

# Unclosed Fascial Defect: Is It the Risk to Develop Port-Site Hernia after Laparoscopic Cholecystectomy?

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**Objective:** Port-site hernia (PSH) is one of the complications after laparoscopic cholecystectomy (LC). Closure of the fascial defect has been mentioned to prevent such complication. However, the results are still controversial. The present study was done to clarify whether unclosed fascial defect was actually the risk factor for the development of PSH.

**Material and Method:** Two hundred ninety four patients underwent LC by a single surgeon at Kalasin Hospital between 2007 and 2010. The procedure was done by using a four-port technique without closure of any fascial defects. The male:female ratio was 85:209, and the mean body mass index was  $24.38 \pm 3.33$  (SD). The mean operative time was  $18.71 \pm 3.76$  minutes and there was no postoperative wound infection. Patients were regularly followed-up and underwent both supine and upright physical examination. The mean duration of follow-up period was  $4.94 \pm 1.31$  years with the shortest follow-up period of two years.

**Results:** None of the patients in the present study developed PSH in any port sites during the follow-up period.

**Conclusion:** Unclosed fascial defect may not have the significant risk factor of developing PSH after LC.

**Keywords:** Port-site hernia, Laparoscopic cholecystectomy

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Since the first laparoscopic cholecystectomy (LC) was done by Prof. Dr. Med Erich Mühe of Böblingen, in Germany, on September 12, 1985<sup>(1-3)</sup>, several new techniques and instruments have been developed. LC is now recognized as the procedure of choice for gallbladder removal particularly in gallstone disease<sup>(4)</sup>. Because of the development of technical aspects of laparoscopic surgery, several serious complications related to the operative technique, such as common bile duct injury, have been reported to be low, and are now at acceptable levels. Port-site hernia (PSH) is one of the recognized complications after LC, and was firstly reported by Maio et al in 1991<sup>(5)</sup>. The incidence of PSH was reported varying between 0.14 and 22%<sup>(6-11)</sup>. Although the majority of patients with PSH had minimal symptoms because the herniated tissue was mainly of omentum<sup>(12,13)</sup>, PSH has been reported to lead to serious complications such as bowel obstruction, perforation, strangulation, and even fatality<sup>(12,13-15)</sup>. Not closing the fascial defect at the port site has been postulated as the risk factor for the

development of PSH<sup>(12,14)</sup>. However, the postulation was not confirmed in several other studies<sup>(7,14,17)</sup>. The present study was done in order to clarify such controversial issue; i.e. the cause-effect of unclosed fascial defect on the development of PSH after LC.

## Material and Method

Seven hundred and ninety-one patients underwent LC at the Kalasin Hospital between 2007 and 2010. The procedure was done by one of the authors (Tangjaroen S) in 302 patients. Four-port technique was routinely used: 10-mm long infra-umbilical incision for the telescope trocar, a 5-mm long incision in the right mid-axillary line about 5 to 8 cm below the right rib margin, a 5-mm long incision at the right mid-clavicular line about 2 cm below the right costal margin, and a 10-mm long incision approximately at the junction of upper third and lower two-thirds of a line between the xiphoid process and the umbilicus. Laparoscopic cholecystectomy was done as a usual manner, but without closure of any fascial defects at the port sites. Informed consent was done in every patient.

Among the 302 patients underwent LC by Tangjaroen S, eight patients were lost follow-up. The remaining two hundred and ninety-four patients were

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regularly followed-up by being physical examined, both in supine and upright position. The mean duration of follow-up period of  $4.94 \pm 1.31$  years (standard deviation range 2-6 years). These 294 patients formed the basis of the present study.

This research study was considered and approved by the ethic committee of the hospital.

## Results

None of these 294 patients had preexisting hernia on preoperative evaluation. The male to female ratio was 85:209, and the mean age was  $52.54 \pm 12.09$  years (range 20-86 years). The mean body mass index at the time of admission was  $24.38 \pm 3.33$  (range 16.65-34.06). The mean operative time was  $18.71 \pm 3.76$  minutes (range 10-30 minutes). None of the patients needed wound extension for gallbladder extraction, likewise the surgical wound infection. All patients were seen according to the follow-up schedule until the end of this study; seven patients could not attend the follow-up clinic as scheduled were contacted by post. These seven patients were asked simple questions about symptoms of abdominal pain, lump or pain or tenderness at the surgical site, and any jaundice. The shortest follow-up period was two years, and the mean body mass index at the last visit was  $24.60 \pm 3.80$  (range 15.06-37.78). There was no significant difference between the body mass index at the time of preoperative admission and the last follow-up visit.

There was no evidence of port-site hernia throughout the period of study. Indurated mass could be felt in seven patients, but definitely not being related to the hernia.

## Discussion

The literature reviewed about port-site hernia following laparoscopic cholecystectomy by Bunting DM showed the most important factors were old age, high body mass index, preexisting hernia, trocar design, trocar diameter, increased duration of surgery, and extension of the port site for gallbladder extraction<sup>(18)</sup>. Almost all these factors did not exist in the patients in the present study; the mean age of  $52.54 \pm 12.09$  years (range 20-86 years), the mean body mass index at the time of admission of  $24.38 \pm 3.33$  (range 16.65-34.06), the negative preexisting hernia, the short operative time of  $18.71 \pm 3.76$  minutes (range 10-30 minutes), and none of the patients needed wound extension for gallbladder extraction. Moreover, there was no port-site wound infection in

all 294 patients. These might partly explain the zero incidence of port-site hernia in the present study.

Possible methods to prevent port-site hernia have been mentioned including the closure of the fascial defects at all port sites particularly those more than 10 mm<sup>(12,14,19)</sup>. However, the issue has still been debatable. In many series, patients who developed port-site hernia actually had more than one risk factors apart from the technique, which may due to the fascial defect at the port sites<sup>(13,14)</sup>. According to a report of the American Association of Gynecologic Laparoscopists in 1994, 933 hernias were detected after 4,385,000 laparoscopic procedures (0.02%). One hundred sixty-seven patients (17.9%) were reported to have occurred despite the closure of fascial defects. Among the 840 hernias, the size of the original fascial defect was noted, 725 (86.3%) developed in port sites where 10 mm or larger diameter trocars had been used. Only 92 hernias (10.9%) occurred at the port sites of 8 to 10 mm trocars and only 23 hernias (2.7%) at the port sites of smaller diameter trocars<sup>(20)</sup>. The maximal size of the trocars used in the present study was 10 mm, and with no further extension of the incision, combined with lack of other risk factors of port-site hernia development might be the reasons of the zero incidence of port-site hernia in the present study.

Increased body weight after laparoscopic surgery has been suggested as one of the risk factors for port-site hernia development<sup>(13)</sup>. However, the mean duration of follow-up period of  $4.94 \pm 1.31$  years and the minimum period of two years are usually acceptable as long enough to study the incidence of port-site hernia development particularly in the group with steady body weights as in the present study.

In conclusion, unclosed fascial defect after laparoscopic cholecystectomy may not be the risk factor for port-site hernia development as long as there are no other major risk factors.

## What is already known on this topic?

Several risk factors for the development of PSH have been reported<sup>(12,14)</sup>.

## What this study adds?

Not closing the fascial defect at the port site is not a significant risk factors for the development of PSH.

## Potential conflicts of interest

None.

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การไม่เย็บปิดแผ่นพังผืดของผนังหน้าท้องเป็นปัจจัยเสี่ยงของการเกิดไส้เลื่อนบริเวณที่ใส่กล้องหรือเครื่องมือในการส่องกล้องผ่าตัดตดุงน้ำดีจริงหรือไม่?

สมอาจ ตั้งเจริญ, ประสิทธิ์ วัฒนภา

**วัตถุประสงค์:** ไส้เลื่อนบริเวณที่ใส่กล้องหรือเครื่องมือเป็นภาวะแทรกซ้อนประการหนึ่งของการส่องกล้องผ่าตัดตดุงน้ำดี การไม่เย็บแผ่นพังผืดของผนังช่องท้องอาจเป็นสาเหตุหนึ่ง แต่รายงานผลการศึกษาเรื่องดังกล่าว ยังไม่สามารถสรุปได้ชัดเจนว่าเป็นสาเหตุหรือไม่ การศึกษาครั้งนี้เพื่อหาข้อมูลว่าการไม่เย็บแผ่นพังผืดของผนังช่องท้องจะเป็นปัจจัยเสี่ยงหรือไม่ ต่อการเกิดไส้เลื่อนบริเวณที่ใส่กล้องหรือเครื่องมือในการผ่าตัดส่องกล้องตดุงน้ำดี

**วัสดุและวิธีการ:** ศึกษาในผู้ป่วยจำนวน 294 ราย ที่ได้รับการส่องกล้องตดุงน้ำดีที่โรงพยาบาลกพสินธุ์โดยศัลยแพทย์คนเดียว (สมอาจ ตั้งเจริญ) ระหว่างปี พ.ศ. 2550 ถึง พ.ศ. 2553 การผ่าตัดใช้วิธีใส่เครื่องมือ 4 ตำแหน่ง และไม่มีการเย็บแผ่นพังผืดของผนังหน้าท้องทุกตำแหน่ง ผู้ป่วยได้รับการติดตามเป็นระยะ ๆ โดยการตรวจร่างกายทั้งในท่านอนและทำยืน

**ผลการศึกษา:** ผู้ป่วยจำนวน 294 ราย เป็นผู้ป่วยเพศชาย 85 ราย เพศหญิง 209 ราย ดัชนีมวลกายเฉลี่ยคือ  $24.38 \pm 3.33$  (ค่าเบี่ยงเบนมาตรฐาน) ระยะเวลาการผ่าตัดเฉลี่ยคือ  $18.71 \pm 3.76$  นาที ไม่เกิดภาวะติดเชื้อมีแผลผ่าตัดในผู้ป่วยทุกราย ระยะเวลาการติดตามผู้ป่วยเฉลี่ยคือ  $4.94 \pm 1.31$  ปี โดยระยะเวลาติดตามผู้ป่วยสั้นที่สุดคือ 2 ปี ไม่พบการเกิดไส้เลื่อนบริเวณที่ใส่กล้องหรือเครื่องมือในการผ่าตัดส่องกล้องตดุงน้ำดีทั้ง 294 ราย ตลอดช่วงเวลาการติดตามผู้ป่วย

**สรุป:** การไม่เย็บพังผืดของผนังหน้าท้องไม่น่าจะเป็นปัจจัยเสี่ยงที่สำคัญของการเกิดไส้เลื่อนบริเวณที่ใส่กล้องหรือเครื่องมือในการผ่าตัดส่องกล้องตดุงน้ำดีในการศึกษาครั้งนี้

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