Decompressive hemicraniectomy in cerebral sinus thrombosis: consecutive case series and review of the literature

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Decompressive Hemicraniectomy in Cerebral Sinus Thrombosis
Consecutive Case Series and Review of the Literature

Jonathan M. Coutinho, MD, MSc; Charles B.L.M. Majoie, MD, PhD; Bert A. Coert, MD, PhD; Jan Stam, MD, PhD

Background and Purpose—Thirteen percent of patients with cerebral venous and sinus thrombosis (CVST) has a poor clinical outcome. In patients with a poor prognosis, endovascular thrombolysis can be considered, but this procedure does not appear to be beneficial in patients with impending transtentorial herniation because of large hemorrhagic venous infarcts. Therefore, halfway through 2006, we changed our policy to decompressive hemicraniectomy in these patients.

Methods and Results—Patients with CVST and impending herniation attributable to venous infarcts were eligible for surgical intervention. Since 2006 we consecutively treated 3 patients with decompressive hemicraniectomy. Two patients had an excellent outcome. The third patient, who had been comatose for at least 12 hours before surgery, died despite intervention.

Conclusions—Our data suggest that decompressive hemicraniectomy can be life-saving and can result in an excellent outcome in patients with severe CVST. (Stroke. 2009;40:2233-2235.)

Key Words: sinus thrombosis ■ intracranial ■ craniotomy ■ cerebrovascular disorders
Hemicraniectomy was subsequently performed. Immediately postoperative the patient showed marked improvement (E3M5Vaphasia), and the CT-scan showed reduction of midline shift (7 mm). At 12 months he had resumed all daily activities (mRS 1).

Patient B, a 36-year-old woman, was admitted because of a generalized epileptic seizure (E1M2V1). On day 3, treatment was withdrawn because there was no hope for recovery. She died 5 days later (mRS 6). The diagnosis of CVST was confirmed at autopsy.

**Discussion**

We present 3 consecutive cases with severe CVST and transtentorial herniation, treated with decompressive hemicraniectomy. This procedure resulted in excellent recovery in 2 patients. Before we changed our policy, similar patients in our center all had a fatal outcome despite maximal conservative treatment and endovascular thrombolysis.2

The scanty evidence for the efficacy of hemicraniectomy in CVST comes from small case series,3–7 summarized in the Table. Including our cases, 11 of 13 patients had a good outcome (mRS ≤3). However, comparability between cases is hampered by a wide variation in preoperative clinical condition (GCS and pupillary reactions) among patients.

There are several reasons why the concept of hemicraniectomy in severe CVST with impending herniation is plausible. First, hemicraniectomy can remove the immediate threat of fatal herniation. Second, decompressive hemicraniectomy has been shown to be effective in young patients with malignant middle cerebral artery infarction and impending herniation.8 The mechanism causing death is likely to be similar in both diseases. Finally, there is ample evidence that even large venous infarcts in general have a better potential for recovery than arterial infarcts.

To obtain more reliable data, a prospective case registry of hemicraniectomy in CVST will be included in a new, large, international study, the ISCVT-2.9 Participating centers will report clinical outcome on consecutive patients treated with decompressive hemicraniectomy for CVST. This will minimize selection bias of predominantly successful cases.

In conclusion, our data, supported by earlier case reports and pathophysiological plausibility, suggests that decompressive hemicraniectomy can be life-saving and result in an excellent outcome in the severest cases of CVST. Until more and better data are available, however, the decision to perform hemicraniectomy in CVST remains up to the individual judgment of the treating physician.

**Table. Summary of Case Reports on Decompressive Hemicraniectomy in Patients With Severe CVST**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year of Publication</th>
<th>No. of Cases</th>
<th>Age</th>
<th>GCS</th>
<th>Pupils</th>
<th>Outcomes</th>
<th>Favourable Outcome (mRS ≤3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stefini3</td>
<td>1999</td>
<td>3</td>
<td>40–54</td>
<td>4–7</td>
<td>/-/-</td>
<td>2/3</td>
<td></td>
</tr>
<tr>
<td>*Barbati4</td>
<td>2003</td>
<td>1</td>
<td>15</td>
<td>5</td>
<td>+/-</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>Weber6</td>
<td>2004</td>
<td>1</td>
<td>62</td>
<td>NA</td>
<td>NA</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>Keller6</td>
<td>2005</td>
<td>4</td>
<td>37–66</td>
<td>6–13</td>
<td>+/-</td>
<td>4/4</td>
<td></td>
</tr>
<tr>
<td>Zeng7</td>
<td>2007</td>
<td>1</td>
<td>48</td>
<td>7</td>
<td>/-/+</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>Current study</td>
<td>2008</td>
<td>3</td>
<td>36–55</td>
<td>5–13</td>
<td>Variable</td>
<td>2/3</td>
<td></td>
</tr>
</tbody>
</table>

GCS indicates Glasgow Coma Score; mRS, modified Rankin Scale; NA, not available.

*Bilateral hemicraniectomy performed in a patient with CVST without evident impending transtentorial herniation or mass lesions.
Acknowledgment
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Disclosures
None.

References