A Single Centre Experience with Two Surgical Sealants for CSF Leak Prevention in Posterior Fossa Surgery.

M. S. Palin & P. van Hille
Department of Neurosurgery, Leeds General Infirmary.

Background

- Cerebrospinal fluid (CSF) leakage following cranial surgery is a well-described and sometimes potentially devastating complication.  
- CSF leak remains a potentially life-threatening complication due to the risk of meningitis.  
  - This is especially true for surgical approaches to the skull base where a watertight dural reconstruction is not always feasible and CSF pulsation waves are greatest in this location.  
  - Postoperative CSF leak after surgery in the cerebellopontine angle has been reported to occur in up to 17.6% of cases.1  
- Untreated, a persistent CSF leak can evolve into a wound breakdown, a surgical site infection, meningitis, as well as the late development of pseudomeningocele.  
- In cases of persistent CSF leakage, surgical re-exploration may become necessary.2  
  - First line treatment aims to promote wound healing by reducing CSF pressure (temporary CSF diversion can be employed via a lumbar or external ventricular drain to reduce the pressure gradient across the dural closure until it "seals").3  
  - Complications are a source of longer hospital stays and elevated medical costs.3  
- Medical costs in such cases have been estimated to be 141% greater than uncomplicated cases.1  

Dural sealants are an adjunct to obtain watertight closure after repair dural defects, including:

- Fibrinogen based liquid based sealants such as Tisseel, Beriplast, Roheal and various autologous preparations.  
- Synthetic devices incorporating polypehylene glycol e.g. DuraSeal.  
- Liquid sealants comprising proteins and cross linking agents e.g. BioGlue.

There are a number of surgical sealants used within neurosurgery to repair dural defects, including:

- Tisseel: a fibrinogen based liquid sealant which can be used as an adjunct to prevent CSF leaks.

Aims & Objectives

- To review the safety and efficacy of a new sealant film for adjunctive closure of the dura mater in a series of patients undergoing posterior fossa surgery.

Methods

- To retrospectively study all patients who underwent posterior fossa surgery.  
- Treated with a surgical sealant between January 2009 and August 2012 (44months).  
- Patients were operated on by a single surgeon at our centre.  
- Data was obtained from Bluespier™ (online patients database) and patients notes.  
- Data was collected using a spread-sheet tool-kit.  
- All post-operative CSF leaks, complications, length of stay in critical care and total duration in hospital were analysed.

Results

- From January 2009 to November 2010 the senior author’s standard adjunctive treatment for sutured dural closure involved the use of fibrin sealant, Tisseel (Baxter Healthcare, USA).  
- From December 2010 to date, the use of this sealant was replaced with a new dural sealant film TissuePatchDural (Tissuemed, UK).  
- A total of 101 patients routinely managed with either Tisseel or TissuePatchDural were included in this analysis.

<table>
<thead>
<tr>
<th>Table 1. Epidemiological characteristics</th>
<th>Tisseel</th>
<th>TissuePatchDural</th>
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</thead>
<tbody>
<tr>
<td>Total Number of patients</td>
<td>48 patients</td>
<td>53 patients</td>
</tr>
<tr>
<td>Sex (Male:Female)</td>
<td>27:21</td>
<td>23:29</td>
</tr>
<tr>
<td>Age Range (Mean Age)</td>
<td>63.82</td>
<td>63.81</td>
</tr>
<tr>
<td>Pathology (Benign/Vascular/Benign)</td>
<td>30:5:9</td>
<td>40:10:10</td>
</tr>
<tr>
<td>Location (Right/Left/Midline)</td>
<td>20:26:2</td>
<td>22:27:4</td>
</tr>
<tr>
<td>Days in Critical Care (Mean days)</td>
<td>1.32</td>
<td>1.15</td>
</tr>
<tr>
<td>Days in Hospital (Mean days)</td>
<td>1.15</td>
<td>1.88</td>
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</tbody>
</table>

One patient in each treatment group presented with an incisional CSF leak which required surgical repair and dural repair.  

The remainder of the CSF leaks had CSF rhinorrhea and all settled following insertion of a lumbar drain.

One patient originally treated with Tisseel underwent a second craniotomy for evacuation of post-op extradural haematoma.

Type and incidence of typical post-operative complications (PEs, DVTs, Pneumonia & cranial nerve palsy’s) were broadly equivalent between the two sealant treatments and within normal range.

Conclusion

The use of a new dural sealant TissuePatchDural has not adversely affected the incidence of CSF leaks in patients undergoing posterior fossa surgery.

The leak rate of CSF leak was lower than the existing baseline for patients treated with a traditional fibrin sealant, although the results were not statistically significant (p=0.28%).

The overall stay in hospital for patients treated with TissuePatchDural was shorter than those treated with Tisseel.

A randomised control study is recommended to investigate safety and efficacy.

References