Observation of Clinical Effect of Hypertensive Severe Brainstem Hemorrhage with Adjuvant Therapy of Multi-Modal Neural Image Fusion Method

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Abstract: Objective: To evaluate the clinical efficacy of multimodal neuroimaging fusion in the treatment of hypertensive severe brainstem hemorrhage. Methods: A total of 50 patients with severe hypertensive brainstem hemorrhage with a volume of 5-10ml admitted to the Department of Neurosurgery of our hospital from February 2008 to February 2020 were enrolled as the research subjects. They were randomly divided into study group and control group by coin toss method with 25 patients in each group. Patients in the control group received conventional CT examination with conventional treatment, while those in the research group received Multimodal nerves influence fusion methods treatment with conventional treatment. Thirty days after treatment was taken as the final observation point, the clinical prognosis and efficacy of patients in the two groups were evaluated using the Glasgow Scale (GCS) as the standard, and the brain stem hemorrhage before and after treatment was recorded statistically. Results: According to the GCS scoring scale, the clinical efficacy of the study group was significantly higher than that of the control group, and the brain stem hemorrhage in both groups was significantly improved after treatment, and the improvement in the study group was better than that in the control group, with statistical significance ($P < 0.05$). Conclusion: After adjuvant therapy, the condition of patients with multimodal neuroimaging fusion method is effectively controlled, and the treatment efficiency is significantly improved, and the curative effect is significant, which is worthy of clinical application.

1. Introduction

Multimodal medical fusion is a new technology that uses functional neuronavigation to fuse and pair medical image data of different modes and efficiently process different medical data [1-3].It can be divided into homologous image fusion and heterologous image fusion according to the different equipment source of image acquisition. According to the principle of image imaging, it can be divided into anatomical image and functional image. At present, multimodal neuroimage fusion has been widely used in the research fields of neuroscience and clinical diseases. The application of this new technology can be used as an assistant to accurately locate the lesion preoperatively in clinical operation, accurately excise the lesion intraoperatively and accurately diagnose the result after surgery, so as to achieve a more minimally invasive and precise surgical process and improve the postoperative recovery effect of patients[4, 5].This article discusses the clinical effect of multimodal neuroimaging fusion in the adjuvant treatment of hypertensive severe brainstem hemorrhage.

1.1 General Information

A total of 50 patients with severe hypertensive brainstem hemorrhage with a volume of 5-10ml admitted to the Department of Neurosurgery of our hospital from February 2008 to February 2020 were included as the research subjects. They were randomly divided into study group and control

group by coin toss method with 25 patients in each group.In the control group, there were 14 males and 11 females, ranging in age from 28 to 73 years, with an average age of (52.36±3.36) years old. The course of hypertension ranged from 1 to 12 years, with an average course of (6.45±2.89) years.In the study group, there were 18 males and 7 females with age ranging from 30 to 75 years old, with an average age of (54.21±3.12) years. The course of hypertension ranged from 2 to 11 years, with an average course of (6.28±2.56) years.There was no statistical significance in the general information of the two groups ($P > 0.05$).This study has been approved by the ethics committee.

Inclusion criteria: ① Patients with brain stem hemorrhage confirmed by CT at admission, and systolic blood pressure>140mmHg or diastolic blood pressure>90mmHg,and patients were definitely diagnosed with hypertension.All patients or their family members have obtained informed consent and signed informed consent.

Exclusion criteria: ① Patients with traumatic brainstem hemorrhage, absence of medical history or poor compliance were excluded.Conscious disorders, serious conditions in organs, psychological disorders and mental disorders.Patients with cerebral vascular malformation and malignant brain stem tumor.

1.2 Methods

The control group was treated with cranial CT examination combined with conventional clinical treatment, while the research group was treated with multimodal neuroimaging fusion method as an adjunctive treatment. The specific measures were as follows: After admission, the multimodal neuroimaging fusion method was used to accurately locate the site of brain stem hemorrhage and the amount of hematoma, and the surgical method and surgical approach were designed.During the operation, the hematoma was accurately reached and the lesion was removed to stabilize the patient's vital signs and ensure the patency of the respiratory tract. When necessary, the patient was given tracheotomy, ventilator assisted breathing, and symptomatic drugs such as cranial pressure lowering, neuronutrition and hemostasis were applied.Close monitoring of patients' systolic and diastolic blood pressure, active prevention and treatment of various complications, timely symptomatic treatment.Postoperative imaging results were determined using this technique to assist in the evaluation of accurate diagnosis of prognosis. The final observation point was 30d after treatment, and the clinical prognosis of the two groups of patients was evaluated using the Grassinger scale (GCS) as standard.

1.3 Observation Indexes

1.3.1 The GCS score of patients in the two groups was used as the standard to evaluate the clinical prognosis, and the effective rate was calculated to compare the prognostic efficacy of patients in the two groups.Inefficiency = plant survival + severe disability + death;Effective rate= good recovery + mild disability.

1.3.2 Statistical analysis of brain stem hemorrhage before and after treatment in the two groups, and comparison of therapeutic effects.

1.4 Statistical Methods

This test was made by SPSS 22.0 statistical analysis software.The measurement data of normal distribution was expressed as ($x\pm s$) t test between groups.Enumeration data were expressed as rates, and $\chi 2$ test was performed between groups.$P<0.05$ indicated that the difference was statistically significant.

2. Result

2.1 Comparison of Clinical Efficacy between the Two Groups after Treatment

Patients in the study group were effectively controlled after adjuvant treatment with multimodal neuroimaging fusion method, and the total effective rate in the study group was significantly higher

than that in the control group, with statistical significance (P < 0.05), as shown in Table 1.

Table 1. Comparison of clinical efficacy between the two groups (n%)

Groups	n	Well recovered	Mild disability	Severe disability	ADLV	Death
Research group	25	8(32.00)	8(32.00)	4(16.00)	4(16.00)	1(4.00)
Control; group	25	5(20.00)	3(12.00)	8(32.00)	4(16.00)	5(20.00)
T value						5.128
P value						<0.05

2.2 Comparison of Brain Stem Hemorrhage before and after Treatment between the Two Groups

After treatment, brainstem hemorrhage was significantly improved in both groups, and the improvement in the research group was better than that in the control group, with statistical significance (P < 0.05), as shown in Table 2.

Table 2. Comparison of brain stem hemorrhage before and after treatment between the two groups (x±s, points)

Groups	n	Brain stem hemorrhage before treatment (mL)	Brain stem hemorrhage after treatment (mL)
Control group	25	8.23±1.22	5.38±2.18
Research group	25	8.18±1.36	4.69±2.77
T value		0.137	2.397
P value		>0.05	<0.05

3 Discussion

Brain stem hemorrhage is one of the most severe neurological diseases, especially in hypertensive people, and the patients with brain stem hemorrhage caused by hypertension account for 7%~16% of the patients with brain stem hemorrhage[6, 7].Although the brain stem is small, it is the basic life center of the human body and the traffic hub of the nerve conduction bundle in the body to transmit information. Once bleeding occurs, it will cause damages on corresponding neurological function, and the patient will fall into the state of consciousness disorder and obnubilation, causing serious consequences and high mortality rate.Among them, the mortality rate of patients with hypertensive brainstem hemorrhage with blood loss of >5ml was as high as 75%[8].Because the brain stem has a vital impact on the human body, it also greatly increases the difficulty of surgical operations, requiring extremely accurate surgical operations without any deviation, so the conservative treatment is generally adopted in operation in clinical treatment.In addition, most of the patients are middle-aged and elderly with a long course of hypertension and with a variety of basic diseases and other organ dysfunction, which greatly increases the difficulty in clinical diagnosis and treatment[9].In recent years, there have also been reports that attempts have been made to apply the multimodal neuroimaging fusion method in the adjuvant microsurgical treatment of hypertensive severe brainstem hemorrhage, and good results have also been achieved [10].

This new technology can be used to match medical imaging data in various modes, process the

related data with high speed,and conduct preoperative auxiliary assessment so as to provide clinical surgical approach.In operation, it can also be used to guide clinicians to precisely locate area with hematoma for accurate and efficient removal of hematoma, so as to achieve the goal of curing brain stem hemorrhage after operation.The application of the new technology provides a new treatment method for the conventional clinical treatment of severe hypertensive brainstem hemorrhage.In this paper, by comparing the conventional diagnostic methods and multimodal fusion method of neuroimaging auxiliary curative effect on the prognosis of patients with hypertensive brainstem hemorrhage, the survival rate of patients with neuroimaging fusion treatment was significantly increased after treatment.In contrast, the proportion of patients well recovered and mildly disabled was significantly decreased .Besides, prognosis and treatment efficiency is also improved significantly. The results of this study also fully proved that the multimodal neuroimage fusion method has definite efficacy in the adjuvant treatment of patients with hypertensive brainstem hemorrhage, and has the characteristics of high precision, high efficiency and more convenience,which effectively provides a boost for clinical surgical treatment to achieve the maximum resection of lesions, but also to achieve the minimum neurological damage to patients, so that patients can obtain the best postoperative recovery effect, improve the quality of life of patients.

In conclusion, based on the premise of medical treatment of brain stem hemorrhage and the multimodal neuroimaging adjuvant therapy, the postoperative survival rate can be tremendously improved, promoting the sound development in a minimally invasive and more precise manner. The effect of postoperative recovery of patients was greatly improved,which proved that the application of surgical treatment for severe brainstem hemorrhage enjoys certain advantages, and is worth popularization and application in clinical treatment.

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