

## Fifteen-year experience in managing obturator hernia: from open to laparoscopic approach

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Received: 23 December 2012 / Accepted: 23 March 2013 / Published online: 2 April 2013  
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### Abstract

**Purpose** Obturator hernia is a rare disease and preoperative diagnosis is always difficult. There are increasing reports employing laparoscopic approach in the recent literature. Our aim was to review and compare the open and laparoscopic approach in repairing obturator hernia.

**Methods** All patients with obturator hernia from 1997 to 2011 were recruited. Patient's demographics, presentation, operative details, morbidity, and mortality were retrospectively collected and reviewed.

**Results** There were 36 patients during the 15-year period. All of them were elderly ladies (median 83). Nineteen underwent open surgery while 16 received laparoscopic surgery. Both age and ASA were comparable. The median operative time was 68 and 65 min for laparoscopic and open group, respectively ( $p = 0.690$ ). The median hospital stay was significantly longer in the open group (19 vs 5 days,  $p = 0.007$ ). There were less major complications ( $p = 0.004$ ) and mortality ( $p = 0.049$ ) in the laparoscopic group. Two recurrences were reported in the laparoscopic group, although statistically not significant ( $p = 0.202$ ).

**Conclusions** Laparoscopic repair can achieve a shorter hospital stay and has lesser major complications and mortality in selected patients.

**Keywords** Obturator Hernia · Intestinal obstruction · Laparoscopic repair

### Introduction

Obturator hernia was first described by Pierre Roland Arnaud de Ronsil in 1924. It is an uncommon hernia accounting for less than 0.07 % of all hernias [1, 2] and 0.4 % of patients with mechanical intestinal obstruction [2]. It is usually found in elderly ladies in their seventh or eighth decades [3, 4]. Majority (nearly 90 %) present as intestinal obstruction in patients with no previous operation [5–7]. The classical and pathognomonic Howship–Romberg sign occurs in only 25 to 50 % of patients. It is characterized by the pain in the medial aspect of thigh, which is relieved by flexion and exaggerated by extension, adduction, or medial rotation. In majority of cases, the diagnosis is only recognized during operation [6].

The standard treatment is repair via open laparotomy; however, it carries a high morbidity and mortality especially in elderly with compromised pulmonary and cardiac status [8–10]. The difficulty in preoperative diagnosis, high peri-operative morbidity, and sometimes mortality explained why it remains a challenge for most surgeons. As reported from the recent literature, there is an increasing trend in adopting laparoscopic approach in managing obturator hernia and able to achieve a favorable outcome. To the best of our knowledge, there is no study comparing the laparoscopic approach against the conventional open method. This study aims at reviewing our results for the past 15 years and see whether there is any advantage in pursuing the laparoscopic approach.

### Materials and methods

Pamela Youde Nethersole Eastern Hospital is a regional hospital and a minimal access surgery center in Hong

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Kong. Patients with a diagnosis of obturator hernia and managed under Department of Surgery from 1997 to 2011 were recruited. They were divided into two groups according to the operative approach, that is, the open and laparoscopic group. Data including patient demographics, ASA status, operative time and details, method of repair, length of stay, recurrence, morbidity and mortality were collected retrospectively.

In our center, liberal use of diagnostic laparoscopy has been gradually adopted for patients with intestinal obstruction since 2000 and which helped in formulating subsequent management decision. Laparoscopic repair of obturator hernia was introduced in our unit in 2002, but the selection was mainly depended on the surgeon's discretion.

SPSS® software (Window version 15.0; SPSS® Inc., Chicago, Illinois, USA) was used in calculating the statistics. Mann–Whitney test was used to compare those continuous variables, whereas categorical variables were compared using either chi-square test or Fisher's exact test. A significant level was taken when  $p < 0.05$ .

## Results

From January 1997 to December 2011, there were 36 patients with obturator hernia managed in our hospital. One patient refused operation and was discharged against medical advice. Thirty-five of them underwent operations. Among them, 19 patients received laparotomy, whereas 16 had the hernia repaired via laparoscopy. All patients were female, and the median age was 83 (range 56–94). For the ASA grading, there were 6, 10, and 3 patients in class I, II, and III in open group, while 10, 4, and 2 patients in class I, II, and III in laparoscopic group, respectively. There were no statistical difference detected in age ( $p = 0.605$ ) and ASA status ( $p = 0.170$ ) between these two groups. The results were summarized in Table 1.

**Table 1** Patient's demographics

	Open group	Lap group	<i>p</i> value
Number of patients	19	16	
Age*	82 (76–92)	81 (56–94)	0.605 <sup>a</sup>
Sex (M:F)	19:0	16:0	N/A
ASA status			
I	6	10	0.170 <sup>b</sup>
II	10	4	
III	3	2	

N/A not applicable

\* Median was used with range given in blanket

<sup>a</sup> Mann–Whitney test

<sup>b</sup> Chi-square test

Regarding the presenting symptoms, 28 patients presented with intestinal obstruction and 8 patients presented with abdominal pain. Only 5 (13.9 %) patients had the classical ipsilateral thigh pain on presentation, and all of them had symptoms of intestinal obstruction as well. The preoperative diagnosis was correctly made in 19 patients based on clinical features and imaging studies. For the remaining 16 patients, diagnosis could only be made upon surgical exploration.

In the operative findings, 22 (63 %) had obstructing right-side hernias while 13 (37 %) had obstructing left-side hernias. Non-obstructing contra-lateral obturator hernias were found in 12 (34 %) patients. For the repair materials, broad ligament was used in eighteen patients and one was repaired primarily in open group. In the laparoscopic arm, broad ligament was used in nine patients while one with intraperitoneal gortex mesh, the remaining six were repaired extraperitoneally using prolene mesh.

Concerning the operative parameters, there was no statistically significant difference in terms of operative time (65 min for open group vs 68 min for laparoscopic group,  $p = 0.690$ ). Ten patients required small bowel resections, nine of them were in the open group while the remaining one in the laparoscopic group. The difference was significant ( $p = 0.010$ ). For the recovery, the median length of stay was 19 days (range: 2–73 days) in open group which was longer than the laparoscopic group (5 days, range: 3–6 days) and the difference was statistically significant ( $p = 0.007$ ).

Five pulmonary and three cardiovascular complications were reported in the open group, while no major complications reported in the laparoscopic group. The difference was statistically significant ( $p = 0.004$ ). There were 5 mortalities in this series, all of them were in the open group ( $p = 0.049$ ). In terms of recurrence, two were reported in the laparoscopic group, whereas no recurrence was noticed in the open group. The difference did not reach statistical significance ( $p = 0.202$ ). The results were summarized in Table 2.

Two subgroup analyses were performed in order to eliminate the selection bias. The first one was the comparison between laparoscopic and open approaches in patients without small bowel resection. The results were summarized in Table 3. There was no significant difference between the groups in the age and ASA status. The median operative time was significantly longer in the laparoscopic group ( $p = 0.013$ ). On the other hand, the median hospital stay ( $p = 0.021$ ), overall complications ( $p = 0.023$ ), and pulmonary complications ( $p = 0.017$ ) remained significantly better in the laparoscopic group. There was also a trend of lesser mortality in the laparoscopic group ( $p = 0.052$ ), although not reaching statistical significant. There was no significant difference in recurrence.

**Table 2** Comparison of operative and postoperative parameters between open and laparoscopic group

	Open group ( <i>n</i> = 19)	Lap group ( <i>n</i> = 16)	<i>p</i> value
Operative parameters			
Small bowel resection	9	1	0.010 <sup>b</sup>
Operative time (min)*	65 (35–120)	68 (45–105)	0.690 <sup>a</sup>
Material used			
Broad ligament	18	9	
Primary closure	1	0	
Intraperitoneal gortex	0	1	
Extraperitoneal mesh	0	6	
Post-operative parameters			
Follow up period (months)*	43 (0–158)	48 (12–112)	0.721 <sup>a</sup>
Complications (overall)	8	0	0.004 <sup>b</sup>
Pulmonary	5	0	0.049 <sup>b</sup>
Cardiovascular	3	0	0.234 <sup>b</sup>
Mortality	5	0	0.049 <sup>b</sup>
Length of stay (days)*	19 (2–73)	5 (2–12)	0.007 <sup>a</sup>
Recurrence	0 (0 %)	2 (12.5 %)	0.202 <sup>b</sup>

Italic values indicate  $p < 0.05$

\* Median was used with range given in blanket

<sup>a</sup> Mann–Whitney test

<sup>b</sup> Fisher’s exact test

<sup>c</sup> Chi-square test

**Table 3** Subgroup Analysis: comparison of operative and postoperative parameters between open and laparoscopic group in patients without bowel resection

	Open group ( <i>n</i> = 10)	Lap group ( <i>n</i> = 15)	<i>p</i> value
Age	84 (75–93)	80 (56–94)	0.458 <sup>a</sup>
ASA status			
I	2	9	0.141 <sup>c</sup>
II	5	4	
III	3	2	
Operative time (min)*	50 (35–90)	70 (45–105)	0.013 <sup>a</sup>
Complications (overall)	5	1	0.023 <sup>b</sup>
Pulmonary	4	0	0.017 <sup>b</sup>
Cardiovascular	1	0	0.400 <sup>b</sup>
Mortality	3	0	0.052 <sup>b</sup>
Length of stay (days)*	15 (2–53)	5 (2–12)	0.021 <sup>a</sup>
Recurrence	0 (0 %)	2 (13.3 %)	0.500 <sup>b</sup>

Italic values indicate  $p < 0.05$

\* Median was used with range given in blanket

<sup>a</sup> Mann–Whitney test

<sup>b</sup> Fisher’s exact test

<sup>c</sup> Chi-square test

Another subgroup analysis was also performed to those patients presented as intestinal obstruction in emergency. The results are summarized in Table 4. There was no significant difference between groups in the age and ASA status. The median hospital stay ( $p = 0.019$ ) and overall complications ( $p = 0.041$ ) remained significantly better in the laparoscopic group. There was also a trend of lesser mortality in the laparoscopic group ( $p = 0.098$ ), although not reaching statistic significant. There was no significant difference in the median operative time and recurrence.

## Discussion

Obturator hernia, also called “the skinny old lady hernia,” is an uncommon hernia occurring in elderly ladies and usually presented as intestinal obstruction [3–5]. It is six

times more common in women due to the wider and more obliquely inclined female pelvis, the larger transverse diameter of the obturator foramen, and pregnancies [6, 12–15]. Right-side obturator hernia is more common [16, 17], possibly explained by the sigmoid colon lying in front of the obturator foramen on the left side, whereas bilateral involvement is uncommon [6, 18]. In our series, all patients were female and the median age was 82. Eighty-three percent of our patients presented with symptoms of intestinal obstruction. Only 12.5 % of our patients had the classical Howship Romberg sign and most are right-sided hernia. This correlates well with the literature. Interestingly, non-obstructing hernia in contra-lateral side was found in 34 % of our patients.

Preoperative diagnosis is difficult and the diagnosis is usually made during exploratory laparotomy. The bowel resection rate was reported to be 25–75 %, and mortality

**Table 4** Subgroup Analysis: comparison of operative and postoperative parameters between open and laparoscopic group in patients presenting with symptoms of intestinal obstruction in emergency

	Open group (n = 14)	Lap group (n = 14)	p value
Age	83 (75–93)	86 (56–94)	0.592 <sup>a</sup>
ASA status			
I	4	9	0.154 <sup>c</sup>
II	7	4	
III	3	1	
Operative time (min)*	60 (35–90)	70 (45–95)	0.217 <sup>a</sup>
Complications (overall)	5	0	0.041 <sup>b</sup>
Pulmonary	3	0	0.222 <sup>b</sup>
Cardiovascular	2	0	0.481 <sup>b</sup>
Mortality	4	0	0.098 <sup>b</sup>
Length of stay (days)*	12 (2–73)	5 (3–12)	0.019 <sup>a</sup>
Recurrence	0 (0 %)	2 (14.3 %)	0.481 <sup>b</sup>

Italic values indicate  $p < 0.05$

\* Median was used with range given in blanket

<sup>a</sup> Mann–Whitney test

<sup>b</sup> Fisher's exact test

<sup>c</sup> Chi-square test

was 15–50 % in conventional open repair [2, 14, 18–20]. The difficulty in diagnosis combined with the concomitant medical illness and frequent small bowel strangulation contributed to the high morbidity and mortality [9, 10].

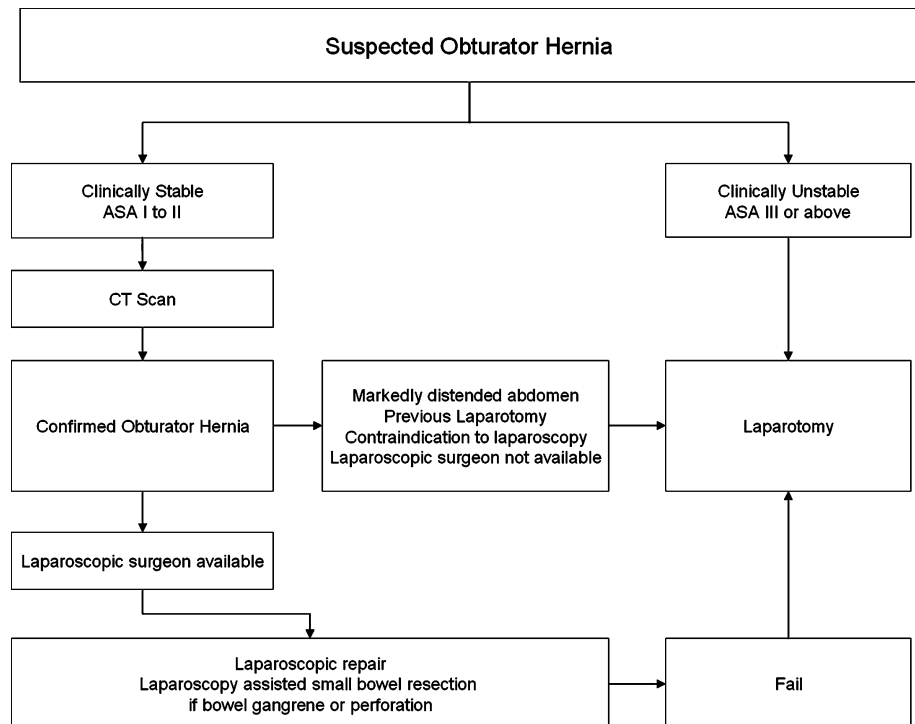
Therefore, improving preoperative diagnosis and developing innovative technique in repairing obturator hernia are two important issues. Using computed tomography (CT) scan in diagnosing obturator hernia was first described in 1983 by Cubillo [21]. Nowadays, CT scan becomes more readily available and being considered as a routine investigation in those patients with intestinal obstruction without previous operation and signs of strangulation. Its value is well proven in diagnosing obturator hernia with an accuracy of 80 % [9, 22, 23], which in turn can allow a better planning before the operation. Kammori also showed that CT scan helped to reduce both bowel resection rate (25.0 vs 52.2 %,  $p = 0.03$ ) and surgical mortality (5.0 vs 30.4 %,  $p = 0.04$ ) [22]. Therefore, CT scan should be recommended as a routine in patients suspected to have obturator hernia.

Laparoscopic repair is another major advance in management of obturator hernia. Since the first 7 laparoscopic repairs of obturator hernia described by Tucker in 1995, there is increasing number of case series describing different successful approaches in the repairing of obturator hernia, not only in elective but also in emergency [24–28]. Laparoscopy theoretically can shorten hospital stay, fasten postoperative recovery, and decrease peri-operative cardiovascular and pulmonary complications. In our study, the time of recovery was significantly shorter in the laparoscopic group as indicated by the shorter length of hospital stay (5 vs 12 days). Furthermore, there were lesser major morbidity, that is, cardiovascular and respiratory complications, and mortality in the laparoscopy group. On the other hand, small bowel resection was significantly more in the open group. It can be challenged that the patients in the open group were actually more ill; however, there was no

difference in the ASA status statistically. We admitted that selection bias is unavoidable in our retrospective study, but a randomized controlled trial is always difficult in such a rare disease. In order to minimize the effect of selection bias, we performed subgroup analyses in patients without small bowel resection (in order to eliminate those more sick patients) and in patients presented with intestinal obstruction in emergency (fair comparison with same presenting symptoms). Both length of stay and overall complications remained significantly better in the laparoscopic group, and there was a trend of lesser mortality in the laparoscopic group in both subgroup analyses. We believed that there is a true benefit in the laparoscopic group.

Although the advantage of laparoscopic repair is generally accepted, there is wide diversity in the methods of laparoscopic repair, and no comparative studies were reported in the literature [8]. Similar to open repair, laparoscopic repair can be divided into intraperitoneal and extraperitoneal approaches. Intraperitoneal repair includes primary closure, and patch repair with either biological or synthetic materials. It has the advantage of making diagnosis and inspection of the bowel viability. It can be performed in both elective and emergency and in those patients without diagnosis made before operation. However, the peritoneal cavity was entered and disturbed, making formation of adhesion and intraperitoneal organ injury as the potential problems.

Extraperitoneal repair includes transabdominal and preperitoneal approaches. Laparoscopic transabdominal extraperitoneal approach was well described by Tucker [24] in 1995, which consists of a diagnostic laparoscopy and reduction in hernia, followed by elevation of peritoneal flap and placement of prolene mesh covering the obturator canal. Laparoscopic total extraperitoneal or preperitoneal repair was first described by Yokoyama [29] in 1998 in a patient with reducible obturator hernia. Trocar was placed

**Fig. 1** A structure approach in managing obturator hernia

in the preperitoneal space created followed by the placement of the mesh. The peritoneal cavity was not entered. Total preperitoneal approach can only be performed in “planned” patients with diagnosis made before the operation when compared to the intraperitoneal approach.

In patients with bowel strangulation which required bowel resection, a mini-laparotomy can be made to assist the operation [26], that is, laparoscopic-assisted bowel resection. Laparoscopic-assisted bowel resection is technically more difficult. It is not feasible if the hernia failed to be reduced laparoscopically, or when the bowel is markedly dilated which preventing the safe insertion of laparoscopy and instruments. It is also more difficult in the extraperitoneal approach. However, it is a valuable option in those suitable patient and when an experience laparoscopic surgeon available. One patient in our series had intraperitoneal repair with laparoscopic-assisted small bowel resection.

In our series, sixteen patients underwent laparoscopic repair. Nine of them had intraperitoneal repair with broad ligament. Two recurred within 1 year, one was due to the loosening of the stitches, and the other one was due to the use of absorbable suture [11]. These two patients actually were our first and second patients. Both patients presented with recurrent intestinal obstruction and required second operation in subsequent admission. They recovered well without residual morbidity finally. For the remaining seven patients, one was an intraperitoneal repair using gortex; the other six were an total extraperitoneal approach using a prolene mesh. There were no morbidity or mortality

reported. Although our experience is limited, these few cases already illustrated the diversity of the methods used, and the potential pitfalls and difficulty of laparoscopic repair. A structured approach in managing obturator hernia is summarized and illustrated in Fig. 1.

In conclusion, obturator hernia is a rare disease and diagnosis is always difficult. Management is still challenging and open repair is the mostly adopted method. Routine preoperative CT scan should be recommended in stable patients. Laparoscopic repair in selected patients can lead to faster recovery, lesser perioperative complication, and mortality. However, further efforts are needed to address the efficacy and long-term recurrence rate.

**Conflict of interest** DCKN, KLMT CNT, MKWL declare no conflict of interest.

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