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Original Research Article

Comparative study of open approach and laparoscopic surgery for emergent groin hernias

Yasuhiro Kurumiya*, Keisuke Mizuno, Ei Sekoguchi, Gen Sugawara

Department of Surgery, Toyota Kosei Hospital, Toyota, Aichi, Japan

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***Correspondence:**
Dr. Yasuhiro Kurumiya,
E-mail: y-kurumiya@toyota.jaaikosei.or.jp

ABSTRACT

Background: The utilization of laparoscopic surgery for groin hernias is rapidly increasing in Japan even though a consensus for the use of the laparoscopic over the open approaches to surgery for emergent cases has yet to be determined. Therefore, we retrospectively examined patient outcomes from both open and laparoscopic surgeries.
Methods: Emergent surgery for a strangulated groin hernia was performed on 63 patients at our hospital from January 2013 to December 2017. All laparoscopic surgeries were performed using the transabdominal preperitoneal repair (TAPP) approach. The choice of whether to perform an open approach (open) or laparoscopic surgery with the TAPP approach was made by doctors who were familiar with both surgical techniques.
Results: There were 49 patients in the open group and 14 patients in the TAPP group. The median operation time (min) was 78 in the open group and 127 in the TAPP group. The median intraoperative blood loss (ml) was 21.0 in the open group and 3.0 in the TAPP group. There were 12 patients (24.5%) in the open group and 1 patient (7.1%) in the TAPP group who had postoperative complications. Surgical site infection did not occur in the TAPP group.
Conclusions: TAPP is a useful technique in emergent surgery for incarcerated hernias.

Keywords: Groin hernia, Emergency, Laparoscopic surgery

INTRODUCTION

The utilization of laparoscopic surgery for groin hernia, which is a commonly encountered ailment, is rapidly increasing in Japan. The laparoscopic and open surgical approaches have equivalent rates of intraoperative complications, such as visceral and vascular injuries, but the laparoscopic approach has a lower rate of postoperative complications, such as hemorrhage and chronic neuroglial disorders.[1–4] The incidence of incarcerated hernia in the population has been reported to be approximately 5%.[5] Strangulated hernias, which can lead to ileus, are most often observed in elderly patients who can have multiple comorbidities that increase their operative risk. Therefore, minimally invasive surgeries are preferred. Given the scarcity of data on laparoscopic surgery with the transabdominal preperitoneal repair TAPP approach for patients with a strangulated hernia, the effectiveness and safety of this surgical method have not been elucidated.[6–9] We retrospectively examined patient outcomes of both the open surgical approach open and laparoscopic surgery with the TAPP approach on patients with strangulated hernias.

METHODS

Emergent surgery for a strangulated groin hernia was performed on 63 patients at our hospital from January 2013 to December 2017. All laparoscopic surgeries were performed with the TAPP approach. The choice of whether to perform the surgery using an open approach or laparoscopically with the TAPP approach was made by doctors who were familiar with both surgical techniques. We examined the following: age, gender, location of

hernia, white blood cell count (WBC), c-reactive protein (CRP), and creatine phosphokinase (CPK) for preoperative data; operation time and blood loss for operative data; and postoperative complications.

Emergent surgery for strangulated groin hernia

We introduced laparoscopic surgery for strangulated groin hernias in 2015, even for emergent situations, and approximately 40% of surgeries are now performed laparoscopically.

Surgical technique of TAPP

One 12 mm and two 5 mm surgical ports were established. The hernia gate was then incised under laparoscopic observation, and the strangled intestinal tract was gently returned. The viability of the intestinal tract was confirmed, and an examination for intestinal perforation was performed. The hernia was repaired with mesh if there was no contamination of the surgical field. If a resection of the intestinal tract was necessary, we extended the midline incision and excised the necrotized intestinal tract.

Statistical analysis

Continuous data were expressed as the median ± SD. The two-tailed Student's t-test was used to compare continuous variables, and the χ^2 test and Fisher's exact test were used to compare discrete variables.

Ethical approval

This study was approved by the human research ethics committee of our hospital, and all procedures involving human participants were in accordance with the ethical standards of the institutional and/or national research committee, and the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

RESULTS

Background of the emergent hernia

There were 49 patients in the open group and 14 patients in the TAPP group. There was no difference in age and gender (76.3±14.3 vs 72.2±112.8 years old, p=0.97; 49% vs 36% men, p=0.38). The location of the lesion was similar between the two groups (Table 1).

Preoperative data

The time from onset of symptoms to operation was shorter in the TAPP group (36±48 vs 16±17 hour, p=0.01). There was no difference in WBC between the two groups (9928±4712 vs 10057±4462 /mm^3, p=0.79), but CRP was relatively higher in the TAPP group (2.54±4.45 vs 3.90±8.51 mg/dl, p=0.06) (Table 2).

Table 1: Demographic characteristics.

Variables	Open (n=49)	TAPP (n=14)	P value
Age	76.3±14.3	72.2±12.8	0.97
Gender	N (%)	N (%)	
Male	24 (49)	5 (36)	0.38
Female	25 (51)	9 (62)	
Location			
Inguinal	21 (43)	5 (36)	0.63
Femoral	22 (45)	5 (36)	
Obturator	6 (12)	4 (28)	

Table 2. Preoperative data.

	Open (n=49)	TAPP (n=14)	P value
Onset～Op (hour)	36±48	16±17	0.01
WBC (/mm^3)	9928±4712	10057±4462	0.79
CRP (mg/dl)	2.54±4.45	3.90±8.51	0.06
CPK (U/L)	108.1±98.6	131.5±109.8	0.53

Table 3: Operation details.

Details of surgery	Open (n=49)	TAPP (n=14)	P value
	N (%)	N (%)	
Repair of both side	0 (0%)	2 (14%)	0.01
Use of mesh	36 (73%)	12 (86%)	0.03
Intestinal resection	6 (12%)	4 (29%)	0.14
Operation time (min)	78±30	127±49	0.09
Blood loss (ml)	21±42	3±6	0.01

Table 4: Postoperative complications.

	Open (n=49)	TAPP (n=14)	P value
Complications	12 (24%)	1 (7%)	0.16
Infection of mesh	2	-	-
Pneumonia	4	-	-
Ileus	1	-	-
Cerebral infarction	1	-	-
Postoperative bleeding	2	-	-
Sepsis	1	-	-
Injury of bladder	1	1	-
Postoperative days	11.2±10.3	9.0±11.5	0.56

Operation

There were two cases of bilateral simultaneous surgery in the TAPP group. Use of mesh was higher in the TAPP group (73% vs 86%, p=0.03). There were no differences between the two groups for incidences of

resected intestinal tract (12% vs 29%, p=0.14). The operation time was slightly longer (78±30 vs 127±49 min, p=0.09), and blood loss was significantly smaller in the TAPP group (21±42 vs 3±6 ml, p=0.01) (Table 3).

Postoperative complications

The TAPP group had less postoperative complications. The stay after surgery was shorter in the TAPP group but was not statistically significant (11.2±10.3 vs 9.0±11.5 day, p=0.56). There have been no reported mesh infections in either group (Table 4).

DISCUSSION

Laparoscopic surgery with the TAPP approach has less postoperative pain and earlier social reintegration than the open surgical approach; however, no differences in the incidence of complications between the two approaches have been reported.[1–4] As a result, the use of laparoscopic surgery has rapidly spread in Japan.[6] However, there has been no worldwide consensus or clear evidence that indicates laparoscopic surgery for emergent inguinal hernias is better than the open surgical approach, and the surgical method performed is usually determined by the preferences of the surgeon.[10] An emergent operation for a groin hernia carries a substantial mortality risk.[5] In cases of groin incarcerated hernias, it is necessary to examine the condition of the intestinal tract and abdominal cavity to determine if resection of the intestinal tract is needed and if contamination of the abdominal cavity is present. Laparoscopic surgery with the TAPP approach has an advantage, because it is possible to widely confirm the condition of the intestinal tract and abdominal cavity.[11] When intestinal resection and anastomosis are required, it is possible to extracorporeally perform laparoscopic surgery with the TAPP approach through the enlarged umbilical port site after completion of the hernia repair with closure of the preperitoneal inguinal space. This wound separation from the inguinal area allows for prosthesis usage with minimal risk of bacterial contamination during the hernia repair.[6] Although wound separation is possible with the open surgical approach, the dissecting incisions would need to be widely placed. When the abdominal distension is caused by ileus, laparoscopic surgery with the TAPP approach is difficult to manipulate due to a poor visual field, and therefore the open surgical method has the advantage. In our retrospective comparison of the patient groups for these two methods, no differences were observed in the background and preoperative examinations; however, the TAPP group had longer operation times and significantly lower blood loss. The TAPP group had fewer complications, but the difference was not statistically significant. The number of hospital days was shorter in the TAPP group, suggesting the possibility that laparoscopic surgery with the TAPP approach may be effective in emergent situations.

CONCLUSION

The operation time of laparoscopic surgery with the TAPP approach is longer than the open surgical approach but with fewer complications and a shorter postoperative stay. Our study demonstrates that laparoscopic surgery with the TAPP approach for strangulated inguinal hernias is comparable to the open surgical approach with regard to short-term outcomes. We also demonstrated that laparoscopic surgery is a useful technique in emergent situations. However, a sufficient knowledge of anatomy and expertise in the reduction of the strangulated organs are required. Further randomized controlled trials are needed to confirm our findings.

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