Efecto del colgajo de hueso grande traumático el tratamiento de pacientes con lesión craneocerebral severa y contusión cerebral y edema cerebral

Effect of Standard Traumatic Large Bone Flap in the Treatment of Patients with Severe Craniocerebral Injury and Brain Contusion and Cerebral Edema

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Resumen
Este artículo analiza la eficacia clínica de la craneotomía traumática grande estándar para el tratamiento de pacientes con lesiones graves en la cabeza y contusión cerebral y edema cerebral. La tasa de recuperación de los pacientes en el grupo de observación fue significativamente mayor que la del grupo de control. La mortalidad del grupo de observación fue significativamente menor que la del grupo control, y la diferencia fue estadísticamente significativa (P<0.05). No hubo diferencias significativas en la presión intracraneal entre los dos grupos (P>0.05). La presión intracraneal fue significativamente menor después del tratamiento (P<0.05). La presión interna fue significativamente menor que la del grupo de control, y la diferencia fue estadísticamente significativa (P<0.05). No hubo diferencias significativas en la incidencia de inflamación cerebral aguda, infección intracraneal y epilepsia traumática entre los dos grupos (P>0.05). La incidencia de hematoma tardío, reoperación y hernia incisional en el grupo de observación fue significativamente menor que en el grupo de observación. La craneotomía grande traumática estándar tiene un buen efecto en el tratamiento de pacientes con lesión craneocerebral severa y contusión cerebral y edema cerebral. Microcirculación cerebral, mejorar la tasa de éxito de rescate y mejorar el pronóstico, es digno de aplicación clínica.

Palabras clave: lesión craneocerebral severa; Contusión cerebral; Edema cerebral; Traumatismo estándar craneotomía grande; Eficacia clínica

Abstract
This paper analyzes the clinical efficacy of standard traumatic large craniotomy for the treatment of patients with severe head injury and brain contusion and brain edema. The observation group and 32 consecutive patients with severe craniocerebral injury and brain contusion in the head were randomly selected as the control group of this study. The recovery rate of the patients in the observation group was significantly higher than that in the control group. The mortality of the observation group was significantly lower than that of the control group, and the difference was statistically significant (P<0.05). There was no significant difference in intracranial pressure between the two groups (P>0.05). The intracranial pressure was significantly lower after treatment (P<0.05). The internal pressure was significantly lower than that of the control group, and the difference was statistically significant (P<0.05). There was no significant difference in the incidence of acute brain swelling, intracranial infection and traumatic epilepsy between the two groups (P>0.05). The incidence of delayed hematoma, reoperation and incisional hernia in the observation group was significantly lower than that in the control group. In the control group, the difference was statistically significant (P<0.05). Standard traumatic large craniotomy has good effect in treating patients with severe craniocerebral injury and brain contusion and brain edema. It can fully expose and effectively remove brain contusion and necrotic tissue, cerebral hematoma, effectively stop bleeding and fully decompress and improve. Brain microcirculation, improve rescue success rate and improve prognosis, it is worthy of clinical application.

Key words: Severe craniocerebral injury; Brain contusion; Brain edema; Standard trauma large craniotomy; Clinical efficacy

1. Introduction

Severe craniocerebral injury is the most serious type of craniocerebral trauma, accounting for 20% of craniocerebral injury. Its mortality rate has been high, its condition is more complicated, critical, and prone to complications, with high disability. Rate and fatality rate [1-2]. How to reduce disability, mortality and improve
the quality of life of patients has always been the focus and difficulty of neurosurgical research. The main cause of disability and mortality in severe craniocerebral injury is the formation of intracranial hematoma after brain trauma, and cerebral edema makes it difficult to control high intracranial pressure [3]. Therefore, the clinical treatment of severe craniocerebral injury mostly uses surgical decompression, and its therapeutic effect is better [4]. Conventional debriding craniotomy is not ideal due to inadequate decompression and excessive exposure [5]. Standard traumatic large craniotomy has good curative effect in the treatment of acute supratentorial intracranial hematoma, brain contusion and malignant intracranial hypertension, so it is widely used in clinical practice [6-7]. However, there are few clinical studies on the treatment of severe craniocerebral injury with brain contusion and brain edema with standard traumatic large craniotomy and conventional debridement craniotomy. In this regard, this paper mainly studies the clinical efficacy of standard traumatic large craniotomy for patients with severe craniocerebral injury and brain contusion and brain edema. The results of the study are now reported as follows:

2. Materials and Methods

2.1 General Information

Randomized digital table method was used to randomly select 55 patients with severe craniocerebral injury and brain contusion and cerebral edema in our hospital from April 2016 to April 2018 as the observation of this study. Thirty-two patients with severe craniocerebral injury complicated with brain contusion and cerebral edema were randomly selected as the control group in this study. The control group had 22 males and 10 females, aged 16 to 75 years, mean age (44.58±4.36) years old; 20 patients with car accidents, 8 patients with high altitude fall, 4 patients with violent injuries; persistent coma after injury There were 14 patients; 12 patients with bilateral dilated pupils and 20 patients with unilateral dilated pupils; Glasgow Coma Scale (GCS) score [8] (5.40±0.84). The observation group had 39 males and 16 females, aged 15 to 78 years, mean age (45.23±4.64) years old; 36 patients with car accidents, 14 patients with high altitude fall, 5 patients with violent injuries; persistent coma after injury There were 32 patients; 22 patients with bilateral dilated pupils and 33 patients with unilateral dilated pupils; GCS score (5.26±0.81). There was no significant difference in the general clinical data of the patient's gender, age, cause of injury, persistent coma after injury, dilated pupils, and GCS score (P>0.05), so there was comparability between the groups.

2.2 Method

Patients in the control group underwent conventional debridement craniotomy, and patients in the observation group underwent standard traumatic large craniotomy. Standard traumatic craniotomy: The patient underwent general anesthesia and the lateral position was taken to fully expose the surgical area; the incision was 1 cm from the upper ear of the iliac crest, from the auricle to the posterior superior to the midline of the parietal bone. The midline is forward to the forehead hairline, the flap is turned over to the frontalis iliac crest, and the muscle flap is turned over to the ankle; the bone flap is freed, and the iliac fascia is cut by a 0.5 cm arc on the inner side of the upper line. Apply the milling cutter to open the bone flap; routinely insert the intracranial pressure monitoring probe, remove the epidural hemorrhage and suspend the dura mater, routinely bite the sphenoid ridge, first bend the crotch along the sphenoid ridge The meninges are cut open, and the arachnoid membrane of the lateral fissure pool is torn, the blood cerebrospinal fluid is discharged, and the blood cerebrospinal fluid is cleared; the hemostasis is completely stopped; the probe for intracranial pressure is placed on the patient's intracranial after the hemostasis is completed. Pressure monitoring; patients with acute brain swelling need to undergo extreme decompression; patients with cerebral palsy are lifted by cerebral infarction and 1.5% hydrogen peroxide and normal saline are repeatedly injected into the base of the cranial fossa to reset; The nerve patch and the dura mater were sutured and the drainage tube was placed under the dura mater. Conventional debridement craniotomy: the patient underwent supine position and raised his head. Craniotomy was performed according to the position of the patient's brain contusion. The position was generally the forehead or the dome flap. The necrotic tissue such as brain contusion and hematoma was taken out thoroughly. Hemostasis, intracranial pressure probe placed under the dura mater to monitor the patient's intracranial pressure. After operation, both groups of patients entered the intensive care unit, closely monitored the patient's vital signs, and according to the guidelines for the treatment of craniocerebral trauma, routine nutritional support, dehydration, anti-infection, hemostasis, etc., and timely treatment of complications.

2.3 Observation Index

The patients in both groups were followed up for 6 months. The results of surgical treatment, intracranial pressure and postoperative complications were compared between the two groups. The surgical treatment effect of the patients was mainly evaluated by the Glasgow Outcome Scale (GOS) [9] scoring standard. The results of surgical treatment were evaluated in 3 months after surgery, which were mainly divided into well-recovered,
moderately disabled, severely disabled, and vegetative. Death. Preoperative and postoperative intracranial pressure was mainly recorded on the intracranial pressure of the patient before and 5 days after surgery.

2.4 Statistical Processing
The processing data software was SPSS22.0, the counting data was expressed by (%), and the independent sample was tested by \( \chi^2 \); the measurement data was represented by \(( \bar{x} \pm s)\), the intra-group comparison was performed by paired sample t test, and the comparison between groups was tested by independent sample t test. \( P < 0.05 \) indicates that the difference was statistically significant.

3. Results

3.1 Comparison of Surgical Treatment between the Two Groups
The postoperative recovery rate of the observation group was significantly higher than that of the control group. The mortality of the observation group was significantly lower than that of the control group, and the difference was statistically significant \((P<0.05)\). See Table 1.

<table>
<thead>
<tr>
<th>Group</th>
<th>Well recovered</th>
<th>Disability</th>
<th>Heavy</th>
<th>Plant state</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation group</td>
<td>28(50.91)</td>
<td>9(16.36)</td>
<td>6(10.91)</td>
<td>4(7.27)</td>
<td>8(14.55)</td>
</tr>
<tr>
<td>Control group</td>
<td>9(28.13)</td>
<td>5(15.63)</td>
<td>4(12.5)</td>
<td>3(9.38)</td>
<td>11(34.38)</td>
</tr>
<tr>
<td>( \chi^2 ) value</td>
<td>4.297</td>
<td>0.008</td>
<td>0.050</td>
<td>0.121</td>
<td>4.66</td>
</tr>
<tr>
<td>( P ) value</td>
<td>0.038</td>
<td>0.928</td>
<td>0.822</td>
<td>0.728</td>
<td>0.031</td>
</tr>
</tbody>
</table>

3.2 Comparison of Intracranial Pressure between Preoperative and Postoperative Patients in Two Groups
There was no significant difference in intracranial pressure between the two groups \((P>0.05)\). The intracranial pressure was significantly lower after treatment \((P<0.05)\). The internal pressure was significantly lower than that of the control group, and the difference was statistically significant \((P<0.05)\), as shown in Table 2.

<table>
<thead>
<tr>
<th>Group</th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>( t ) value</th>
<th>( P ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation group</td>
<td>34.36±3.52</td>
<td>20.39±2.00</td>
<td>69.780</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Control group</td>
<td>34.36±3.52</td>
<td>26.31±2.61</td>
<td>50.041</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>( t ) value</td>
<td>0.662</td>
<td>11.877</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( P ) value</td>
<td>0.510</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3 Comparison of Postoperative Complications between the Two Groups
There was no significant difference in the incidence of acute brain swelling, intracranial infection and traumatic epilepsy between the two groups \((P>0.05)\). The incidence of delayed hematoma, reoperation and incisional hernia in the observation group was significantly lower than that in the observation group. In the control group, the difference was statistically significant \((P<0.05)\), as shown in Table 3.

<table>
<thead>
<tr>
<th>Group</th>
<th>Acute brain swelling</th>
<th>Delayed hematoma</th>
<th>Surgery again</th>
<th>Incisional defect</th>
<th>Intracranial infection</th>
<th>Traumatic epilepsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation group</td>
<td>4(7.27)</td>
<td>2(3.64)</td>
<td>1(1.82)</td>
<td>1(1.82)</td>
<td>0(0.00)</td>
<td>2(3.64)</td>
</tr>
<tr>
<td>Control group</td>
<td>5(15.63)</td>
<td>6(18.75)</td>
<td>4(12.5)</td>
<td>4(12.5)</td>
<td>1(3.13)</td>
<td>2(6.25)</td>
</tr>
<tr>
<td>( \chi^2 ) value</td>
<td>1.522</td>
<td>5.534</td>
<td>4.261</td>
<td>4.261</td>
<td>1.739</td>
<td>0.315</td>
</tr>
<tr>
<td>( P ) value</td>
<td>0.217</td>
<td>0.019</td>
<td>0.039</td>
<td>0.039</td>
<td>0.187</td>
<td>0.575</td>
</tr>
</tbody>
</table>

4. Discussion
Severe craniocerebral injury combined with brain contusion and cerebral edema and refractory intracranial hypertension caused by various reasons are important reasons for the high disability and mortality of patients. Brain injury due to post-injury cerebral edema, secondary intracranial hematoma caused by an increase in the volume of intracranial substances, cerebrospinal fluid and cerebral blood volume can be compensated by self-regulation to increase the volume of some intracranial substances, but the intracranial contents An increase in volume beyond the intracranial regulation of compensatory capacity results in an increase in intracranial pressure [10]. The continuous increase of intracranial pressure causes a pressure difference in the brain and causes brain displacement, which leads to cerebral palsy [11]. Therefore, the clinical should remove the intracranial hypertension and cerebral palsy as soon as possible, and reverse the brain stem function of the patient, so as to improve the prognosis of patients.

For patients with severe brain injury and brain contusion and cerebral edema, clinical conservative treatment has been difficult to obtain better therapeutic effect, but decompressive craniectomy is required to expand the brain volume, reduce intracranial pressure, and eliminate brain. Dry compression, improve blood flow, and reduce clinical complications of patients [12]. Conventional debridement craniotomy can remove brain contusion tissue and intracranial hematoma, which can reduce intracranial pressure to a certain extent, but there are still some defects: First, the skull base tissue cannot be fully exposed, it is difficult to completely remove brain contusion tissue and Hemostasis, and then delayed intracranial hematoma due to insufficient hemostasis or hemostasis in hemostasis; Second, if the decompression is insufficient, after removing some brain contusion tissue and hematoma, hyperperfusion and cerebral edema will cause brain tissue to The outer bulging, while the range of the bone window is small, the bulging brain tissue will be stuck at the edge of the bone window, the blood flow back of the brain tissue is hindered, the brain bulging and brain edema are aggravated, and malignant circulation is formed [13-14]. It can be seen that thorough removal of brain contusion tissue, hematoma, effective hemostasis, and adequate decompression are the key to successful surgery and reduction of morbidity and mortality.

A number of clinical studies have found that the clinical treatment of severe and severe craniocerebral injury with standard traumatic large craniotomy is significantly better than conventional craniotomy, and its prognosis is better [15-16]. According to the clinical literature and the author's clinical experience, the advantages of standard traumatic large craniotomy are summarized: First, the intracranial pressure is effectively reduced. Intracranial hypertension is an important cause of morbidity and mortality in patients with severe craniocerebral injury. The standard traumatic large bone craniotomy can reach the upper edge of the iliac crest and the iliac crest. The bone window has a wide range and low position. There will be incarceration of the brain tissue. The larger the bone window and the closer to the skull base, the better the decompression effect. The sacral leaf can be lifted through the brain plate to make the cerebellar sulcus edge appear and bite off the sphenoid bone. The lateral fissure vessels are exposed, which further reduces the decompression, and also avoids the pressure and loss of the brain stem, so that the cerebral palsy is compensated, and the clinical treatment effect is improved [17]. Second, effective hemostasis and complete removal of necrotic tissue and hematoma. Standard traumatic large craniotomy has a wide range of bone windows, which can fully expose the intracranial tissues, thus effectively removing the subfrontal, epidural and intracerebral hematoma of the frontal, temporal and parietal lobe, and effectively clearing the brain contusion area. Necrotic tissue, effective control of sagittal sinus bridge vein, sinus sinus, transverse sinus tear and cranial fossa hemorrhage, repairing the skull base dura mater, avoiding leakage of hydrocephalus, and effectively stopping bleeding under direct vision, reducing late Hematoma and the incidence of reoperation [18]. Third, promote microcirculation to improve and protect brain tissue. Standard traumatic large craniotomy can improve the blood vessel and brain tissue oxygen partial pressure due to adequate decompression, so that brain swelling can be alleviated, brain tissue can be protected, and brain tissue hemorrhage and reperfusion injury can be alleviated. The venous decompression is sufficient, so that the microcirculation of the brain and the lateral fissure microcirculation are improved, and the postoperative brain edema is alleviated. Fourth, the surgical incision does not affect the facial appearance of the patient, and the surgical incision is mostly in the hairline. However, there are certain defects in standard traumatic craniotomy. Firstly, the surgical trauma is large, the operation time is long and the bleeding is more. Secondly, there may be delayed hematoma in the early stage, which may aggravate brain edema. Later, brain softening and effusion may occur. Complications such as atrophy, epilepsy, and hydrocephalus; Finally, the range of postoperative skull defects is large, which makes it difficult to repair the skull later. It is not suitable for sudden death and advanced patients. In order to avoid the above surgical defects, it can be treated according to different conditions during the operation. The decompression or gradient decompression can reduce the compliance of the brain tissue at the bone window, avoid the occurrence of delayed hematoma, and repair the dural Need to reduce unnecessary damage when fully decompressed [19]. Standard traumatic large craniotomy should be performed as soon as possible. The closer the cerebral palsy is to the distance, the better the clinical prognosis. The patient with slow progression is better than the patient with rapid progression [20]. In this study, patients with standard traumatic craniotomy had lower mortality, better clinical outcome, and lower
postoperative complications than patients undergoing conventional debride craniotomy. This is consistent with the findings of other scholars [21-24].

5. Conclusion

In summary, standard trauma large craniotomy has good results in the treatment of severe brain injury with brain contusion and cerebral edema. It can fully reveal and effectively remove brain contusion necrotic tissue, cerebral hematoma, effective hemostasis and adequate decompression. Improve brain microcirculation, improve rescue success rate and improve prognosis, it is worthy of popularization and application in clinical treatment.

References

