hernia case (3.4%). Twenty-six patients were operated under general anesthesia, while spinal anesthesia was the preferred technique for three patients.

In five patients with a preoperative diagnosis of incarcerated inguinal hernia (17.2%), the direct hernial sac was found to be empty following the induction of general anesthesia. The hernial

sac contained only omentum in 17 cases (58.6%). Small bowel loops were found in the hernia sac in 4 cases (13.8). A diverticulum of the urinary bladder was found in the sac in two cases (6.9%). Twenty-one patients out of 29 had a small direct hernia defect in the transversalis fascia just lateral to the pubic margin.

A 74-year old female patient with a right-sided hernia developed skin necrosis secondary to small bowel perforation due to delayed strangulation. The total number of patients with strangulation was three. We did not find any difference between bowel resection rates of incarcerated-strangulated indirect and direct hernias (14/193 -7.3%- vs 2/29 -6.9%-,  $p = 0.95$ ). Small bowel resection of 15-30 cm. in length was performed in 2 of 3 patients with direct hernia. In one of these cases, a perforated appendix was found in the hernial sac and appendectomy was performed. Appendectomy was also done in another patient because the sac contained the appendix, which was grossly inflamed.

The side of direct hernia had no effect on strangulation (10.5% for right-sided vs 10.0% for left-sided,  $p = 0.97$ ). On the other hand, female gender and advanced age had a significant effect on strangulation risk (Table 1). The only prognostic factor for strangulation and resection in regression analysis was the age-group of the patients (<60 vs. 60 or older: B:10.22, S.E.: 63.83, Wald: 0.256, Sig: 0.873, R:0.0, Exp: 27502.82).

At operative examination of incarcerated direct hernias, the average diameter of the defect in the transversalis fascia was 23.8 mm (S.E.: 0.84, range: 15-30, median: 25.0, S.D. 4.4). Two of three patients with strangulation had a 20 mm defect and the third patient had a 25 mm defect. The diameter of the defect had no effect on strangulation (24.0 mm in patients with strangulation and 21.7 mm in patients without strangulation,  $p = 0.38$ ).

Bassini repair was performed in 14 cases, while the Lichtenstein technique was preferred for the other 14. A preperitoneal suture repair was used in one patient. Three patients developed postoperative cardio-pulmonary complica-

**Table 1.** The effects of age and gender on the strangulation rate in patients with direct inguinal hernia

	Patients with strangulation (%)
Age < 60	0/18 (0%)
Age 60 or more	3/11 (37.9%) <sup>a</sup>
Female	2/6 (33.3%) <sup>b</sup>
Male	1/23 (4.3%)

<sup>a</sup>  $p = 0.019$

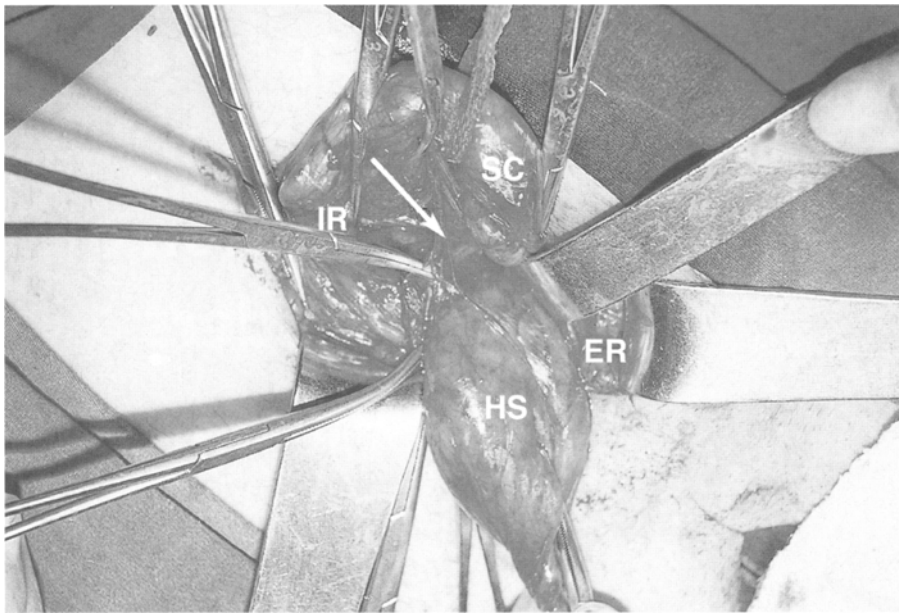
<sup>b</sup>  $p = 0.038$

tions (10.3%), however no mortality was encountered. Wound infection as a local complication was also recorded in two patients, both with strangulation. Hospitalization time was significantly longer for the patients who developed strangulation than for those who did not.

### Discussion

Strangulated external hernias account for 20% of all intestinal obstructions in adults [McEntee 1987]. In a large series, Kekec and coworkers reported that 18.3% of all hernia repairs were performed on an emergency basis [Kekec 1993]. Among inguinal hernias, indirect hernias were more likely to develop incarceration in comparison with direct hernias. Nehme has reported that an incarceration rate for indirect inguinal hernia was 18.2% [Nehme 1983]. Additionally, indirect inguinal hernias carry more risk of strangulation than direct hernias when they become incarcerated: 34.1% vs 16.7% in Kekec's series and 32.6% vs 10.3 in our emergency practice.

It is generally believed that, in contrast to indirect hernias, the neck of a direct hernia is wide enough to avoid strangulation. However, our study revealed that the fascial defects in incarcerated direct hernias (especially in parapubic hernias) were only 20-25 mm in diameter, and even if the neck of the hernial sac (fascial defect) was soft in the early stage of the hernia, it might become fibrotic and solid with time. This process may create a risk for a direct hernia to be incarcerated (Fig. 1).



**Fig. 1.**  
An incarcerated direct hernia containing omentum (narrow fibrotic hernia neck, arrow; transversalis fascia, TF; hernial sac, HS; internal ring, IR; external ring, ER)

Besides, it is usually difficult to make a differential diagnosis between direct and indirect inguinal hernias at physical examination [Ralphs 1980, Cameron 1994].

It has been shown that strangulation and subsequent small bowel resection cause higher morbidity and mortality rates and significant delay in discharge

[Kecec 1993]. We had to perform bowel resection due to strangulation in 2 of 3 patients, aged 74 and 69, while the bowel regained its viability after local warming in the other case. Although we did not record any mortality, morbidity rate and hospitalization time were longer for the patients with strangulation and resection. We found that advanced age was a significant factor for strangulation. Kecec also reported that strangulation was more frequent in patients in their 7th decade. Thus, it does not seem logical to leave elderly patients with direct inguinal hernias untreated. Moreover, it has already been shown that elective hernia repair is safe in elderly patients and should be undertaken as early as possible to prevent the problem from becoming an emergency [Nehme 1983, Rørbæk-Madsen 1992].

In conclusion, direct inguinal hernias may become incarcerated and even strangulated, especially in aged patients. Therefore, we advocate repairing direct inguinal hernias on an elective basis in any age group.

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