

# **Vortrag**

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## **Retromuscular Tension-Free Repair of Large Midline Incisional Hernias by Two Layers of Polypropylene Mesh**

**Author:** Frido E. Muetsch M.D.

**Institution:** Private Surgical Clinic Dr. Gloeckner Dr. Muetsch  
**Address:** Pestalozzistrasse 19-21, D 74076 Heilbronn, Germany  
**E-mail:** frido.muetsch@t-online.de  
**Phone:** +49-7131-94230  
**Fax:** +49-7131-942394

## **Abstract:**

### Introduction:

In the repair of large incisional hernias the use of a mesh is mandatory for good long-time results. Among the different ways of mesh placement and fixation, we decided for a tension-free method using two layers of monofilament polypropylene mesh.

### Method:

In all operations the complete former incision was *excised*. Hernia sacks were not opened to avoid intraperitoneal damage, but reduced and covered by the reconstructed linea alba, using the medial parts *either dorsal* rectus sheath. The first mesh was placed behind the rectus muscle, if necessary from xyphoid to symphysis, and fixated either by sutures, staples or human fibrin glue. When the edges of the defect could not be brought together a second mesh was placed *tension-free* and fixed by sutures in the defect between the lateral parts of the *anterior* rectus sheath.

### Results:

Retrospective study on 47 cases (26 males, 21 females) with large or multiple incisional hernias operated between 06/01/1999 and 10/31/2003. Analysis of our own results regarding recurrences, treatment of complications and patient's wellness.

### Conclusions:

The double-layer mesh method is safe and efficient for the repair of *large* or multiple incisional hernias without *mortality* even in old and multimorbid patients. A main problem is the *occurrence* of seromas for several weeks.

**Keywords:** incisional hernia, tension free repair, double-layer mesh repair

## **Text:**

### *Introduction:*

In the repair of large incisional hernias the use of a mesh is mandatory for good long-time results. Among the different ways of mesh placement and fixation, we decided for a completely tension-free method using two layers of monofilament polypropylene mesh. The dimension of the problem of recurrent hernias is demonstrated: during the observation period we performed 48 double-layer mesh operations, 48 preperitoneal meshes in hernias away from the midline and 198 operations with mesh placement for recurrent groin hernias.

Huge midline incisional hernias cause discomfort and danger to the patient. „These seemingly benign lesions in fact display a formidable tendency to undergo aggravation and recurrence and thus are always an indication for surgical treatment.” [1] “Loss of abdominal wall integrity leads to general and local disturbances” [2]

Beside of local muscular disease and skin disease, general diseases are more important, as there are respiratory disturbances, visceral, vascular and static disturbances. Possible etiologic factors of an incisional hernia are wound infections, drains through original incisions, operations through previous incisions, interrupted stitches instead of non absorbable running sutures, steroid or other immunosuppressant therapy and obesity [3].

Because „Closure of an incisional hernia has nothing in common with closure of laparotomy“ [2], we followed the “8 Principles of Repair” formulated by Kingsnorth and Leblanc [3]

1. The linea alba must be firmly reconstructed.
2. Only tendinous/ aponeurotic/ fascial structures should be brought together
3. Suture material must retain its strength long enough to maintain tissue apposition and allow sound union of tissues to occur. Use of non absorbable material is mandatory.
4. The ratio of suture length to wound length must be 4:1 or more, using deep bites at not more than 0,5 cm intervals
5. Try to minimize the increase of abdominal pressure
6. Prevent abdominal distension due to adynamic ileus by minimalized handling of the viscera
7. Avoid coughing, pulmonary collaps, pulmonary infection and edema
8. The repair must be performed aseptically; inoculated bacteria, traumatized tissue and hematoma should not be features of these wounds.

This operation must be done as “A carefully planned procedure using a tension-free repair with prosthetic reinforcement in appropriate patients”. [3]

#### *Method:*

All operations were done in general anaesthesia. Every patient received a single-shot antibiotic prophylaxis with 2g of cefazoline, due to the rather long operation time, the big wound-area and the high amount of foreign material implanted.

In all operations the complete former incision was excised. Hernia sacks were not opened to avoid intraperitoneal damage and infection, but reduced and covered by the reconstructed linea alba, using the medial parts of either ventral rectus sheath. In all 48 cases we used ordinary heavy weight monofilament polypropylene meshes. The first mesh was placed behind the rectus muscle, if necessary reaching from xyphoid to symphysis, and fixated either by monofilament non-absorbable sutures, staples (Autosuture® STAT TACK® helical fasteners with a diameter of 5 mm (OMS-TTS)) [4] or human fibrin glue.(BAXTER®™). The second mesh was placed tension-free as well and fixed by non-resorbable running sutures in the defect between the lateral parts of the anterior rectus sheath. Special problems occurred, when an praeternatural anus was positioned through the rectus sheath and the rectus muscle, or when many drains or additional incisions damaged the rectus muscle or caused cicatricial contractures. At the end of the operation we always used two suction drains and local anaesthesia, to reduce postoperative pain in order to improve patient’s mobilisation and recovery.

#### *Results:*

This is a retrospective study on 48 cases, 27 men and 21 women, with large or multiple incisional hernias, operated between 06/01/1999 and 10/31/2003. 44 of them could be examined for this study, one man had died from metastasizing prostate cancer in August 2003.

The patients average age was 67 years in women and 60 years in men. 22 of our patients were employed, 26 were retired. The body-mass-index (BMI) was elevated with 33 in women, and about normal with 28 in men. (Table 1) (Table 2)

The reason for the first laparotomy was in ten cases colon surgery, eight giant hernias followed operations on small epigastric and umbilical hernias and five minimally invasive cholecystectomies. We found seven big incisional hernias after emergency operations on bleeding gastric ulcers and perforations. Rare indications were diagnostic laparotomies performed abroad, hysterectomy, emergency splenectomy, aorto-bifemoral bypasses and urological operations. (Table 3)

Thirty five patients had one previous hernia operation before our incisional hernia surgery, five patients had two previous operations, two patients had three previous operations, one had four previous operations and five patients had five operations before, two of them had already two onlay meshes of polypropylene and Goretex implanted. The biggest defect was 16 cm in diameter, 13 patients had up to five defects and ten patients had giant hernias. Ten hernias were irreducible.

Heavy weight monofilament polypropylene meshes were used. The average size of the retromuscular mesh was 50.5 cm<sup>2</sup>, the average size of the mesh covering the defect in the anterior rectus sheath was 31.5 cm<sup>2</sup> (Table 4).

The time needed for this operation varied between 50 and 135 minutes with an average of 90.52 minutes. In one case we reduced fatty tissue in the same operation, in another case we performed fat resection 6 months later.

The average length of the hospital stay was 7.73 days with a minimum of 4 days and a maximum of 39 days. Reconvalescence took a long time: surgical treatment ended on average after 51 days, varying from 8 to 189 days. The average follow-up is 21.13 months (range 1-47 months).

The most serious problem in 21 of our cases was a postoperative seroma of about 500 ml about four to six weeks after the operation. All patients were examined by ultrasound regularly (table 5).

Two patients suffered from late postoperative wound infections, two developed fever for 2 days immediately postoperatively and one patient had a second stroke one week after hernioplasty. There were no fatalities following the double layer mesh hernioplasty, though 15 patients had risks like high age (> 70 years) and 17 were obese (more than 100 kg of body weight). Incidence of heart disease, high blood pressure and diabetes were about normal compared to the corresponding average population, twelve patients had their first operation because of a malignant tumor.

Up to now there was no recurrency, even though many patients had gained 5 to 10 kg of weight since the operation. All younger patients returned to work. One carpenter had 5 hernioplasties before the retromuscular tension free repair and he was unemployed for 6 years. He has no complaints at all now doing his heavy physical work.

The two cases of postoperative wound infection were infected seromas and these patients were treated with open drainage and antibiotics according to microbiological analysis. No mesh had to be removed. In these cases infection developed weeks after mesh placement, meshes were already covered by vital tissue. Never the less, medical treatment continued for more than 4 months.

20 % of our patients suffered from minor discomfort like foreign body sensations and some pain under special conditions, like when lifting heavily or lying on the wound. 80 % were fully content with the operation's result and have a normal life without any pain, discomfort or restrictions.

*Conclusions:*

The double-layer mesh method is a safe and efficient method for the repair of big or multiple incisional hernias without mortality, even in old and multimorbid patients. Though follow-up is still short, the results are convincing, as it is well known that many of our patients developed their incisional hernia within weeks after the first operation. A main problem is the treatment of seromas for several weeks. Frequent examinations by the operating surgeons are necessary to avoid secondary infections. Perhaps the use of new meshes with less polypropylene can bring an improvement.

**References:**

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**Tables:**

Table 1

<b>Age</b>	<b>Women</b>	<b>Men</b>
Average:	67.57	60.48
Minimum:	50	43
Maximum:	81	81

Table 2

<b>Body-Mass- Index</b>	<b>Women</b>	<b>Men</b>
Average	33.53	27.71
Maximum	47.61	37.04
Minimum	22.56	22.31
Normal	28	27

Table 3

**Previous Surgery**

colon surgery	10	28.0%
epigastric and umbilical Hernia	8	16.7%
various Gastric operations	7	14.6%
MI Cholecystectomy	5	10.4 %
diagnostic laparatomy	3	6.2%
gynekologic operations	3	6.2%
splenectomy	2	4.2%
uortobifemoral-bypass	3	6.3 %
urological tumor surgery	2	4.2 %
various or unknown operations	5	10.4 %

Table 4

**Mesh Size**

1st. mesh	
Average	50.5 cm <sup>2</sup>
Minimum	6 x 12
Maximum	30 x 30
2nd. Mesh	
Average	31.5 cm <sup>2</sup>
Minimum	5 x 6
Maximum	30 x 30

Table 5

**Complications**

Seromas	21
Infections	2
Postoperative Fever	2
Phlebitis	1
Stroke	1
Pulmonary Oedema	1