## **Original Research Article**

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# Should a laparoscopic repair be the first choice in incarcerated inguinal hernia

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#### **ABSTRACT**

**Background:** An important part of the procedures for admission to emergency surgery is incarcerated inguinal hernia repair. Minimally invasive surgical procedures have led surgeons to perform these operations laparoscopically. The aim of this study was to demonstrate the safety of laparoscopic inguinal hernia repair in patients admitted to the emergency department with incarcerated inguinal hernia.

Methods: The files of patients who underwent laparoscopic surgery for incarcerated inguinal hernia between January 2015 and June 2019 in Bandirma State Hospital General Surgery Clinic was retrospectively reviewed. Pearson Chi-Square test was used as statistical method. Version 18 of the SPSS program was used. P<0.05 was considered significant as it should be.

Results: A total of 63 patients were included in the study. The mean age was 52.8 years. A total of 64 repairs were performed on the right side in 41 (65%) cases, on the left side in 21 (33.3%) cases and on both sides in one (1.58%) case. Four (6.25%) of 63 patients had strangulation. Three of these patients (4.68%) had strangulated hernia, and one (1.56%) had strangulated and incarcerated hernia. Four patients (6.25%) presented with ileus. The mean operation time was 65 minutes (35-110 minutes). Mean duration of hospitalization was 2.4 days. The rate of minor complications was 4.68%. Only one (1.56%) major complication was introgenic small intestinal perforation. The mean follow-up time was 25.2 months. There was no early recurrence in patients.

Conclusions: We suggest that laparoscopic transabdominal preperitoneal hernia repair can be performed safely in emergency procedures in patients with incarcerated inguinal hernia.

**Keywords:** Laparoscopic transabdominal preperitoneal, Incarcerated, Hernia repair

#### INTRODUCTION

The incidence of inguinal hernias varies between 3% and 8%. The high incidence of this disease makes inguinal hernia repair one of the most common surgical procedures. Although various techniques are reported for repair, the back wall repair made by using the patient's own tissues has been seen to be insufficient particularly in giant and recurrent hernias. Thus, techniques using prosthetic material have been created.1 Inguinal hernia surgery has gained a different dimension with the application of laparoscopic surgery in inguinal hernia repairs. Furthermore, these laparoscopic methods have become accepted all over the world in a short time and successfully applied in many centers. In laparoscopic inguinal hernia repair, the defect in the inguinal region and all potential hernia areas are supported with a prosthetic material without causing tension. Inguinal hernia repairs have several advantages. For instance, it is a laparoscopic approach, the postoperative pain and

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infection risk is lower, patients can return to their daily activities within a shorter time, and cosmetic appearance is better. There are two methods commonly used in laparoscopic inguinal hernia repairs. One of them is total extraperitoneal preperitoneal (TEP) and the other is transabdominal preperitoneal (TAPP) hernia repair.2 In the TAPP technique, the process of closing the peritoneum, which seems to cause time loss and difficulty, can be performed with intracorporeal suture experience and continuous suture technique. The entry into the peritoneum, which seems to be a disadvantage, can turn into an advantage in many cases. The control on the back-wall anatomy is better and adequate parietalization can be done more easily. Today, laparoscopic TAPP hernioplasty is accepted as a method that is routinely performed in bilateral and recurrent hernia cases as well as in primary unilateral hernia cases.3 Although the laparoscopic approach in elective inguinal hernia repairs has been an accepted and widely used method in surgical practice, the use of this technique in incarcerated inguinal hernia repair is still controversial. The most important reasons that restrict the laparoscopic approach are technical difficulties encountered during returning the incarcerated hernia sac and its contents into the abdomen and increased risk of iatrogenic injury. On the other hand, being able to visualize the incarcerated directly and to perform the resection laparoscopically if necessary is one of the important advantages of the technique.4

The aim of this study was to seek an answer to the question of should laparoscopic inguinal hernia repair be the first choice by discussing the applicability of laparoscopic inguinal hernia repair under emergency conditions and its early postoperative results.

#### **METHODS**

This study included 63 patients who underwent laparoscopic TAPP hernioplasty with a diagnosis of incarcerated inguinal hernia between January 2015 and June 2019 in Bandirma State Hospital General Surgery Clinic. Cases, where it was considered to be unable to obtain adequate information in the preoperative evaluation due to advanced ileus, and patients who needed regional anesthesia due to comorbidities were excluded from the study. Approval was obtained from the local ethics committee prior to the study. The patients were analysed retrospectively in terms of age, gender, duration of admission to the emergency room, hernia location, hernia type, presence of incarceration, hospitalization, operation time, and complications. Pearson Chi-Square test was used as statistical method. Version 18 of the SPSS program was used. P<0.05 was considered significant as it should be.

#### Surgical technique

Laparoscopic TAPP hernia repair: In the operation room, the operating surgeon stands on the side opposite

the hernia, and the assistant and camera operator stand on the same side as the hernia. The monitor is placed at the foot of the operative table. The abdomen is entered using an insufflation needle and intraabdominal pressure is inflated to 12 mmHg by giving CO2. A 10 mm umbilical trocar is established and then, a telescope is passed through the trocar. In addition, two 5 mm trocars are entered into the abdomen through the paramedian areas. Dissection of the inguinal hernia area is started by opening the peritoneum with an incision 1 cm over the hernia sac (defect), starting from medial umbilical ligament and extending to anterior superior iliac spine. The hernia sac is found and released from the spermatic cord. Following the exposure of inferior epigastric artery or vein, Cooper's ligament, iliopubic tract, transverse aponeurotic arc and pubis, a mesh of 6×10 cm prepared externally is fixed to the transverse aponeurotic plana, pubis, Cooper's ligament, and iliopubic tract. It should definitely not be fixed to the lateral of the external iliac artery or vein and inferior to the lateral edge of the iliopubic tract. Because the nervus cutaneus femoris which is the branch of the nervus lateralis, genitofemoralis, is located here. After fixing the mesh, the peritoneum is closed.<sup>5</sup> All patients were administered appropriate dose of prophylactic antibiotics, considering their preoperative weight. A urinary catheter was placed following the intratracheal intubation while the patients were in the supine position. All operations were performed by the same general surgery specialist.

#### **RESULTS**

The files of 63 patients who underwent laparoscopic TAPP hernia repair were examined, of the patients, 59 (93.6%) were male and four (6.4%) were female, with a mean age of 52.8 (21-88). A total of 64 hernia repairs were found to be performed; on the right side in 41 (65%) patients, on the left side in 21 (33.3%) patients, and bilateral sides in one (1.58%) patient. Of these hernias, 47 (73.4%) were indirect hernias, one (1.56%) was femoral hernia and 16 (25%) were direct hernias. Of the 63 patients, three (4.68%) had strangulated hernia, one (1.56%) had strangulated and incarcerated hernia (patient with a bilateral inguinal hernia), and 59 had incarcerated hernia (Figure 1). Four (6.25%) of the patients were presented with subileus (Figure 2). Three of these patients (4.68%) had hernia at the level of the small intestine (ileum in two patients and cecum in one patient were incarcerated) and one (1.56%) patient had hernia at the colon level (sigmoid colon was incarcerated). The mean duration of admission to the hospital was found to be 186 minutes (120-2880). As minor complications, seroma developed in one patient (1.56%), hematoma in one (1.56%) patient (strangulated sigmoid colon herniation, hematoma in the left paracolic area), and urinary tract infection in one (1.56%) patient. The minor complication rate was found to be 4.68% in total. As a major complication, only one (1.56%) patient had iatrogenic small bowel perforation. A patient had undergone exploratory laparotomy upon development of the acute abdomen clinic 48 hours after the operation and iatrogenic small bowel perforation had been detected. Segmental small bowel resection (ileum 220-230 cm) and an end-to-end anastomosis had been performed and the mesh had been removed because of infection. The said patient underwent Lichtenstein tension-free mesh repair two months after the operation. The mean operation time was 65 minutes (35-110). The mean length of hospital stay was 2.4 days (2-11). The mean follow-up time was 25.2 months. No recurrence was detected in any patient in the early and late periods (Table 1).

Table 1: Patient data.

	N	%
Gender		
Male	59	93.6
Female	4	6.4
Location of hernia		
Right	41	65
Left	21	33.4
Bilateral	1	1.6
Mean age	52.8	-
Hernia type		
Direct	16	25
Indirect	47	73.4
Femoral	1	1.6
Incarceration	59	93.6
Strangulation	4	6.4
Minor complications		
Seroma	1	1.6
Hematoma	1	1.6
Urinary tract inf.	1	1.6
Major complications		
Small bowel perforation	1	1.6
Mean duration of admission to the hospital (min)	186	-
Mean operation time (min)	65	_
Mean length of hospital stays	0.5	-
(days)	2.4	-
Mean follow-up time (months)	25.2	-
Recurrence	-	-
Mortality	-	-



Figure 1: Laparoscopic repair of the incarcerated omentum in the right inguinal hernia.

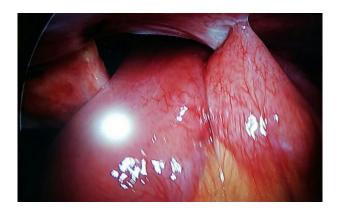


Figure 2: The small intestines drown in the right inguinal hernia and form a subileus, environmental adhesions occurred with extensive edema and inflammation in the intestinal system.

#### **DISCUSSION**

Incarcerated inguinal hernia is the second most common cause of intestinal obstruction. It is easily treatable like inguinal hernia, but it can be life-threatening in complications such as incarceration. Negative results in these cases are observed for elderly patients, patients with serious comorbidities, and patients with applying to the hospital in the late period.<sup>6</sup> Many authors have recently and consistently published the results and benefits of laparoscopic TAPP hernia repair for patients undergoing elective surgery.<sup>7-10</sup> In contrast, the number of studies on laparoscopic TAPP hernia repair under emergency conditions, such as incarcerated inguinal hernia, is very small.<sup>11,12</sup>

The increasing time of incarceration at which symptoms begin causes local and systemic changes in the intestine. 13 Some studies have reported that there is no correlation between the severity of the damage and the duration of strangulation. On the other hand, in a study by Kurt et al involving 102 cases, the incarceration lasting longer than six hours has been reported to pose a risk for intestinal resection.<sup>14</sup> In the same study, incarceration has been emphasized to be more common in men, however, intestinal resection is more common in women and particularly in femoral hernias. In a similar prospective study by Atila et al involving 95 cases, incarceration lasting longer than six hours has been found to be a risk factor for bowel resection.<sup>15</sup> In a study by Akıncı et al, 39 patients applied to the hospital between 0-24 hours, 46 patients between 25-48 hours and 24 patients between 49-120 hours.<sup>16</sup> In the present study, the time between the start of incarceration-related complaints and admission to the hospital was two hours minimum and 48 hours maximum, with a mean admission time of 186 minutes. In the present study, it is understood from the patients' files that four cases with strangulation applied to the hospital within the first 24 hours following the onset of complaints and this was compatible with the literature.

In a study by Kartal et al, 24 (63%) patients had hernia on the right side and 14 (37%) patients had hernia on the left side.<sup>17</sup> In the present study, 41 (65%) patients had a hernia on the right side, 21 (33.3%) patients had a hernia on the left side and one (1.58%) patient had a bilateral incarcerated inguinal hernia; which was compatible with the literature.

In the general literature, it has been proved by scientific studies that the incidence of indirect incarcerated inguinal hernias is higher (18-20). In a study by Akıncı et al direct, indirect, mixed, and femoral hernias were reported in 30, 52, 11, and 16 patients, respectively. In our study, there were 16 (25%) direct hernias, 47 (73.4%) indirect hernias and one (1.56%) femoral incarcerated inguinal hernia.

In a study by Leibl et al, strangulation was observed in six (3.8%) patients who had undergone 153 laparoscopic TAPP hernia repairs that were operated within a six-year period. Rebuffat et al reported strangulation in 43 (2.8%) patients. In the studies by Heydorn et al and Guzman et al the incidence of strangulation was found to be 6-10%. In the present study, incarcerated inguinal hernia and strangulation were found in 60 (93.75%) and four (6.25%) patients, respectively. The strangulation rate in our study is similar to the literature data.

In a study by Felix et al, the morbidity rate has been reported to be 1.2%.<sup>24</sup> In our study, one (1.56%) patient had seroma after surgery. The minor complication rate was found to be 4.68%. No recurrence was seen in patients in the early and late periods. As a major complication, iatrogenic small bowel perforation was seen in only one patient. Apart from that, no major vessel injury, organ injury and mortality were detected. The major complication rate was found to be 1.56%. It has been understood from the patient file that the reason for the occurrence of perforation in this patient was the circulatory disorder in the meso of the strangulated intestine. We believe that in laparoscopic inguinal hernia operations, holding the intestine from the meso of the intestine while returning it into the abdomen may cause circulatory disorders in the meso.

The limitation of the present study is the fact that it is a retrospective study, not a comparative study.

#### **CONCLUSION**

We believe that laparoscopic transabdominal preperitoneal hernia repair can be safely performed under emergency conditions in patients diagnosed with an incarcerated inguinal hernia. However, there is a need for comparative studies with large case series.

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Ethics Committee

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