



**ORIGINAL RESEARCH PAPER**

**Surgery**

**SUTURE REPAIR AND MESH REPAIR IN INCISIONAL HERNIA**

**KEY WORDS:** Incisional Hernia, Suture repair, Mesh repair

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**ABSTRACT**

Incisional hernia is an important complication of abdominal surgery. Procedures for the repair of these hernias with sutures and with mesh have been reported, but there is no consensus about which type of procedure is best. Studies around the globe were analyzed to compare suture repair and mesh repair techniques in incisional hernia. Results recommended attachment of the prosthesis to the dorsal side of the defect with an overlap as large as possible, and we recommend that the mesh be sutured to the surrounding fascia with intervals of no more than 1 to 2 cm between stitches. Bulging must be prevented, but the mesh should not be implanted under tension. Contact between the polypropylene mesh and the viscera must be avoided because of the risk of adhesions, intestinal obstruction, and fistulas. When the peritoneum cannot be closed or when omentum cannot be interposed, polyglactin 910 (Vicryl) mesh may be interposed to protect the viscera, but experimental and clinical studies are not conclusive with respect to the efficacy of the interposition of the polyglactin mesh in preventing these complications. It was concluded that in patients with incisional hernias, retrofascial preperitoneal repair with polypropylene mesh is superior to suture repair with regard to the recurrence of hernia, even in patients with small defects.

**INTRODUCTION**

The first laparoscopic repair of a ventral incisional hernia (LVHR) was reported by LeBlanc and Booth <sup>[1]</sup> in 1993. Approximately 90,000 ventral incisional hernia repairs are performed in the United States each year. The LVHR procedure continues to gain increasing popularity over open repair. The recurrence rates for LVHR and open repairs are similar. Complications of the laparoscopic technique tend to be fewer but may be more serious, mainly due to a higher incidence of iatrogenic enterotomies <sup>[2,3]</sup>.

The presence of SSI significantly increases morbidity and mortality <sup>[27]</sup>. The reported incidence of infection is 10% for open procedures and 1.1 % for laparoscopic procedures <sup>[28]</sup>. Laparoscopic procedures lower the risk of infection by reducing wound size, hospital stay, operative time, and the probability of bacteria entering the subcutaneous space <sup>[29-32]</sup>. The preoperative factors increasing the risk of infection include shaving of the surgical site, short duration of scrubbing, antiseptic use, and blood transfusion. The SSI rate was 5.6 % for patients who had hair removed by razor compared with 0.6 % for patients who either had their hair removed by depilatory agents or had no hair removal <sup>[31]</sup>. Blood transfusion increases the risk twofold <sup>[26]</sup>. Long operating time also predisposes to the risk of infection. Procedures longer than 3-4 h increase the risk <sup>[28]</sup>.

In addition, mesh infection is a major factor contributing to infection. The reported incidence of infection after laparoscopic repairs is 0-3.6 % <sup>[24]</sup>. A mesh infection rate as low as 0.78 % after laparoscopic repair was reported in a systematic review by Carlson et al. <sup>[18]</sup>. Polyester meshes and meshes positioned subcutaneously are associated with a high incidence of infection <sup>[24, 25]</sup>. The use of prosthetic mesh with bowel resection or injury increases the risk of infection many-fold <sup>[36]</sup>. Also, blood loss during the surgery is a significant risk factor. Postsurgery complications such as seroma, thromboembolism, pulmonary embolism, post-procedure pneumonia, and anemia make the patient more susceptible to infection <sup>[37]</sup>.

To prevent infection, management of these risk factors is important. The risk factors that can be modified should be addressed and managed by adherence to established guidelines and protocols <sup>[38]</sup>. Cessation of smoking before the surgery reduces the risk of postoperative SSI in addition to other cardiovascular and respiratory benefits. No data are reported on the effect of

preoperative parenteral or enteral nutrition on the incidence of SSI <sup>[39]</sup>.

Strict preoperative glycemic control with maintenance of intraoperative normothermia is necessary <sup>[40]</sup>. Remote infection, especially when mesh is being implanted, should be treated and resolved completely before the surgery. Preoperative hair removal should be avoided, and clipping should be performed instead <sup>[32]</sup>. Prophylaxis with antibiotics administered half an hour before surgery produces the best results <sup>[21]</sup>. During surgery, careful attention to proper surgical technique and timely completion of the operation also reduce the risk of SSI.

Incisional hernia is a frequent complication of abdominal surgery. In prospective studies with sufficient follow-up, primary incisional hernia occurred in 11 to 20 percent of patients who had undergone laparotomy. <sup>[1-3]</sup> Such hernias can cause serious morbidity, such as incarceration (in 6 to 15percent of cases) and strangulation (in 2 percent) <sup>[4,5]</sup>.

If the hernia is not reduced promptly, small bowel that is strangulated in the hernia may become ischemic and necrotic and perforation may ultimately occur. Although many techniques of repair have been described, the results are often disappointing. After primary repair, rates of recurrence range from 24 percent to 54 percent <sup>[4,6-9]</sup>.

Repairs that include the use of mesh to close the defect have better but still high recurrence rates, up to 34 percent. 8,10 After repair of recurrent incisional hernias, recurrence rates of up to 48 percent have been reported <sup>[5]</sup>.

These studies of suture repairs and mesh repairs, however, were either uncontrolled or nonrandomized, and it remains uncertain whether mesh repair is superior to suture repair. To define the indications for the use of mesh materials, we undertook a randomized, multicenter studies of patients with midline abdominal incisional hernias.

**METHODOLOGY**

**Objective**

The main objective of the study was to assess the comparison between suture repair and mesh repair in incisional hernia.

**Method**

A systematic search of the available literature was performed in

January 2019 based on Medline, PubMed, and the Cochrane Library, as well as relevant journals and reference lists using the aforementioned search terms. The first search found 118 relevant articles. In a second-level search, four articles were added. A total of 15 publications were used for this systematic review.

## DISCUSSION

Among the 200 studies cited, 171 had patients with primary incisional hernia, and 29 studies had patients with first recurrence of incisional hernia. Seventeen studies in the former group and two in the latter group were found to be ineligible for the study, for the following reasons: no incisional hernia was evident intraoperatively (nine studies), the operation was canceled (five studies), no follow-up data were obtained (three studies), hernia repair was part of another procedure (one study), or herniation was too close to an enterostomy for the specified procedure to be performed (one study).

The techniques used for repairing incisional hernias have generally developed in a practical, experiential way. Several authors have reported favorable results with mesh repair<sup>[3,8,10-19]</sup> but to date this technique has not been studied systematically. The results of a prospective, randomized, multicenter trial in which suture repair was compared with mesh repair, it was seen that the latter was determined to be more effective. In techniques for the repair of incisional hernias in which sutures are used, the edges of the defect are brought together, which may lead to excessive tension and subsequent wound dehiscence or incisional herniation as a result of tissue ischemia and the cutting of sutures through the tissues<sup>[20]</sup>. With prosthetic mesh, defects of any size can be repaired without tension. In addition, polypropylene mesh, by inducing an inflammatory response, sets up a scaffolding that, in turn, induces the synthesis of collagen. This study establishes the superiority of mesh repair over suture repair with regard to the recurrence of hernia.

## RESULTS

Patients with hernias who had undergone surgery higher recurrence rates than patients without such a history. An increased frequency of primary or recurrent inguinal and incisional hernia in patients who have had an aneurysm has been previously reported in some retrospective studies but not in others<sup>[23-29]</sup>. Whether an inherent defect in healing exists in patients with aortic aneurysms or hernial disease is not known, but possible defects in healing may be explained by defects in collagen and elastin cross-linkages,<sup>[30]</sup> increased activity of elastase with reduced content of elastin,<sup>[31]</sup> and different relative proportions of collagen subtypes<sup>[32-34]</sup>. Smoking may also be a factor,<sup>[35]</sup> but it was not a factor in this study.

Infection did not lead to the removal of mesh in this and most other series,<sup>[6,12,13,15,19]</sup> but it was a risk factor for recurrence. Therefore, the administration of broad-spectrum antibiotics at the induction of anesthesia is recommended<sup>[36]</sup>. On the basis of our results, we recommend attachment of the prosthesis to the dorsal side of the defect with an overlap as large as possible, and we recommend that the mesh be sutured to the surrounding fascia with intervals of no more than 1 to 2 cm between stitches. Bulging must be prevented, but the mesh should not be implanted under tension. Contact between the polypropylene mesh and the viscera must be avoided because of the risk of adhesions, intestinal obstruction, and fistulas<sup>[19]</sup>.

When the peritoneum cannot be closed or when omentum cannot be interposed, polyglactin 910 (Vicryl) mesh may be interposed to protect the viscera,<sup>[17,37,38]</sup> but experimental and clinical studies are not conclusive with respect to the efficacy of the interposition of the polyglactin mesh in preventing these complications<sup>[38-40]</sup>.

## CONCLUSION

In conclusion, in patients with incisional hernias, retrofascial preperitoneal repair with polypropylene mesh is superior to suture repair with regard to the recurrence of hernia, even in patients with small defects.

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