USE OF SURGICAL SEALANT FILMS TO REDUCE HOSPITAL STAY AFTER VIDEO-ASSISTED THORACOSCOPIC LUNG VOLUME REDUCTION

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Air leaks after LVRS

• Common and prolonged
• Incidence of AL >7 days 40-80%
• NETT Trial (bilateral, stapled) 50%

• Risk factors for prolonged AL:

  • after anatomic lung resection\textsuperscript{1}
    low FEV1, low FVC, adhesions, upper lobes

  • after LVRS (NETT Trial)\textsuperscript{2}
    DLCO as well as inhaled steroids

Where is the air leak coming from?

- Many air leaks might not be immediately present at the end of procedure.
- May develop hours to days after operation.
- Lung “remodeling” induces redistribution of tethering forces.
- Delayed tears mainly along and around (sometimes away) from staple line.)
What are the benefits of reducing the air leak?

Less frequent, less prolonged and less intense air leak lead to

• less air space related problems (better lung expansion)
• reduced risk of pleuro-pulmonary infections
• fewer further complications (NIV, AF, right heart failure, ITU admission)
• shorter hospital stay
• decreased mortality
• larger proportion of patients can be sent home with Heimlich valve
• reduced costs
What attempts have been made to reduce AL?

- Autologous fibrin glue
- Synthetic tissue glue
- Staple line buttressing (bovine pericardium/synthetic)

→ Not always reproducible effects, acute or long-term adverse reactions also reported

- Some reported markedly reduced air leak with no-cut plication technique

→ No long term reports available of efficacy of this LVRS technique
Inclusion criteria:
- Heterogeneous emphysema
- FEV1 20-40% predicted
- TLC $\geq$120% predicted
- RV $\geq$200% predicted
- RV : TLC $> 60$
- pCO2 <7kPa
- mMRC dyspnoea score 3-4

Our experience

Staged bilateral (Unilateral )
VATS LVRS
Our experience

Staple line buttressing
(bovine pericardium/synthetic)

Synthetic tissue glue

TissuePatch™
(TissueMed, Leeds, UK)

Historical Control Group

TissuePatch Group
- Synthetic self-adhesive reabsorbable films
- Polylactide-co-glycolide (PLGA) → structural and protective barrier
- Bioadhesive polymer (TissueBond) → stable chemical cross-link with proteins on the lung surface
- No advance preparation required
- It can be cut to any shape or size
- Can be placed and conforms to any desired surface
- Binds within 60 seconds
- Resistant to excess pressure
- Ultra-thin, fully reabsorbable in 12 weeks with minimal foreign body reaction
## Comparison

<table>
<thead>
<tr>
<th></th>
<th>TissuePatch Group</th>
<th>Control Group</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total n= 255</td>
<td>86</td>
<td>169</td>
<td>-</td>
</tr>
<tr>
<td>Age (median, range)</td>
<td>62.5 (37-79)</td>
<td>60 (39-73)</td>
<td>0.003</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>38 (44%)</td>
<td>65 (39%)</td>
<td>n.s.</td>
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<tr>
<td>FEV1 preop (median, range)</td>
<td>27 % (12-59)</td>
<td>26 % (12-78)</td>
<td>n.s.</td>
</tr>
<tr>
<td>DLCO preop (median, range)</td>
<td>37.5 % (17-72)</td>
<td>37 % (5-90)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Target Lobe (lower)</td>
<td>7 (8%)</td>
<td>14 (8%)</td>
<td>n.s.</td>
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</table>
# Results

<table>
<thead>
<tr>
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<th>TissuePatch Group</th>
<th>Control Group</th>
<th>p=</th>
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</thead>
<tbody>
<tr>
<td><strong>Lenght of Stay (LOS)</strong></td>
<td>11 (4-96)</td>
<td>14 (2-197)</td>
<td>0.007</td>
</tr>
<tr>
<td>days (median, range)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Duration of Drainage</strong></td>
<td>10 (2-87)</td>
<td>11.5 (2-76)</td>
<td>0.954</td>
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<tr>
<td>days (median, range)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LOS DLCO &lt;40%</strong></td>
<td>11 (4-95)</td>
<td>18 (2-197)</td>
<td>0.007</td>
</tr>
<tr>
<td>days (median, range)</td>
<td>n=</td>
<td>n=</td>
<td></td>
</tr>
<tr>
<td><strong>LOS Age &gt; 60yo</strong></td>
<td>12 (4-96)</td>
<td>18 (4-197)</td>
<td></td>
</tr>
<tr>
<td>days (median, range)</td>
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Conclusions

- Routine use of surgical sealant films has contributed to an overall reduction of LOS of around 20%

- The benefit is particularly noted in those patients at highest risk of air leak and its consequences