

Effects of platelet infusion, anticoagulant and other risk factors on the rehaemorrhagia after surgery of hypertensive cerebral hemorrhage

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Abstract. – OBJECTIVE: Our objective is to explore the effect of platelet infusion, anticoagulant and other risk factors on the rehaemorrhagia after surgery of hypertensive cerebral hemorrhage (HCH), and to provide a reference for the prevention and treatment of rehaemorrhagia in patients with HCH.

PATIENTS AND METHODS: The patients with HCH admitted during April, 2007-June, 2012 in our hospital were selected. The general data such as age and gender, disease course, past pathogenic characters, past and present medical history such as treatment, personal history, family history and son on, were collected. The data were analyzed by *t* test, ANOVA, Chi-squared test and logistic regression analysis.

RESULTS: The application of aspirin and platelets has significant effect on rehaemorrhagia after surgery of HCH: 72 patients received aspirin, of which 14 cases had rehaemorrhagia while 197 patients did not receive aspirin, of which 20 cases had rehaemorrhagia. The difference between these two groups was statistically significant ($p < 0.05$). 186 patients received platelet infusions, of which 18 cases had rehaemorrhagia whereas among other 83 patients not receiving platelet infusions, 16 cases had rehaemorrhagia. Statistical analysis showed a significant difference between these two groups ($p < 0.05$). In the univariate logistic regression analysis of related data in patients with rehaemorrhagia after surgery of HCH, diastolic or systolic blood pressure at admission, the time from onset to surgery, coagulation disorder, surgical method, hematoma volume, cerebral hemia, effect of hematoma clearance and GCS at admission were the potential risk factors for rehaemorrhagia after surgery of HCH ($p < 0.05$). In the multivariate logistic regression analysis of related data in the same patients, diastolic blood pressure at admission (> 120 mmHg), systolic blood pressure at admission (> 200 mmHg), the time from onset to

surgery and coagulation disorder were screened out ($p < 0.05$) to be associated with rehaemorrhagia.

CONCLUSIONS: Aspirin increased the risk of rehaemorrhagia after surgery of HCH. On the contrary, infusion of platelets decreased the risk of rehaemorrhagia and improved the prognosis of patients. High diastolic and/or high systolic blood pressure at admission, ultra-early surgery after onset of HCH and coagulation disorder were related with rehaemorrhagia after operation of HCH. Our results indicate that rehaemorrhagia rate can be decreased by controlling related risk factors.

Key Words:

Platelet, Anticoagulant, Risk factors, Rehaemorrhagia, Hypertensive cerebral hemorrhage, Logistic regression analysis.

Introduction

As an acute cerebrovascular accident, cerebral hemorrhage is a common cause of death¹⁻³. It is reported that the incidence rate of cerebral hemorrhage is increasing by 8.7% each year in China, and 70% of survivals have functional disorder⁴⁻⁷. Cerebral hemorrhage has brought a heavy burden on society and families. The proportion of hypertensive cerebral hemorrhage (HCH) in cerebral hemorrhage is around 70-80%, and the treatment for HCH is timely clearance of intracranial hematoma^{8,9}. However, rehaemorrhagia occurs in around 50% of the HCH patients after surgery, and the mortality rate stays at a high level¹⁰⁻¹². Thus, the prevention and treatment of rehaemorrhagia after surgery of HCH have long been an important issue for doctors. In this study, in order to provide a reference for the prevention, diagnosis and treat-

ment of rehaemorrhagia after surgery of HCH, we analyzed the risk factors for this type of rehaemorrhagia, and explored the effects of platelets and anticoagulant on it.

Patients and Methods

Patients

The patients with hypertensive cerebral hemorrhage admitted during April, 2007-June, 2012 in our hospital were selected, which were diagnosed according to the diagnostic criteria of ischemic cerebrovascular disease. The patients with following criteria were excluded from the study: (1) Patients with severe hepatic and renal function insufficiency, thyroid hypofunction, malignant tumor, and patients taking oral contraceptive, folic acid and vitamin B12; (2) Patients with HCH complicated with hematological diseases. In total, 269 patients after surgery of HCH were selected, including 235 cases who did not have rehaemorrhagia and 34 cases who had rehaemorrhagia. There were 156 male cases and 113 female cases. The maximum age was 97 years, the minimum age was 32 years, and the average age was 67.1 ± 12.1 years.

Data Collection

Collection of general data: The general data, including age, gender, the time from onset to surgery, coagulation disorder, systolic pressure and diastolic blood pressure at admission, application of aspirin and platelets, were collected.

Collection of clinical data: GCS (Glasgow scale score) at admission, symptoms including headache, nausea, vomiting, complications including hemiplegia, meningeal irritation sign, cerebral hemia, intracranial infection, multiple organ failure, acute renal failure, urinary system

infection, dysphoria, GOS (Glasgow outcome scale) score and coagulation function data were collected.

Statistical Analysis

The data were analyzed by SPSS17.0 (SPSS Inc., Chicago, IL, USA). The comparisons of different groups were completed by ANOVA, and intergroup comparisons of continuous variables were analyzed by t test. The data, which were not conformed to normal distribution, were analyzed by rank sum test, while the comparison of rates were completed by χ^2 test. Multivariate analysis was completed by logistic regression analysis. The inspection level was set as 0.05.

Results

The effect of Platelet and Anticoagulant on Rehaemorrhagia After Surgery of HCH

As shown in Table I, the application of aspirin and platelets had significant effect on rehaemorrhagia after surgery of HCH. 72 patients received aspirin, of which 14 cases had rehaemorrhagia while 197 patients did not receive aspirin, of which 20 cases had rehaemorrhagia. The difference between these two groups was statistically significant ($\chi^2 = 4.523, p < 0.05$). 186 patients received platelet transfusions, of which 18 cases had rehaemorrhagia whereas among other 83 patients not receiving platelet transfusions, 16 cases had rehaemorrhagia. Statistical analysis showed a significant difference between these two groups ($\chi^2 = 4.790, p = 0.045$).

Univariate Logistic Regression Analysis of Rehaemorrhagia After Surgery of HCH

To find out the risk factors for rehaemorrhagia after surgery of HCH, the univariate logistic re-

Table I. The effect of platelets and anticoagulant on rehaemorrhagia after surgery of HCH.

Group		Postoperative rehaemorrhagia		
		No rehaemorrhagia (%)	Rehaemorrhagia (%)	In total
Aspirin*	Yes	58	80.6	14
	No	177	89.4	197
Platelet#	Yes	168	90.3	186
	No	67	80.7	83
	In total	235		269

*Means $\chi^2 = 4.523, p = 0.049$; #Means $\chi^2 = 4.790, p = 0.045$.

gression analysis of related data in patients with rehaemorrhagia after surgery of HCH were performed. As shown in Table II, the results demonstrated that diastolic or systolic blood pressure at admission, the time from onset to surgery, coagulation disorder, surgical method, hematoma volume, cerebral hernia, effect of hematoma clearance and GCS at admission are the potential risk factors for rehaemorrhagia after surgery of HCH ($p < 0.05$).

Multivariate Logistic Regression Analysis of Rehaemorrhagia After Surgery of HCH

In the multivariate logistic regression analysis of related data in patients with rehaemorrhagia after surgery of HCH, diastolic blood pressure at admission (> 120 mmHg), systolic blood pressure at admission (> 200 mm Hg), ultra-early surgery and coagulation disorder were screened out ($p < 0.05$), which are risk factors for the rehaemorrhagia after surgery of HCH (Table III).

Discussion

Cerebral hemorrhage is a common disease, in which hypertensive cerebral hemorrhage is around 50% even up to 93.91%¹³⁻¹⁷. The mortality and disability rate of patients with HCH are very high, which significantly affect the health of people^{18,19}. In the treatment of HCH, it is recommended to apply ultra-early (within 6 hours after onset) hematoma clearance to relieve the pressure on surrounding brain tissue²⁰⁻²². Theoretically, it can improve the prognosis of patients, however, the clinical effect is not satisfactory and the risk of rehaemorrhagia is increased. Thus, the

time windows in ultra-early stage surgery should be concerned²³⁻²⁵. However, some researchers have shown that whether or not to accept surgical treatment, the incidence rate of rehaemorrhagia after cerebral hemorrhage is up to 20.6-38%²⁶. In this study, the risk factors related to rehaemorrhagia after surgery of HCH were analyzed to explore the effect of platelet infusion and anticoagulant on rehaemorrhagia after surgery of HCH.

In this study, the patients with hypertensive cerebral hemorrhage admitted during April, 2007-June, 2012 in our hospital were selected. The general data such as age and gender, disease course, past pathogenic characters and present medical history such as treatment, previous medical history, personal history and family history and so on, were collected. The data were analyzed by t test, ANOVA, Chi-squared test and logistic regression analysis. Our results showed that the application of aspirin and platelet had significant effect on rehaemorrhagia after surgery of HCH. Compared with patients not receiving aspirin, the patients received aspirin had higher incidence of rehaemorrhagia ($p < 0.05$). However, patients received platelet infusion had lower incidence of rehaemorrhagia compared with the patients not receiving platelets ($p < 0.05$). In the univariate logistic regression analysis of related data in HCH patients after operation, diastolic or systolic blood pressure at admission, the time from onset to surgery, coagulation disorder, surgical method, hematoma volume, cerebral hernia, effect of hematoma clearance and GCS at admission were potential risk factors for rehaemorrhagia after surgery of HCH ($p < 0.05$). In the multivariate logistic regression analysis of related data in HCH patients after operation, diastolic blood

Table II. Univariate logistic regression analysis of rehaemorrhagia after surgery of HCH.

Indicator	B	S _b	Wald χ^2	v	p	OR value	95% confidence interval of overall OR	
							Lower	Upper
Diastolic blood pressure at admission	2.365	0.591	0.376	1	0.005	10.735	2.686	27.624
Systolic blood pressure at admission	1.965	0.629	3.502	1	0.007	9.424	2.157	24.869
Time from onset to surgery	1.862	0.563	5.350	1	0.021	8.239	2.065	22.566
Coagulation disorder	1.065	0.489	40.257	1	0.033	2.843	1.452	10.238
Surgical method	0.984	0.372	8.509	1	0.047	1.925	1.381	4.769
Hematoma volume	-0.867	0.299	8.413	1	0.004	0.420	0.234	0.755
Cerebral hernia	-0.885	0.274	10.417	1	0.001	0.413	0.241	0.706
Effect of hematoma clearance	1.397	0.451	9.597	1	0.002	4.042	1.670	9.781
GCS at admission	-2.257	0.430	27.619	1	0.000	0.105	0.045	0.243

*Means $\chi^2 = 4.523$, $p = 0.049$; #Means $\chi^2 = 4.790$, $p = 0.045$.

Table III. Multivariate logistic regression analysis of rehaemorrhagia after surgery of HCH.

Indicator	B	S _b	Wald χ^2	v	p	OR value	95% confidence interval of overall OR	
							Lower	Upper
Diastolic blood pressure	2.237	0.583	0.376	1	0.008	9.96	2.246	23.681
Systolic blood pressure	1.965	0.629	3.502	1	0.009	8.068	2.083	20.634
Time from onset to surgery	1.794	0.541	5.350	1	0.026	7.662	1.806	17.504
Coagulation disorder	1.002	0.517	40.257	1	0.041	2.194 1.224	0.041	6.716

pressure at admission, systolic blood pressure at admission, the time from onset to surgery and coagulation disorder were screened out ($p < 0.05$), which were risk factors of rehaemorrhagia after surgery of HCH.

Conclusions

Our results demonstrated that aspirin increased the risk of rehaemorrhagia after surgery of HCH; however, infusion of platelet decreased the risk of rehaemorrhagia and improved the prognosis. Diastolic blood pressure > 120 mmHg and systolic blood pressure > 200 mmHg at admission, ultra-early stage surgery after onset and coagulation disorder were related to rehaemorrhagia after surgery of HCH. Our findings indicate that rehaemorrhagia rate can be decreased by controlling related risk factors.

Conflict of Interest

The Authors declare that there are no conflicts of interest.

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