Fixation des prothèses avec de la colle dans les hernies ventrales

DR. TIJL VIERENDEELS
DIFFERENT TYPES OF GLUE

1. Biologic Fibrin glue: Tisseel®, Tissucol®, Vivostat®, Biocol®, Beriplast®
   Quixil®, Avitene®, Advasael®, TachoComb®

2. Semi-synthetic glue: formaldehyde: Bioglu®

3. Synthetic glue:
   Long-chain acrylates like
   a. n-butyl –cyanoacrylate:
      Histoacryl®, Indermil®, Dermabond®, Glubran®,
      Liquibandfix8®

   b. n-hexyl–α–cyanoacrylate:
      Ifabond®

Short– chain acrylates removed from med use (toxic)
General structure of cyanoacrylates

\[
\text{CH}_2 = \text{C} \quad \text{CN} \quad \text{COO-R}
\]

- \text{CH}_3 \quad \text{Methyl}
- \text{C}_2\text{H}_5 \quad \text{Ethyl}
- \text{C}_4\text{H}_9 \quad \text{Butyl}
- \text{C}_8\text{H}_{17} \quad \text{Octyl}
- \text{C}_{10}\text{H}_{15} \quad \text{Hexyl}

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### Properties of cyanoacrylates in surgery (Europe)

<table>
<thead>
<tr>
<th></th>
<th>Ifabond®</th>
<th>Glubran ®</th>
<th>Histoacryl®</th>
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</thead>
<tbody>
<tr>
<td>Compound</td>
<td>a-hexyl</td>
<td>n-butyl</td>
<td>n-butyl</td>
</tr>
<tr>
<td>Company</td>
<td>Fimed (Fr.)</td>
<td>GEM (It)</td>
<td>B.Braun (Germ.)</td>
</tr>
<tr>
<td>Temp °C</td>
<td>+2</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Time (sec)</td>
<td>1–30</td>
<td>1–90</td>
<td>5–7</td>
</tr>
<tr>
<td>Degradation</td>
<td>3–9</td>
<td>more than 12</td>
<td>12</td>
</tr>
<tr>
<td>In months</td>
<td></td>
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Long-chain (butyl-, hexyl- and octyl-). Less cytotoxic, as their degradation is much slower, and concentrations of formaldehyde greater than those habitually present in the blood are not reached and, therefore, they can be used safely in multiple medical applications, both externally and internally.

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Review of literature clinical studies

Hernia August 2011, Volume 15, Issue 4, pp 361–369
Systematic review of the use of fibrin sealant in abdominal-wall repair surgery
S. Morales–Conde, et al

Articles were RCT and non-RCT only few ventral hernia repair: 10 studies, only open

The fibrin sealant was shown to be biocompatible with the surrounding tissue. In patients treated with fibrin sealant, less pain and less hemorrhagic complications occurred. Efficiency in experimental models was similar to that observed for mechanical methods of fixation. Also, adhesions with fibrin sealant were less than that for mechanical methods.

Conclusions
Compared with mechanical methods, fibrin sealant is an good alternative for mesh fixation
Use of fibrin sealant (Tisseel®/Tissucol®) in hernia repair: a systematic review.
Fortelny RH, et al

There were 36 Tisseel/Tissucol studies included in this review involving 5,993 patients undergoing surgery for hernia (mainly inguinal open or laparoscopic; some open ventral hernia repairs).

Conclusion:
Clinical evidence published to date supports the use of Tisseel®/Tissucol® as an option for mesh fixation in open and laparoscopic repair of inguinal and incisional hernias. When used in the repair of incisional hernias, Tisseel/Tissucol significantly decreased both postoperative morbidity and duration of hospital stay.

Use of fibrin glue (Tissucol®) in laparoscopic repair of abdominal wall defects: preliminary experience
S. Olmi, et al,

40 patients small, mediumsized
Parietex®
Mean follow-up 16 months

Conclusions:
The use of fibrin glue in the present study provided stable and uniform fixation of the prosthesis and minimized intraoperative and postoperative complications. Low incidence of pain, hemorrhage, seroma formation and recurrence. "....is our therapeutic option of choice".
Laparoscopic repair of incisional hernias by using Hi–tex mesh fixed to the parietal wall with fibrin glue was feasible and easy in patients with parietal defects <6cm in diameter. Mean operating time was 30 minutes. Mean hospital stay was 1.5 days. Almost no postoperative pain, major surgical complications, seroma formation, relapses, or prosthesis infection occurred during a mean follow-up of 20 months. 19pts!
Randomized clinical trial of fibrin sealant versus titanium tacks for mesh fixation in laparoscopic umbilical hernia repair

J. R. Eriksen et al

38 pt; Small defects between 1,5 and 5 cm; FU 1 month 3 Danish hernia centers

Conclusion:

Mesh fixation with FS in LVHR was associated with less acute postoperative pain, discomfort and a shorter convalescence than tack fixation. Long-term follow-up is needed to show whether the effect of FS fixation persists in terms of chronic pain and recurrence.
Fibrine sealant for mesh fixation in laparoscopic umbilical hernia repair: 1-year results of a randomized controlled double-blinded study.
Eriksen et al

34 patients with umbilical hernia defects from 1.5 to 5 cm at three Danish hernia centres with follow-up 1 year; titanium versus fibrin sealing (Tisseel®)

Five patients (26%) in the fibrin sealant group and one (6%) in the tack group were diagnosed with a recurrence at the 1-year follow-up (p = 0.182)

Patients with larger hernia defects and fibrin sealant mesh fixation had higher recurrence rates than expected, although the study was not powered for assessment of recurrence. There was no significant difference between groups in any parameters after the 1-year follow-up.

Fibrin sealing can not be recommended routinely for intraperitoneal mesh fixation
Mesh Fixation Alternatives in Laparoscopic Ventral Hernia Repair. Muyssoms, Berrevoet et al

“The continuously increasing multitude of marketed meshes and fixating devices leads to unlimited options in mesh fixation combination and geometry. Therefore, we will never be able to get a clear view on the benefits and pitfalls of every specific combination”
Belgian study (not published) M. Van De Moortel Belgian Surgical Week 2015

**Intramesh T1 study Belgium: safety and efficacy in (L)VHR**

- Prospective multicenter (7) study
- 96 pts 90 LVHR and 6 OVHR
- 19 pts, fixation only ifabond ®
  - mean hernia size 1,71 cm
  - 12 cm round mesh repair
- Nil discharge
- No perop/postop complications
- 1 mth FU: seroma/hematoma/pain tack fixation/ileus
- 12 mth FU: no recurrences (95% show-up)

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Retrospective analysis 75 pts

- 38 only cyanoacrylate
- 36% overall comp
- laparosc for subobstruction
- No recurrence
- less pain

- 37 all others
- 53%
- lap for peritonitis
Conclusion glue fixation

- Good results in inguinal hernia surgery
  - feasible and safe (good fixation strength)
  - less pain
  - Gaining popularity

- BUT

- Not enough information in laparoscopic ventral hernia repair
Toxicity esp. synthetic glue? heat-induced inflammation and necrosis of nerves and blood vessels
Genotoxicity long term?
Many glues, many prosthesis incompatibility?
Impaired mesh integration?
better and easier application device

glues may obliterate the laparoscopic instruments

glue application intraperitoneally is still challenging and a barrier on the visceral side of the mesh is necessary to prevent leakage onto intra-abdominal content.
Cost effectiveness? Comparing with other fixation devices

Few clinical reports in ventral hernia, long term follow-up? Large RCTs are required

No studies glues/self-gripping prosthesis
Thank you for your attention!