



Minimally Invasive Surgery for Patients with Hypertensive Intracerebral Hemorrhage with Large Hematoma Volume: A Retrospective Study

Weijun Wang, Ningquan Zhou, Chao Wang

OBJECTIVE: Therapeutic efficacy of patients with hypertensive intracerebral hemorrhage (HICH) with large hematoma volume is poor. This study aimed to explore the efficacy of minimally invasive surgery for patients with HICH with large hematoma volume.

METHODS: A total of 104 patients with HICH with a hematoma volume >50 mL were treated with different surgical approaches. The patients were allotted to a minimally invasive surgery group (minimally invasive, $n = 70$) and conventional craniotomy group (craniotomy group, $n = 34$). Patients were followed-up for 30 days postoperatively, and their clinical data were compared.

RESULTS: No statistically significant differences were found in age, sex, hematoma volume, and preoperative Glasgow Coma Scale score between the 2 groups ($P > 0.05$), whereas patient age was slightly greater in the minimally invasive group than the craniotomy group ($P < 0.05$). Postoperative mortality and complication rates in the minimally invasive group were significantly lower than those in the craniotomy group (20% vs. 44.1% and 15.2% vs. 29.4%, $P < 0.05$), and a better Glasgow Outcome Scale score at 30 days postoperatively was found in the minimally invasive group than the craniotomy group ($P < 0.05$). No significant differences were observed between the 2 groups in terms of mortality rate in patients with brain herniation and complication rates of postoperative renal failure, pulmonary infection, and cerebral infarction ($P > 0.05$).

CONCLUSIONS: Minimally invasive surgery is safe and effective in patients with HICH with a hematoma volume >50 mL. Because of its minimal invasiveness, better recovery rate, lower mortality rate, and less complications,

this approach is considered superior to craniotomy. However, further validation on a larger sample size is required.

INTRODUCTION

Hypertensive intracerebral hemorrhage (HICH) is a type of stroke or intracerebral bleeding that is caused by hypertension-induced intracranial arterial, venous, and capillary ruptures. The incidence of HICH has decreased recently, but the rates of disability and mortality rates on the increasing trend during the long-term follow-up period.¹⁻⁴ In recent years, the age of onset of HICH has been younger, which has exposed society greatly to heavy social and economic burdens. In particular, patients with HICH with a hematoma volume >50 mL have greater rates of disability and mortality,^{2,5-10} and therefore it is necessary to investigate therapeutic strategies deeply.

At present, craniotomy has been a conventional and important surgical technique for the treatment of HICH for evacuating hematoma. This technique has been used because of its advantages of removing hematoma rapidly and relief from intracranial hypertension as well as mechanical compression. However, results from multicenter clinical trials conducted in 2005 and 2013 showed that patients benefitted little from the craniotomy procedure because of massive surgical trauma.^{11,12}

In recent years, the minimally invasive concept has been gradually developed in neurosurgery,¹³⁻¹⁷ minimally invasive surgery has completely replaced craniotomy for treating patients with a hematoma volume of 30-50mL and mild disturbance of consciousness. This procedure avoids the surgical trauma associated with conventional craniotomy in most patients while obtaining excellent therapeutic efficacy.¹⁸⁻²¹ However, few studies have reported the suitability and efficacy of minimally invasive surgery for patients with HICH with a hematoma volume >50 mL.

Key words

- Craniotomy
- Efficacy
- Hypertensive intracerebral hemorrhage
- Large hematoma volume
- Minimally invasive surgery

Abbreviations and Acronyms

GOS: Glasgow Outcome Scale

HICH: Hypertensive intracerebral hemorrhage

Department of Neurosurgery, Qiannan People's Hospital, Qiannan, Guizhou, China

To whom correspondence should be addressed: Weijun Wang, M.Sc.

[E-mail: 751829615@qq.com]

Citation: World Neurosurg. (2017) 105:348-358.

<http://dx.doi.org/10.1016/j.wneu.2017.05.158>

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

1878-8750/© 2017 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Because hemostasis cannot be achieved under the direct vision during minimally invasive surgery, many physicians are concerned that this method has a greater rate of rebleeding compared with conventional craniotomy.^{20,21} Also, high intracranial pressure cannot be relieved promptly and may result further in the occurrence of brain herniation due to the deterioration. This is followed by the peak period of cerebral edema and increase in mortality rate.¹⁸⁻²¹ In addition, because the hematoma cannot be completely removed with one minimally invasive surgical operation, whether the frequent use of mannitol help to lower cerebral hypertension, leading to increased incidence rates of renal failure, still remains as a question. Moreover, is there a possibility for the patient to have a poor functional recovery, as it takes 3–7 days to completely drain the hematoma?

All these issues decide whether minimally invasive surgery is suitable as a treatment for HICH with large hematoma volume. However, because of its minimally invasive nature, short operation time, and low anesthesia risk, both patients and neurosurgeons wish that minimal invasive surgery could have a broader application even in patients with a larger hematoma volume.²²

METHODS

Patients

A total of 104 patients with HICH with a hematoma volume >50 mL admitted in the Department of Neurosurgery, The People's Hospital of Qiannan, Guizhou Province between April 2012 and August 2016 and were analyzed retrospectively. The protocol was approved by the ethics committee, and we obtained signed informed consent from the patients or their relatives. Patients and their relatives were briefed on minimally invasive (minimally invasive) surgery¹⁰ and decompressive craniotomy for hematoma evacuation (craniotomy), which were intended to be performed. Then, the surgical method was chosen by patients and their relatives. Therefore, patients were divided according to the surgery performed into a minimally invasive group and a craniotomy group. A comparative study was conducted between the 2 groups to assess the preoperative and postoperative conditions.

Surgical Indications and Relative Contraindications

The indications included 1) a supratentorial hematoma volume >30 mL with a midline displacement of >0.5 cm and an obvious lateral ventricle compression²³; and 2) infratentorial hematoma volume >10 mL with brainstem compression and hydrocephalus. The following patients were relatively contraindicated for the surgery: 1) conscious patients with a small amount of supratentorial hemorrhage; 2) patients with severe disturbance of consciousness and who might soon develop brainstem symptoms; 3) patients with brainstem hemorrhage; 4) patients with systemic diseases involving the heart, lungs, kidneys, etc. before the onset; 5) patients older than 70 years (for such patients, decisions on whether performing the operation and the selection of surgical approaches should be prudently made based on the their systemic conditions); and 6) patients with high blood pressure that was difficult to control by medications or retinal hemorrhage after the onset.

Inclusion and Exclusion Criteria for the Minimally Invasive Group

Inclusion criteria included patients with an acute hemisphere HICH >50 mL confirmed by the 64-row computed tomography (CT) of the head and no contraindication found during the routine preoperative examination, and patients who along with their relatives have decided to adopt the minimally invasive surgery. The following patients were excluded: 1) patients with a hemorrhage due to cerebral vascular malformation, aneurysm, tumor bleeding, and coagulation abnormalities; 2) patients with a hemorrhage originated from the cerebellum and brainstem; 3) patients with hemophilia; and 4) patients with advanced brain herniation who underwent minimally invasive surgery for the purpose of palliative care.

Surgical Procedures for Minimally Invasive Surgery

In 70 patients in the minimally invasive group, stereotactic positioning with 64-row CT of the head was performed to determine the amount and site of hematoma. The slice containing the maximal hematoma diameter was selected as the puncture site and the shortest route to the hematoma center was chosen as the puncture route, whereas the scalp puncture site was determined based on the maximum slice and shortest route (**Figure 1A**). The scalp was disinfected routinely, and the sterile towels were draped before the infiltration of local anesthesia with lidocaine in the scalp puncture site. A full-thickness scalp incision of 0.6–0.8 cm was then made to approach the skull (**Figure 1B**), and the manual skull drilling was performed; after which, the dura was punctured with a brain puncture needle and the hematoma was pierced using a 12F tube with a core till the old bloody fluids were drained out (**Figure 1C**). Finally, the drainage tube was forwarded 1.0 cm along the direction of the hematoma, the core tube was withdrawn, the drainage tube was sutured and then fixated, and the closed anti-countercurrent drainage device was connected (**Figure 1D**).

After the operation, CT of the head was adopted to dynamically monitor the drainage of the hematoma, whereas urokinase was administered to dissolve the blood clots and to facilitate easy drainage. After the hematoma was evacuated substantially, the drainage tube was withdrawn (**Figures 2C, 3C, and 4C**), whereas treatments such as oxygenation, hemostasis, dehydration for lowering the intracranial pressure, prophylactic use of antibiotics, brain cell nutrition, etc. also were taken care of routinely after the surgery.

Principle for the Timing of Surgery

If patients are lethargic without significant symptoms of intracranial hypertension (such as headache and vomiting), the best timing of surgery should be 6 hours after the onset.²⁴ If patients have significant symptoms of intracranial hypertension (such as severe headache and vomiting), severe disturbance of consciousness, coma, or even unilateral mydriasis and the occurrence of hernia, surgery should be performed immediately.

Selection Criteria for Surgical Procedure for the Minimally Invasive and Craniotomy Groups

For patients in the minimally invasive group, those with a small amount of hemorrhage were given drainage with single-tube puncture (**Figure 2B**), whereas those with a large amount of

Download English Version:

<https://daneshyari.com/en/article/5634220>

Download Persian Version:

<https://daneshyari.com/article/5634220>

[Daneshyari.com](https://daneshyari.com)