Interventional procedures overview of supraorbital minicraniotomy for intracranial aneurysm

Introduction

This overview has been prepared to assist members of the Interventional Procedures Advisory Committee advise on the safety and efficacy of an interventional procedure previously reviewed by SERNIP. It is based on a rapid survey of published literature, review of the procedure by Specialist Advisors and review of the contents of the SERNIP file. It should not be regarded as a definitive assessment of the procedure.

Date prepared

This overview was prepared in December 2002.

Procedure names

- Supraorbital minicraniotomy for intracranial aneurysm.
- Synonym: frontolateral keyhole craniotomy.

Specialty societies

- Society of British Neurological Surgeons.

Description

Indications

Aneurysms within the front and middle parts of the skull (the anterior, middle and pituitary fossae).

Aneurysms are dilated portions of blood vessels that may rupture, causing stroke. They are relatively rare.

This surgical approach may also be used for tumours in the front and middle parts of the skull including tumours of the cranial nerves, the pituitary, or the outer covering of the brain (the meninges). The prognosis varies according to the site of the tumour and its rate of growth.

Summary of procedure

The traditional surgical approach to aneurysms in the front and middle parts of the skull is through a large cut in the bone to expose a large section of the brain surface. Aneurysms are usually clipped to separate them from the blood vessel they arise from. If clipping is not possible, the aneurysm is wrapped with synthetic material to reduce the risk of rupture.

Supraorbital minicraniotomy is a minimally invasive approach through a skin incision between 3 and 10 mm long, made above the eyebrow. A cut about 20 mm by 30 mm...
is made in the skull. The aneurysm is then clipped or wrapped using conventional microsurgical instruments.

The claimed advantages of supraorbital minicraniotomy are: quicker operation; better cosmetic outcome; reduced risk of damage to nerves and arteries; and reduced risk of infection.

**Literature review**

**Appraisal criteria**
Studies on supraorbital minicraniotomy for intracranial aneurysms that examined clinical outcomes were included.

**List of studies found**
No controlled studies were found.

Seven case series were found. The table give details of three largest case series.\(^1\)\(^-\)\(^3\)

References to smaller studies are given in Appendix A.
Table 1 Summary of key efficacy and safety findings (1)

<table>
<thead>
<tr>
<th>Study details</th>
<th>Key efficacy findings</th>
<th>Key safety findings</th>
<th>Key reliability and validity issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van Lindert E¹</td>
<td>• aneurysm clipped: 94% aneurysms</td>
<td>• rupture of aneurysms during surgery: 4 people</td>
<td>Uncontrolled case series.</td>
</tr>
<tr>
<td></td>
<td>• aneurysm wrapped: 6% aneurysms</td>
<td>• further craniotomy for inaccessible multiple aneurysms: 4 people</td>
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<tr>
<td>Czirják S²</td>
<td>• aneurysm clipped: 100/102</td>
<td>• rupture of aneurysms during surgery: 2 people</td>
<td>Uncontrolled case series.</td>
</tr>
<tr>
<td></td>
<td>• aneurysm wrapped: 2/102</td>
<td>• death within 8 days: 4 people</td>
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<td></td>
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<td>• 'central nervous system infection': 2 people</td>
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<td></td>
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<td>• impaired CSF circulation requiring ventriculoperitoneal shunts: 7 people</td>
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<td>Also described supraorbital minicraniotomy for treating tumours.</td>
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</tbody>
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Uncontrolled case series.

Also described supraorbital minicraniotomy for treating tumours.
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<td><strong>Paladino J³</strong>&lt;br&gt;Croatia&lt;br&gt;1996 to 1998&lt;br&gt;37 people with intracranial aneurysms, age range 12 to 63&lt;br&gt;Operated on:&lt;br&gt;- within 48 hours of rupture: n = 3&lt;br&gt;- between 48 hours and 53 days of rupture: n = 34&lt;br&gt;Follow up: up to 17 months</td>
<td>Good recovery on Glasgow outcome scale: 33/37&lt;br&gt;Cosmetic effects: 'good'</td>
<td>- deaths: none&lt;br&gt;- damage to supraorbital nerve: 4 people&lt;br&gt;- intraoperative rupture of carotid artery aneurysm: 1 person&lt;br&gt;- wound infection: 1 person</td>
<td>Small uncontrolled case series.&lt;br&gt;Follow up long for some people.&lt;br&gt;Outcomes appropriate.</td>
</tr>
</tbody>
</table>
Validity and generalisability of the studies

- The studies were carried out in settings appropriate to the UK.
- Case series only were found. This study design cannot show whether supraorbital minicraniotomy is safer or more efficacious than conventional approaches. Follow up length was stated in only one report.3

Bazian comments

- The procedure refers only to the surgical technique for gaining access to the aneurysm or tumour, not the treatment itself.

Specialist advisors' opinions

Specialist advice was sought from the Society of British Neurological Surgeons.

- This is a modification of a standard surgical approach.
- Not ever really been accepted into mainstream practice.
- Interventional radiology techniques have superseded it.
- More difficult to deal with intraoperative rupture.
- Very few aneurysms will be treated surgically in the future (about 2%).

Issues for consideration by IPAC

None other than those discussed above.
References


## Appendix A: References to studies not described in the table

<table>
<thead>
<tr>
<th>Reference</th>
<th>Number of study participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czirjak S, Nyary I, Futo J, Szeifert GT. Bilateral supraorbital keyhole approach for multiple aneurysms via superciliary skin incisions. Surgical Neurology 2002; 57: 314–23.</td>
<td>36 (likely to be also included in Czirjak(^2))</td>
</tr>
</tbody>
</table>

Overview prepared by: Bazian Ltd December 2002