

## CASE REPORT

# Components separation technique for large abdominal wall defect

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Repairing large incisional hernia with abdominal wall reconstruction is a technically challenging problem for surgeons. We report our experience of large midline incisional hernia which was repaired successfully with components separation technique. A patient with incisional hernia, 35 × 20 cm in size, underwent operation following standard components separation technique. The aponeurosis of the external abdominal oblique muscle was longitudinally transected from the rectus sheath, and the external abdominal oblique muscle was separated from the internal abdominal oblique muscle. With further separation of the posterior rectus sheath from the rectus abdominis muscle, closure of the abdominal wall was attained without tension. The post-operative course was uneventful with minor wound seroma. The patient discharged safely, and no further complication in terms of recurrence and wound problem has occurred. Components separation technique could be a possible and effective treatment option for repair of large abdominal wall defect.

**Key Words:** Ventral hernia, Components separation technique, Abdominal wall reconstruction

## INTRODUCTION

In the era of aging population and increasing obesity, the repair of incisional hernia has become a major concern. When the size of incisional hernia is too large, it could be insufficient, and occasionally, even impossible to be repaired with mesh. Despite the advancement of surgical techniques and prosthetics, repair of large midline incisional hernia and reconstruction of the abdominal wall defect is technically challenging problem for surgeon.

Ramirez et al. [1] invented a novel technique for reconstruction of abdominal wall defect without using prosthesis in 1990. Basically, this technique was performed by

enlargement of the abdominal wall surface with separating the space without vessels and nerves, and advancement of the muscular layers. De Vries Reilingh TS et al. [2] further developed this technique by adding separation of the posterior rectus sheath from the rectus abdominis muscle, and reported the "component separation technique (CST)" in 2003.

Through our successful experience, we intended to introduce CST for repair of a large (35 × 20 cm) midline incisional hernia.

Received May 24, 2010, Accepted August 9, 2010

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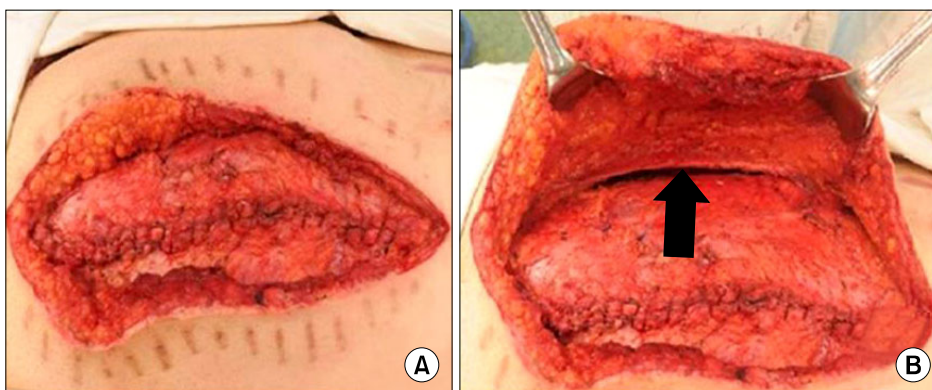
## CASE REPORT

A 28 year old injured man was raced to emergency room at our institution. He had multiple stab injuries over the abdomen and chest. The patient underwent an emergency operation. Multiple small bowel and mesenteric injuries, liver laceration, and right diaphragmatic laceration were identified. Laceration wounds at liver and right diaphragm were repaired, and segmental resection of injured small bowel with mesenteries were performed. The abdominal wall was closed in whole layer with non-absorbable interrupted 1-0 polyester (Green Polyester (R), Ailee, Busan, Korea) sutures due to wound contamination. The post-operative course was uneventful, and the patient was transferred to department of neuro-psychiatry on 8th post-operative day, for evaluation and treatment of post-traumatic stress disorder. Abdominal wall sutures were removed on 21st post-operative day, and no abnormal finding on abdominal wound was identified. When the patient visited outpatient clinic for follow-up on 3rd post-operative month, a large incisional hernia, 35 × 20 cm in size, was detected. The patient underwent repair for incisional hernia. Under general anesthesia, the patient was placed in supine position. After midline skin incision, large hernia sac was taken down, and adhesions between peritoneum and small bowels were meticulously dissected until rectus muscles were entirely exposed. The abdominal skin was elevated at midline and was dissected from anterior surface of rectus sheath to exposure of external abdominal oblique muscles by 5 cm. At 2 cm lateral from rectus sheath, the aponeurosis of external abdominal

oblique muscle was longitudinally transected, superiorly to the level of costal margin, and inferiorly to the symphysis pubis. The avascular plane between external abdominal oblique muscle and internal abdominal oblique muscle was separated. By releasing bilateral external abdominal oblique muscle attachments, a gap of 7 to 10 cm between rectus abdominis muscles could be bridged at waist line. The posterior rectus sheath was released with further longitudinal relaxing incision, and additional approximation of rectus abdominis muscle by 2 to 4 cm could be attained. Defects up to 28 cm in the waistline could be bridged by this way. Tension free closure of the abdominal wall defect was achieved using polydioxanone continuous running sutures (Fig. 1). Two closed suction drains were placed at subcutaneous space, and the skin was approximated with 2-0 interrupted nylon sutures. The operation took 240 minutes. The patients recovered well without significant problems, except for minor periumbilical wound infection (about 4 cm) which was detected on 7th post-operative day. There was no evidence of fascial infection, and the skin was re-approximated after 3 days of wound dressing. The patient discharged on 25th post-operative day, and has no further problems at current 17th post-operative month of follow-up.

## DISCUSSION

Incisional hernia is common and important source of post-operative morbidity. The incidence of incisional hernia after abdominal surgery is reported as 9 to 19% in other



**Fig. 1.** (A) Tension free abdominal wall closure was attained by taking big bites of fascia with polydioxanone continuous running sutures. (B) External oblique aponeurosis separated and retracted laterally. Defects up to 28 cm in the waistline could be bridged.

series [3,4]. Burger et al. [5] estimated that 4% of patients after laparotomy, in general, needed additional surgical repair of incisional hernia. The reported recurrence rate of incisional hernia is 33.3% for suture repair and 16.4% for mesh repair [6]. Due to high recurrence rate after suture repair, Burger et al. [5] postulated that mesh repair (Prolene, Ethicon, Amersfoort, the Netherlands; Marlex, Bard Benelux, Nieuwegein, the Netherlands) was superior to suture repair (Prolene No.1, Ethicon) in their prospective randomized controlled trials. Mesh repair has reduced the recurrence rate of incisional hernia, however, predisposed to further complications [7] which attribute to lack of evidence for safety and long-term reliability of prosthetic materials, and consequently, only about 52% of current surgeons use mesh for incisional hernia repair [8].

Since first introduced in 1990 [1], outcomes of CST has been continuously reported [2,9,10]. It can be used in reconstruction of a large, complex, and contaminated abdominal wall defects with autologous innervated and vascularized tissue.

CST, however, has several drawbacks. De Vries Reilingh TS et al. [10] reported relatively high rates of wound complication (12 to 67%) including hematoma, seroma, skin necrosis, and infection, which was compared to 12 to 27% of mesh repair. Since the skin and subcutaneous tissue need to be mobilized over a large area, long operative time and excessive dissection might predispose to the above-mentioned wound complications. Another concern is the recurrence rate, though heterogenic results have been reported [9,10].

We considered CST for our patient with huge abdominal wall defect, instead of mesh repair, for following reasons. First, we concerned about tensile strength when several combined meshes were used to cover the whole defect, and intestinal erosion or adhesion due to direct contact with the mesh. Second, mesh shrinkage during wound contraction could lead to infection, fistula formation, and ultimately, mesh removal. The third issue was cost problem. The patient could not afford to pay expensive cost of several meshes, and furthermore, when mesh infection did occur, prolonged antibiotics treatment and length of hospital stay could result in distress to our patient.

CST, in general, has advantages in patient with large incisional hernia, since both the patient and surgeon are relatively free from concerns about mesh infection, recurrence, wound pain, and cost problem. Long operative time and risk of wound complication due to excessive dissection should be considered simultaneously. It could be an alternative option in complicated situations, and in accordance with heterogenic study results, various risk factors and associated conditions need to be estimated individually.

In our conclusion, CST was a safe and effective surgical technique for large abdominal wall defect. Relative risks and benefits need to be determined when considering CST as a treatment option.

## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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