Controversies in chronic subdural hematoma: Continuous drainage versus one-time drainage

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Summary

Background: Various surgical methods are recommended for the therapy of chronic subdural hematoma (CSH). In this study, burr-hole continuous drainage (CD) and burr-hole one-time drainage (OTD) methods for the treatment of CSH are retrospectively compared.

Material/Methods: Fifty patients with CSH referred to this clinic between July 1995 and December 2003 were selected for treatment. Twenty-one patients were treated by the burr-hole OTD method and 29 patients received burr-hole CD therapy. The recurrence rates and the extension of the hematoma were evaluated with respect to the period of postoperative hospitalization to evaluate the most effective method.

Results: The postoperative hospitalization period was 7.9 days in the burr-hole continuous drainage group and 17 days in the burr-hole one-time drainage group. Recurrence developed in two cases (6.8%) in the CD group and in six cases (28.5%) in the OTD group. When the pre- and postoperative hematoma extension in the CD group were compared, a significant degree of decrease was observed on post-op day 1. Extension of the hematoma was found to be minimal in the days following the modification. The width of the hematoma in the OTD group was also reduced at post-op day 1; however, the degree of this decrease was not significant.

Conclusions: Continuous drainage therapy for CSH is superior to the one-time drainage method due to the shorter time of post-op hospitalization and to the reduced rate of recurrence.

key words: chronic subdural hematoma • continuous drainage • one-time drainage

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BACKGROUND

Chronic subdural hematoma (CSH) is a neurosurgical disease that poses high treatment potential. Diagnosis is readily facilitated by brain computerized tomography (CT) and magnetic resonance (MR) imaging [1,2]. Excluding minimal subdural hematoma, therapy is commonly surgical, and a dramatic and rapid improvement in postoperative symptoms is frequently observed [3]. Many surgical interventions, including craniotomy, trepanation, burr-hole craniectomy and twist-drill perforation, irrigation and non-irrigation drainage methods are applied in the treatment of CSH [4]. We used burr-hole continuous drainage (CD) and burr-hole one-time drainage (OTD) in the treatment of CSH. The objective of this study is to determine the most effective method with additional benefits for the patient.

MATERIAL AND METHODS

The present study included 50 CSH cases treated in our clinic between July 1995 and December 2003. Twenty-one patients were treated with burr-hole OTD while 29 patients were treated with burr-hole CD. Patients who had previously undergone craniotomy were excluded from the study. The patients were between 1 and 84 years of age (62.72±23.23 years) in the CD group and between 1 and 86 years of age (60.00±24.23 years) in the OTD group. Forty of the patients were males and 10 were females. There were two patients who had undergone a shunt operation due to hydrocephalus and one patient who suffered from liver dysfunction and who was receiving anticoagulant agents. Sixteen male and 5 female patients were treated with OTD and 24 male and 5 female patients were treated with CD therapy. The characteristic features of the patients are displayed in Table 1. A habit of alcohol consumption was found in the two cases in the continuous drainage group and in one case in the one-time drainage group. A medical history of cranial trauma was present in 12 cases in the one-time drainage group and in 18 patients in the continuous drainage group. There were no significant differences in age, sex, alcohol consumption, and past medical history of cranial traumas between the groups.

Four patients received local anesthesia, while total anesthesia was applied to 46 patients. The procedure applied for burr-hole OTD is described as follows: under local or total anesthesia a double burr-hole was opened and, after the duramater was incised, the external membrane of the hematoma was incised. Using a soft catheter located at the subdural area, irrigation with warm serum physiologic solution (saline) continued until a limpid liquid was discharged; no drains were inserted. The procedure applied for burr-hole CD is described as follows: immediately after a double burr-hole was opened and the dura was incised, the external membrane of the hematoma was incised. A soft drain was inserted between the burr-hole area and the subdural distance. The irrigation procedure with warm serum physiologic solution (saline) continued until a limpid liquid was discharged. After irrigation was completed, the drain was not removed; instead, the free end of the drain was connected to an external drainage system. The heads of post-op patients were ascended to an angle of 30° upwards from the bed level. Drains were withdrawn before the fourth day in patients with a limpid discharge and at the fourth day in patients who did not have a limpid discharge. Drains were kept in situ for a maximum period of four days.

The thickness of the preoperative and postoperative hematomas was evaluated by CT. The CD group’s mean preoperative hematoma thickness was 32.21±1.57 mm and the OTD group’s 33.14±1.58 mm. The recurrence rate, the period of postoperative hospitalization, and the differences between postoperative hematoma thickness were retrospectively compared in both of the groups. For statistical examinations, the Student’s t test was used.

RESULTS

Recurrences rates and number of post-op hospitalization days

Recurrence developed in two cases (6.8%) in the continuous drainage group and in six cases (28.5%) in the one-time drainage group. The period of recurrence in patients who were operated for a second time due to recurrences was a maximum of 8 days in the continuous drainage group and between 10 and 17 days in the one-time drainage group (mean: 13.5 days). Half of the patients with recurrences were male and half were female.

The mean post-op hospitalization period was 7.9 days in the continuous drainage group and 17 days in the one-time drainage group. However, the post-op hospitalization period in the continuous drainage group was significantly shorter (p<0.001) (Table 2). Without any recurrences the post-op hospitalization period was 6.8 days in 42 patients in the continuous drainage group and 12.1 days in the one-time drainage group, significantly shorter in the continuous drainage group.

Modifications in postoperative hematoma thickness

The thickness of the hematoma was significantly reduced at postoperative day 4 in the CD group (2.41±0.87 mm). However, the decrease was not significant in the OTD group (9.62±1.70 mm) (Table 2).

DISCUSSION

CSH is commonly treated and in general a cure is obtained; however, the possibility of recurrence cannot be eliminated. The standard surgical therapy is carried out as single or double burr-hole irrigation and drainage [5–7]. The recurrence rate after surgical intervention may vary between 3.7% and 22.2% [5,8–12]. In our study the total recurrence rate was approximately 28.5% and recurrences were lower in the CD group. The recurrence rate was 6.8% in the CD group and 28.5% in the OTD group. This shows that CD is more effective than OTD in patients suffering from CSH. The second surgical intervention in patients with recurrences was carried out 13 days after the first surgical operation. In previous studies the period of re-operation is reported as approximately 12 days [13]. This period is compatible with the value we determined in the present study. Thus the therapy appears simple, but a satisfactory result may nevertheless not be consistently obtained. The brain may sometimes fail to widen to requested sizes and recurrence plus consciousness disorders due to the torsion of the brain stem.
or intracranial hypotension may therefore develop. Factors that may increase the risk of recurrence include advanced age, cerebral atrophy, alcoholism, renal failure, liver dysfunction, meningeal diffusion of malignant tumors and a large hematoma, septum formation in the hematoma, inadequate postoperative drainage, air collection in the hematoma cavity, and early surgical intervention of the capsule in an undeveloped hematoma [2,16].

We analyzed the recurrence factors in eight CSH patients who were referred to our clinic and as reported in a study carried out by Suzuki et al. [15]. When factors such as age, sex, medical history of trauma, clinical status, hematoma density on CT, and clinical findings were considered we observed no significant differences between recurrence groups and non-recurrence groups. We therefore assumed that no estimation of recurrences may be available prior to an operation in a CSH patient. CSH usually develops after a rupture in parasagittal bridge veins due to an accelerative type of trauma. As the intracranial pressure (ICP) is low, pressure correlated with a lower number of recurrences. Drainage may help avoid such problems.

The hematoma area in the CD group was decreased at day 4 in postoperative cases and the subsequent changes in the hematoma area in the following days were minimal. If infection is avoided, a drainage period of three to four days is adequate. In this study the mean drainage period was 3.8 days and no infections developed during the drainage procedure. Prophylactic antibiotic agents were administered to patients during the drainage period.

After the irrigation process, complications included cerebral hemorrhage, brain edema, and convulsions due to immediate changes in the intracranial status have been reported [3,18]. The mentioned complications are valid for both group, and we applied irrigation in both groups. Few complications are likely in the CD group. These complications include incomplete drainage in patients with a multiple hematoma cavity, patients with an incomplete drainage due to obstruction of the drainage tube originating from a blood clot, and patients with hemorrhages due to damage to cortical vessels by the drainage tube. However, in spite of the possible complications mentioned, the CD procedure appears more safe and secure, with fewer recurrences and a shorter hospitalization period than the OTD procedure.

### Table 1. Characteristic features of the patients.

<table>
<thead>
<tr>
<th>Continuous drainage group (n=29)</th>
<th>One-time drainage group (n=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age range (years)</td>
<td>Gender male/female</td>
</tr>
<tr>
<td>1–84</td>
<td>24/5</td>
</tr>
<tr>
<td>1–86</td>
<td>16/5</td>
</tr>
</tbody>
</table>

### Table 2. Comparison of parameters of the CD and OTD groups.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>CD</th>
<th>OTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age range (years)</td>
<td>62.72±3.23</td>
<td>60.00±4.23</td>
</tr>
<tr>
<td>Gender</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Head trauma</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hospitalization days</td>
<td>7.90±0.41</td>
<td>17.00±0.54*</td>
</tr>
<tr>
<td>Preoperative hematoma thickness (mm)</td>
<td>32.21±1.57</td>
<td>33.14±1.58</td>
</tr>
<tr>
<td>Postoperative hematoma thickness (mm)</td>
<td>2.41±0.87</td>
<td>9.62±1.70*</td>
</tr>
<tr>
<td>Recurrence rate</td>
<td>2 (6.8%)</td>
<td>6 (28.5%)</td>
</tr>
</tbody>
</table>

Data presented as mean ±standard error. * P<0.001 compared with the CD group.
CONCLUSIONS

From the evaluation of treatment for CSH and assessment of postoperative hospitalization, recurrences, and re-operation, burr-hole CD may lead to a shorter hospitalization period compared with the burr-hole OTD method, with decreased recurrence rate and need for re-operation. Therefore we suggest that the burr-hole CD method may be more useful in the treatment of a chronic subdural hematoma.

REFERENCES:

5. Asano Y, Hasuo M, Takahashi I, Shimosawa S: Recurrence cases of chronic subdural hematoma: its clinical review and serial CT findings. No To Shinkei, 1992; 44: 827-31

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