

## ORIGINAL RESEARCH

# Analysis and Comparative Study between Mesh Repair and Anatomical Repair of Incisional Hernia

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## ABSTRACT

**Introduction:** Incisional hernia is a source of morbidity and requires high health care costs. Despite significant advances in many areas of surgery, correction of incisional hernias continues to be problematic. This study was conducted with the purpose to compare outcomes in incisional hernia patients operated with prolene mesh hernioplasty and anatomical repair.

**Materials and methods:** Totally 50 patients diagnosed with incisional hernia were allocated to either a proline mesh group (n = 25) or anatomical repair group (n = 25) using simple random sampling method.

**Results:** On comparison of recurrence after mesh repair and anatomical repair, it was found that there was significant difference (p = 0.016) between two groups on performing chi-squared test.

**Conclusion:** In conclusion, in patients with incisional hernias, prolene mesh is a better option than anatomical repair with regard to the recurrence of hernia.

**Keywords:** Anatomical repair, Incisional hernia, Prolene mesh.

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## INTRODUCTION

Incisional hernia is increasingly adding to the workload of the general surgeon in our practice and presents enormous operative challenges on account of difficult scar tissue and extensive adhesions encountered. It is one of the most common complications following abdominal surgery, with a reported<sup>1,2</sup> incidence of 3 to 13%. Incisional hernia has been clinically defined as “a bulge, visible and palpable when the patient is standing, and often requiring support or repair.” It is a source of morbidity and requires high health care costs. It is seen more in females, the obese, and older age group. Poor

surgical technique and postoperative wound infections are contributory. Midline scars are particularly vulnerable because of the poor healing properties of fascial tissue.<sup>3</sup> Obesity, size of defect, advanced age, prolonged use of steroids, malnutrition, uremia, diabetes, jaundice, and raised intra-abdominal pressure from any cause are other known risk factors.<sup>4</sup>

Incisional hernia is a common and often debilitating complication after laparotomy. With the increase in the number of abdominal operations, the number of incisional hernias has also increased considerably. Recurrence, the ultimate nightmare of a hernia surgeon, adds significantly to health care costs and poses a further economic burden. Despite significant advances in many areas of surgery, correction of incisional hernias continues to be problematic, with recurrence rates ranging from 5 to 63% depending on the type of repair used.<sup>5</sup>

There are many surgical techniques available, but consensus is lacking. Each technique has its own merits and demerits. Recurrence is common and depends on technical error, patient's error, and due to materials. Until 1958, abdominal wall hernias were closed with primary suture repair. In 1958, Usher and Wallace<sup>6</sup> published their technique using a polypropylene mesh. This led to the Lichtenstein repair some 30 years later, which popularized mesh for hernia repair. Currently, about one million meshes are used per year worldwide.<sup>7</sup> This study was conducted with the purpose to compare outcomes in incisional hernia patients operated with prolene mesh hernioplasty and anatomical repair.

## MATERIALS AND METHODS

This prospective randomized control trial was conducted between June 2011 and June 2013. Totally 50 patients diagnosed with incisional hernia and willing to participate were included in the study. Patients were allocated to either a proline mesh group or anatomical repair group using simple random sampling method. After allocation of patients, a detailed history was taken, which included history of previous operations, its nature, and postoperative period; to know the etiology of incisional hernia. Onset and progress of the hernia were also noted from the history. Local examination of the patient was done to know the size of defect, reducibility, and the muscles of abdominal wall.

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### Prolene Mesh Repair

Incision was taken in the longest dimension of the hernial defect, generally encircling the previous scar and excising it. Dissection was done laterally to identify the healthy musculofascial layer, and hernial sac is dissected. Dissection of the anterior sheath for a breadth of 3 to 4 cm from the hernia edge is carried out; similarly, peritoneum is also freed. In intraperitoneal mesh implantation, peritoneum was required to open and after reducing the contents and dividing the adhesions between clamps, intraperitoneal mesh was placed and sutured to the peritoneum. Omentum is placed between the bowels and the mesh.<sup>8</sup>

Prolene mesh of required breadth and length was cut and desired type of repair was carried out. Mesh can be kept over sutured anterior rectus sheath and rectus muscle as a reinforcement (onlay) or sutured to the anterior rectus sheath and rectus muscle of both halves (single-layer bridging over fascia).

Similarly, prolene mesh can be kept below the musculofascial layer, over the peritoneum (underlay), or can be sutured to rectus sheath and muscle (single-layer bridge between fascia and peritoneum).<sup>9</sup> Mesh was placed in such a way that it should extend for about 3 cm beyond the margin of the defect. Suturing of mesh to peritoneum or musculofascial layer is done with the 1 or 2° prolene suture. A closed suction drain was kept over the repair and also in the subcutaneous space. In case of intraperitoneal repair, only subcutaneous drain is used. Subcutaneous tissue was closed with 2-0 plain catgut and skin was closed with 1-0 ethilon. In the end, a dry dressing was done at incision site.

### Anatomical Repair

Anatomical repair is recommended for the well-defined sacs and small-to-moderate size defect, which can be successfully repaired by opposing each anatomical layer without tension. It was pioneered by Wangenstein.<sup>6</sup>

A vertical elliptical incision was taken including the previous scar, which was excised. Rectus sheath on both sides was dissected laterally and rectus abdominalis muscle was exposed. Sac was dissected out and opened.<sup>10</sup> Sac was excised up to the neck and peritoneum is closed with continuous sutures. Anterior rectus sheath was approximated in midline using continuous prolene 1-0 or no. 1 suture with interrupted stitches in between. Subcutaneous tissue was opposed using Vicryl 2-0. Ethilon 2-0 used to close the skin. A dry dressing was applied on incision with adequate padding at drain site.

### RESULTS

The average age of presentation in this study was 47.2 years and minimum age at which patient presented

with incisional hernia was 28 years and maximum age at which patient presented with incisional hernia was 70 years. Majority of patients affected with incisional hernia were between 31 and 60 years. Incisional hernia occurred more commonly in women when compared with males. The commonest previous surgeries that caused incisional hernia were lower segment cesarean section (LSCS), 13 (26%), and perforation peritonitis, 18 (36%).

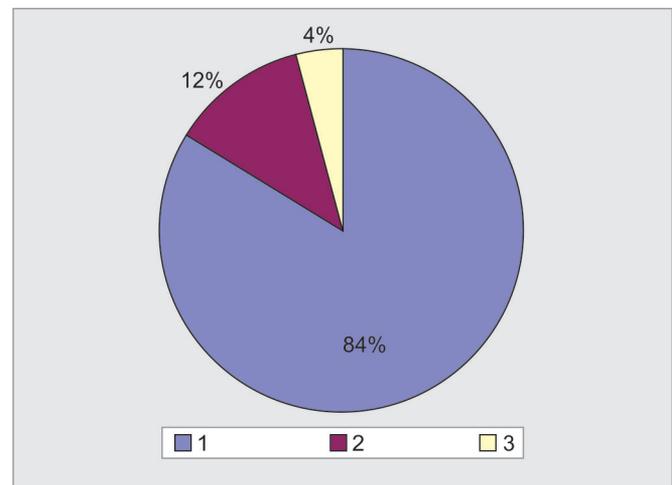
Table 1 and Graph 1 shows that majority of patients had undergone at least one [n = 42 (84%)] operation before occurrence of incisional hernia.

There was no significant difference in distribution of patients in the two groups (p > 0.05) (Table 2).

On comparison of recurrence after mesh repair and anatomical repair, it was found that there was significant difference (p = 0.016) between two groups on performing chi-squared test (Table 3 and Graph 2).

**Table 1:** Number of operations patients with incisional hernia had undergone earlier

No of surgeries previously done	Patients
1	42 (84%)
2	6 (12%)
3	2 (4%)



**Graph 1:** Number of operations with patients that had undergone earlier incisional hernia

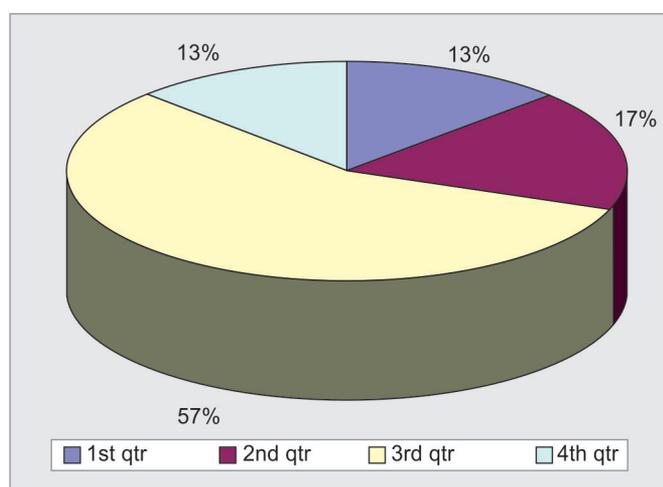
**Table 2:** Management of the patient: Mesh repair and anatomical repair of incisional hernia

Anesthesia used in repair	GA	SA	Chi-square	p-value
Mesh repair (n = 25)	15	10	2.88	0.089
Anatomical repair (n = 25)	9	16		

GA: General anesthesia; SA: Spinal anesthesia

**Table 3:** Recurrence of incisional hernia following repair

Recurrence	Patients	Chi-square	p-value
Mesh repair	2 (4%)	5.71	0.016
Anatomical repair	9 (18%)		



**Graph 2:** Recurrence of incisional hernia after repair

## DISCUSSION

The development of incisional hernia represents undesirable sequelae following abdominal surgery, which is performed for a cure of a particular condition or for the benefit of patient. The scope of incisional hernia continues to expand with the advances in diagnostic facilities as the number of surgeries done will be increasing, utilizing the newer diagnostic aids available.

Sex distribution in this study showed a female preponderance. As per results of our study, 38 (76%) women were affected with incisional hernia compared with 12 (24%) male patients (Table 4). This is because there is frequent use of lower midline incision in women. Lower midline incisions are weak because they lack posterior rectus sheath and, as the age advances, the muscles also become weak and lax. Also, in pregnancy, overstretching of muscles and aponeurosis occur.<sup>11</sup> Number of LSCS, wound infection, and obesity are the most considerable associated factors in women, which leads to more number of women being affected with incisional hernia.<sup>12</sup>

In the study, 84% of patients were operated once, 12% twice, and 4% of patients through the same incision. In Ponka's<sup>13</sup> series, 73% of patients were operated once, 16% patients were operated twice, and 11% had three or more operations performed through the same incision. Due to poor socioeconomic strata and poor nutritional status, single surgical intervention is enough to damage the integrity of abdominal wall.

On comparison of recurrence after mesh repair and anatomical repair, it was found that there was significant difference ( $p = 0.016$ ) between two groups on performing

**Table 4:** Distribution of patients according to sex

Sex	Patients
Male	12 (24%)
Female	38 (76%)

chi-squared test. This showed that mesh repair is a better option for treating the incisional hernia than the anatomical repair, as number of recurrence was more in anatomical repair than the mesh repair. Our results are similar to the study done by Liakakos et al,<sup>14</sup> wherein they found that the recurrence rate with mesh repair was only 8% compared with 25% after suture repair after 90 months of follow-up. Similarly, in a larger comparative study of 272 hernias, Schumpelick et al<sup>15</sup> found a recurrence rate of 7% for mesh repair and 33% for suture repair after a mean follow-up period of 64 months. Koller et al<sup>16</sup> retrospectively compared the results of sutured repair in 70 patients with mesh repair in 26 patients. The recurrence rate after 24 months was 63% for the sutured group and 13% for the mesh group. The recurrence rate for sutured repair is the highest rate reported in the literature. Recurrences, when they occurred, were usually at the periphery of the mesh repair or lateral to mesh, where sutures pull through the musculofascial margin and allow the mesh to separate.<sup>17</sup>

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>5</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. Our study establishes the superiority of mesh repair over suture repair with regard to the recurrence of hernia.

## CONCLUSION

In conclusion, in patients with incisional hernias, prolene mesh is a better option than anatomical repair with regard to the recurrence of hernia.

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