Surgical Treatment of Acute Subdural Hematomas in Patients with Low Glasgow Coma Scale Scores

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Summary: Difficulties in treating subjects with acute subdural hematomas and low Glasgow Coma Scale (GCS) scores (5 or less) were studied in 30 patients using two different surgical treatments. The outcomes in these patients were good for 13%, poor for 23%, and fatal for 63%. The ICP was well controlled in 2 patients (12%) in the DH (decompressive hemicraniectomy) group. No patient was well controlled in the HITT (hematoma irrigation with trephination therapy) group. Uncontrollable ICP occurred more frequently in the HITT group than in the DH group. The mortality rate was 56% for the DH group and 71% for the HITT group. The mortality rate of older patients, however, was 100% for the DH group and higher than 67% for the HITT group. This preliminary work demonstrates that decompressive craniectomy is more effective in controlling ICP and in improving the outcomes of patients with acute subdural hematomas and low GCS scores.

Key words: acute subdural hematoma—hemicraniectomy—intracranial pressure—GCS score—outcome

Introduction

Surgical treatment of acute subdural hematomas in patients with low Glasgow Coma Scale (GCS) scores (Teasdale and Jennett, 1974), is discouraging (Gennarelli et al. 1982; Stone et al. 1983; Shigemori et al. 1980). Two different types of surgical treatment have been employed for these patients. One is decompressive hemicraniectomy (Shigemori et al. 1980, 1985), and the other is small craniotomy (Aruga et al. 1984). The results of these treatments have not been satisfactory (Shigemori et al. 1980, 1985; Aruga et al. 1984). In the present report, preliminary work was performed to clarify the problems with these treatments.

Materials and Methods

This study involved 30 patients who had GCS scores of 3, 4 or 5. They were divided into two groups: 16 patients in the DH group had decompressive hemicraniectomy (Shigemori et al. 1980, 1985), and 14 in the HITT group had hematoma irrigation with trephination therapy under local anesthesia (Aruga et al. 1984). The mean age of the patients was 46 years for the DH group and 47 years for the HITT group. Preoperative GCS scores were almost evenly distributed, and 63% of the patients had GCS scores of 3 and 4. All the patients were operated on within 24 hours after the injury. They all had intensive medical management, including barbiturate therapy (5 mg/kg thiopental as an initial dose followed by 2–3 mg/kg/hr. for 3–4 days).
(Shigemori et al. 1985, 1986) and osmotic therapy with intracranial pressure (ICP) monitoring utilizing a Gaeltec sensor after the operation. The ICP after the operation was classified into 3 types; controlled, high but reduced and uncontrolled. A "controlled ICP" means that the ICP was maintained under 30 mmHg. A "high but reduced ICP" was initially as high as 30 mmHg and was then reduced. An "uncontrolled ICP" was never reduced below 30 mmHg. The outcomes of the patients were determined by using the Glasgow outcome scale (Teasdale and Jennett, 1976), 3 months after the injury, and were classified into three categories: i.e. good (good recovery with moderate disability), poor (severe disability and vegetative state), and fatal.

**Results**

For the 30 patients, the outcome was good in 4 patients (13%), poor in 7 patients (23%) and fatal in 19 patients (63%). There were no survivors with GCS scores of 3. The series included 11 patients over 60 years of age and none of them had a good outcome. The mortality rate was 82% (9 cases) for the elderly group. On the other hand, 4 young patients (21%) had good outcomes and the mortality rate was 53% (10 cases) for this group. The ICP was well controlled in 2 patients (12%) from the DH group, but could not be controlled in any patient in the HITT group. Uncontrollable ICPS occurred more frequently in the HITT group than in the DH group. In all the patients, only 7% had controlled ICPS and 50% had uncontrolled ICPS (Table 1). The patients had different outcomes depending on the type of treatment. 3 of 16 patients (19%) had a good outcome in the DH group, but the mortality rate was 56%. On the other hand, only one patient (7%) had a good outcome in the HITT group, and the mortality rate was 71% (Table 1). The mortality rate for the older patients was 100% in the DH group and higher than 67% in the HITT group. Only two patients in the HITT group who had no postoperative barbiturate therapy survived. On the contrary, in young patients, the mortality rate was much lower in the DH group than in the HITT group.

**TABLE 1**

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<th>Postoperative intracranial pressures (ICP) and outcomes after two types of surgical treatment</th>
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DH : Decompressive hemicraniectomy  
HITT : Hematoma irrigation with trephination therapy
Discussion

The most common and most important problems associated with severe head injury are brain ischemia due to compression from hematomas and uncontrolled intracranial hypertension (Langfitt, 1976). Decompressive craniectomy probably controls ICP by reducing the intracranial elasticity and increasing the capacity for spatial compensation. Cerebral perfusion is then maintained at levels adequate to prevent ischemic injury (Shigemori et al. 1980; Hase et al. 1978). In addition, secondary brain stem compression and brain shifting or distortion may be avoided. It is still controversial whether decompressive craniectomy can improve the outcome from an acute subdural hematoma (Cooper et al. 1979). Two types of surgical treatment, including decompressive craniectomy, were compared in this study.

It is well established that acute subdural hematomas in patients with low GCS scores are the most difficult head injuries to treat (Gennarelli et al. 1982). The mortality rate for these patients has been reported to be 74–84% (Gennarelli et al. 1982; Stone et al. 1983). The present result of a 63% mortality rate is better, thus decompressive craniectomy appears to be better for controlling the ICP and for improving the outcomes of these patients, particularly younger patients. In older patients, the results of decompressive craniectomy were poor and only two patients undergoing HITT without barbiturate therapy survived. The relatively low doses of barbiturates employed in these cases was effective in lowering the ICP by 10 to 15 mmHg without any serious complications in the younger patients (Shigemori et al. 1986). In the older patients it was occasionally difficult to maintain the cerebral perfusion pressure above 40 to 50 mmHg due to arterial hypotension (Shigemori et al. 1986). Therefore less invasive surgical treatment, such as HITT without barbiturate therapy, is recommended, although further studies are necessary to determine the best treatment.

References


