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Original Article

Management of Giant Ventral Hernia after Trauma Laparotomy: The 8-year Experience from a Level 1 Trauma Center in Thailand

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Abstract

Background: **Giant ventral hernia occurs after failure to achieve formal fascial closure after laparotomy. This condition needs further treatment for closure while the techniques very among institutes.**

Objective: **This study aims to review the treatment and the results of giant ventral hernia closure after trauma laparotomy at Songklanagarind hospital where is a level 1 trauma center in Thailand.**

Materials and Methods: **A retrospective review of all trauma patients who had giant ventral hernia closure between January 2007 and December 2014. The repair techniques, type of mesh and results were collected.**

Results: **Forty-six patients underwent giant ventral hernia repair. The median age was 33 years. Ninety-one percent was mesh repair and 7% was tissue repair. Composite mesh was most commonly used (93%). The median follow-up time was 598 days (IQR 228 to 1356 days; longest, 2031 days). Surgical site infection occurred in 4 cases (9%) but only one needed surgical intervention for mesh infection. There was one recurrence (2%).**

Conclusions: **Mesh repair is safe for giant ventral hernia closure. Serious mesh-related infection and recurrence were rare.**

Keywords: **Ventral hernia, surgical mesh, complications**

Introduction

Initial fascial closure after trauma laparotomy is achievable in only 66% of the time after damage control surgery[1]. Patients who could not have primary fascial closure will have giant ventral hernia, and will require subsequent abdominal wall reconstruction. Also, after damage control surgery, giant ventral hernia can occur following abdominal wall debridement after deep surgical site infection[2].

There is no consensus on the best technique of ventral hernia repair, and it varies according to the surgeon's preference. Even for surgeons who prefer the mesh repair method, the type of mesh used also varies[3]. Theoretically, the reconstruction technique

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can be divided into two groups. The first repair uses the host tissue, also called tissue repair. This technique is to suture the patient's abdominal wall together. The second repair uses a prosthetic mesh.

The purpose of this study is to describe the technique and outcomes of giant ventral hernia repair at Songklanagarind Hospital which is a university hospital and a level 1 trauma center of Prince of Songkla University.

Materials and Methods

This report is a retrospective review of all adult trauma patients who underwent giant ventral hernia repair from January 2007 to December 2014 at the hospital at Prince of Songkla University. Patients were identified from the hospital data base using the International Classification of Diseases (ICD) 10 code K43-K46. Patients included were 15 years old or older. Giant ventral hernia was defined as a hernia that occurred along the entire midline incision after abdominal closure. This condition often occurred after damage control laparotomy or after abdominal wall debridement from infection, and the abdominal fascia could not be used for closure.

The data collected included demographics, repair techniques, materials and complications. The follow-up time was defined as the time interval between hernia repair and the last visit at the trauma clinic. Complications included surgical site infection and recurrence.

Result

There were 46 patients who underwent giant ventral hernia repair in the study period. Seventy-four percent were male. The median age was 33 years (IQR 27 to 46 years). The median follow-up time was 598 days (IQR 228 to 1356 days). The longest follow-up time was 2031 days.

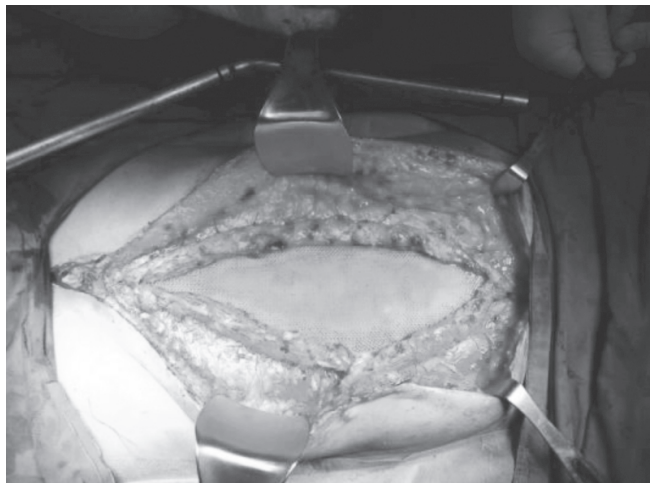

Figure 1 Giant ventral hernia repair with a composite mesh

The median time from injury to repair was 384 days (IQR 278 to 511 days). Forty-two patients (91%) received mesh repair. Only three patients had tissue repair (7%). No information was available on the repair technique and date of injury in one patient. Among the 42 patients who had mesh repair, 39 patients (93%) were repaired with a composite mesh, see Figure 1, two (5%) were repaired with a Marlex mesh, and one patient (2%) was repaired with a polytetrafluoroethylene mesh (PTFE).

Of the 46 patients, complications occurred in 8 patients (17%), with infection occurring in 4 patients (9%) (Table 1). Among patients who had an infection, only one required mesh removal. This particular patient

Table 1 Details of patients with complications occurring after giant ventral hernia repair

Gender	Age	Repaired Technique	Complications
Male	46	Mesh repair, composite mesh	Partial small bowel obstruction
Female	74	Mesh repair, PTFE	Mesh infection & removal
Male	26	Mesh repair with free flap coverage, composite mesh	Flap loss, infected mesh
Male	30	Mesh repair, composite mesh	Superficial surgical site infection
Male	51	Mesh repair, composite mesh	Recurrence
Male	54	Mesh repair, composite mesh	Superficial surgical site infection
Male	49	Mesh repair, composite mesh	Pneumonia
Male	29	Mesh repair, composite mesh	Septicemia

had a PTFE mesh repair and developed abdominal distension postoperatively as a result of skin flap necrosis followed by mesh infection. The patient underwent mesh removal and was discharged home with a giant ventral hernia.

Only one patient (2%) who had a hernia repair with a composite mesh had a recurrence 3 months postoperatively. The details of patients and their complications are given in Table 1.

Discussion

Giant ventral hernia repair with mesh was the most popular method of repair at Songklanagarind Hospital. There are a few published reports of the outcomes after giant ventral hernia repair, especially a repair with prosthetic mesh. Our recurrence rate was quite low compared with that of other studies. Hawn et al.[4] followed almost a thousand incisional hernia repair patients and found a 28.5% recurrence rate, but this study did not analyze the recurrence based on the details of each technique. Another study reported a recurrence rate between 18% and 40% after mesh repair, depending on the type of mesh used[5].

Compared with laparoscopic ventral hernia repair, in which the reported recurrence rate varied from 11.2% to 12.4%[6,7], our recurrence rate was lower. The component separation technique which uses a biological mesh had reported a recurrence rate of only 1.5%. However, the average follow-up time in the report was only 20 months[8].

When compared with a study from DiCocco, et al. who reported long-term outcomes in post-trauma ventral hernia patients, a similar patient population to that of the present study, our recurrence rate was much lower (2% vs 14%).This study also found prosthesis used to be related to increased recurrence which was contrary to the result of our study that showed prosthesis repair to have only one recurrence. However, the follow-up time in our study was much shorter[9]. We did see any recurrences in the tissue repair group, but the number of the patients with tissue repair was too small to make the conclusion that tissue repair had a lower recurrence rate.

The rate of infection in our series was quite high, at 11% of all repairs. A systematic review of primary ventral hernia repairs reported surgical site infection rate as 7.3%[10]. Another study, from Sailes et al.[5], reported a 10-year experience with ventral hernia repair, found a 1.8% mesh infection rate and a low rate of enterocutaneous fistula (<1%). In the present study, five patients had infectious complications, with only one mesh removal and no enterocutaneous fistula.

Limitations of the present study included some missing data. We could not find details on mesh laying techniques, or the size of the defects in the medical records.

Conclusion

Mesh repair is a safe technique for treating giant ventral hernia occurring after trauma laparotomy. The recurrence rate is much lower than those of other reports and there were no serious complications, such as the occurrence of enterocutaneous fistula.

Conflict of Interests

The authors do not have any conflict of interest with the related topic of this research.

Declarations

This research did not have any source of funding.

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บทคัดย่อ **การรักษาไส้เลื่อนผนังหน้าท้องขนาดใหญ่ที่เกิดตามหลังการผ่าตัดช่องท้องในผู้ป่วยอุบัติเหตุ ระยะเวลา 8 ปี ในศูนย์อุบัติเหตุในประเทศไทย**

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ที่มาและความสำคัญ: ไส้เลื่อนผนังหน้าท้องขนาดใหญ่เกิดเมื่อไม่สามารถปิดผนังหน้าท้องได้หลังจากการผ่าตัดช่องท้อง โดยภาวะนี้จำเป็นต้องรับการรักษา แต่ในปัจจุบันยังไม่มีแนวทางการรักษาที่ชัดเจน

วัตถุประสงค์: ทบทวนการรักษาและผลของการรักษาไส้เลื่อนผนังหน้าท้องขนาดใหญ่ที่เกิดภายหลังจากการผ่าตัดช่องท้องในผู้ป่วยอุบัติเหตุ ในศูนย์อุบัติเหตุในประเทศไทย

วิธีการ: เป็นการศึกษาแบบย้อนหลัง โดยศึกษาในผู้ป่วยทุกรายที่ได้รับการผ่าตัดซ่อมแซมไส้เลื่อนผนังหน้าท้องขนาดใหญ่ ระหว่างมกราคม 2550 ถึงธันวาคม 2557 ในโรงพยาบาลสงขลานครินทร์ โดยเก็บข้อมูลถึงวิธีการซ่อมแซม ชนิดของผนังหน้าท้องเทียม และผลการรักษา

ผลการศึกษา: ผู้ป่วยจำนวน 46 รายได้รับการผ่าตัดซ่อมแซมไส้เลื่อนผนังหน้าท้องขนาดใหญ่ อายุเฉลี่ยของผู้ป่วย 33 ปี ร้อยละ 91 ของผู้ป่วยได้รับการผ่าตัดใส่ผนังหน้าท้องเทียม ร้อยละ 7 ได้รับการซ่อมแซมด้วยเนื้อเยื่อของผู้ป่วย ผนังหน้าท้องเทียมที่นิยมใช้มากที่สุด คือ ชนิดคอมโพสิต (ร้อยละ 93) ระยะเวลาเฉลี่ยของการติดตามอาการคือ 597.5 วัน (229.25, 1355.50) ระยะการติดตามที่นานที่สุด คือ 2031 วัน ภาวะแทรกซ้อนด้านการติดเชื้อเกิดขึ้นในผู้ป่วย 4 ราย คิดเป็นร้อยละ 9 แต่มีเพียงรายเดียวเท่านั้นที่ต้องการการรักษาด้วยการผ่าตัด การกลับเป็นซ้ำเกิดในผู้ป่วย 1 ราย (ร้อยละ 2)

สรุป: การรักษาไส้เลื่อนผนังหน้าท้องด้วยการใส่ผนังหน้าท้องเทียมเป็นวิธีที่ปลอดภัย มีภาวะแทรกซ้อนที่รุนแรงและการกลับเป็นซ้ำที่น้อย