“INFLUENCE OF THE INFLAMMATORY PROCESS OF THE PERITONEUM ON THE INTEGRATION OF THE MESH DURING LAPAROSCOPIC VENTRAL HERNIA REPAIR”

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### Acute postop. pain

3 RCT- study (Ib), 1 prosp.study (IIb)

#### Table: Mesh fixation and acute postoperative pain

<table>
<thead>
<tr>
<th>Authors</th>
<th>Study</th>
<th>Pat. total (groups)</th>
<th>Typ of fixation</th>
<th>Assessment week</th>
<th>Pain Sut.</th>
<th>Pain Tack</th>
<th>p-value</th>
<th>Level of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wassenaar et al. 2010</td>
<td>RCT</td>
<td>172 (56/60/56)</td>
<td>sr+t vs t vs sn+t</td>
<td>2/6/18</td>
<td>ns</td>
<td>ns</td>
<td>&gt;0.05</td>
<td>Ib</td>
</tr>
<tr>
<td>Bansal et al. 2011</td>
<td>RCT</td>
<td>68 (32/36)</td>
<td>sn vs t</td>
<td>1/12</td>
<td>↑s/s</td>
<td></td>
<td>&lt;0.05</td>
<td>Ib</td>
</tr>
<tr>
<td>Beldi et al. 2011</td>
<td>RCT</td>
<td>40 (20/320)</td>
<td>sn vs t</td>
<td>6/24</td>
<td>↑/ns</td>
<td></td>
<td>0.020</td>
<td>Ib</td>
</tr>
<tr>
<td>Nguyen et al. 2008</td>
<td>prosp. comp.</td>
<td>50 (29/21)</td>
<td>sn vs t</td>
<td>1/4/8</td>
<td>ns/ns/ns</td>
<td></td>
<td>&gt;0.05</td>
<td>IIb</td>
</tr>
</tbody>
</table>

In the short term follow up there is **no significant difference of acute postop pain** concerning the different type of mesh fixation by sutures, tacks or combination of both.
### Chronic postop. pain:

<table>
<thead>
<tr>
<th>Type of fixation</th>
<th>Number of studies</th>
<th>Total number of patients</th>
<th>Chronic pain % median (IQR)</th>
<th>Follow up month median (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sutures + tacks</td>
<td>10</td>
<td>2211</td>
<td>2,75 (1,72-13,22) #”</td>
<td>31,5 (27,75-38,25)</td>
</tr>
<tr>
<td>Sutures only</td>
<td>2</td>
<td>1121</td>
<td>3,75 (3,12-4,37) #”</td>
<td>39 (33,5-44,5)</td>
</tr>
<tr>
<td>Tacks only</td>
<td>11</td>
<td>2473</td>
<td>6,35 (2,17-13,22) #”</td>
<td>40 (30,5-49,5)</td>
</tr>
</tbody>
</table>

*Kruskal-Wallis Test: p = 0,845 (ns)

*ANOVA: p= 0,747 (ns)*

**The incidence of postop. chronic pain is without significant difference concerning the type of fixation technique used.**
LAPAROSCOPIC VENTRAL HERNIA REPAIR

MECHANICAL FIXATION

Sutures
Tackers

PAIN

ADHESIONS
LAPAROSCOPIC VENTRAL HERNIA REPAIR

Sutures
Tackers

PAIN

ADHESIONS

RECURRENCES

MECHANICAL FIXATION
The different fixation techniques - combination of suture with tack, tacks only and suture only fixation respectively are **without significant difference concerning the recurrence rate.**

<table>
<thead>
<tr>
<th>Type of fixation</th>
<th>Number of studies</th>
<th>Total number of patients</th>
<th>Recurrence-rate in % median (IQR)</th>
<th>Follow up month median (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sutures + tacks</td>
<td>10</td>
<td>2211</td>
<td>3,65 (2,45-5,75)#”</td>
<td>31,5 (27,75-38,25)</td>
</tr>
<tr>
<td>Sutures only</td>
<td>2</td>
<td>1121</td>
<td>1,05 (0,82-1,27)#”</td>
<td>39 (33,5-44,5)</td>
</tr>
<tr>
<td>Tacks only</td>
<td>11</td>
<td>2473</td>
<td>4,5 (2,4-6,17)#”</td>
<td>40 (30,5-49,5)</td>
</tr>
</tbody>
</table>

# Kruskal-Wallis Test: p = 0,17 (ns)

“ ANOVA : p= 0,535 (ns)
The incidence of acute postop. pain correlates significantly with the number of tacks used for mesh fixation.

1 comp. study (III)
Schoenmaeckers et al. Surg Endosc 2011

The absorbability of the suture material used for mesh fixation is not related to the incidence of postop. pain.

1 RCT study
Wassenaar et al. Surg Endosc 2010 (Ib)

The use of additional glue fixation increases the efficacy of fixation and implicates the reduction of penetrating devices as well as the risk of postoperative pain.


We should decrease mechanical fixation to decrease pain.

- Tackers and absorbible sutures do not increase recurrences, but do not decrease pain.

- Glues alone are not useful, but they could be used to decrease mechanical fixation.
We should decrease mechanical fixation to decrease pain. Tackers and absorbible sutures do not increase recurrences, but do not decrease pain. Glues alone are not useful, but they could be used to decrease mechanical fixation.
Sutures
Tackers

MECHANICAL FIXATION

BIOLOGICAL FIXATION

Decrease mechanical fixation
INCREASE IN-GROWTH
MESH
TECHNIQUE
FIXATION

BIOLOGICAL FIXATION

Decrease mechanical fixation

INCREASE IN-GROWTH
MESH – ABDOMINAL WALL

TECHNIQUE

FIXATION

INTERFACE

BIOLOGICAL FIXATION

Decrease mechanical fixation

INCREASE IN-GROWTH
INTERFACE
MESH – ABDOMINAL WALL

DOUBLE CROWN
INTERFACE
MESH – ABDOMINAL WALL
DOUBLE CROWN

PERITONEUM

INTERFACE

MESH – ABDOMINAL WALL
The main GOAL of our STUDY was to DEMONSTRATE that the inflammatory process of the peritoneum could have some influence in the integration of the mesh.
Experimental study
12 pig

Two 4x4 meshes were placed intraperitoneally fixed with one tacker in each corner.
One mesh as control group and the other once the inflammatory process of the peritoneum has been performed.

We analyzed epidemiological data (sex, BMI...) and local complications where the mesh were placed.
Experimental study
12 pig

All animals were sacrificed 5 weeks later

Macroscopic findings: cellulitis, infection, seroma, adhesions
Histological study: fibroblast, new vessels
MACROSCOPIC FINDINGS

No cellulitis, infection or seroma
No difference in adhesions

RESULTS

No animal died previous being sacrificed at week 5
No differences between the two groups

HISTOLOGICAL STUDY

More fibroblast and new vessels in the mesh
(Statistically significant)
No difference in rest of histological parameters
More fibroblast and new vessels in the mesh  
(Statistically significant)  
No difference in rest of histological parameters
CLINICAL APPLICATIONS
CLINICAL APPLICATIONS
CLINICAL APPLICATIONS

FIBRIN GLUE
CLINICAL APPLICATIONS

FIBRIN GLUE
CLINICAL APPLICATIONS

FIBRIN GLUE
CLINICAL APPLICATIONS

DOUBLE CROWN
PERITONEUM
FIBRIN GLUE

REDUCE THE INTERFACE
MESH – ABDOMINAL WALL

REDUCE MECHANICAL FIXATION
SINCE THE INTEGRATION IS INCREASED
DOUBLE CROWN

PERITONEUM

FIBRIN GLUE

CLOSING THE DEFECT

REDUCE THE INTERFACE
MESH – ABDOMINAL WALL

REDUCE
MECHANICAL FIXATION
SINCE THE INTEGRATION IS INCREASED
INTERFACE
MESH – ABDOMINAL WALL

DOUBLE CROWN
PERITONEUM
FIBRIN GLUE
CLOSING THE DEFECT
There is an important difference in the integration of the mesh when an inflammatory process of the peritoneum is created. In those cases in which no adhesions are detected an abrasion of the peritoneum should be performed.

The Double Crown technique, the use of fibrin glue, the inflammatory process of the peritoneum and closing the defect could increase the biological fixation of the mesh, what could be another factor that may influence the reduction of mechanical fixation