Journal of the Neurological Sciences 341 (2014) 128–132

Contents lists available at ScienceDirect

Journal of the Neurological Sciences

journal homepage: www.elsevier.com/locate/jns

Risk factors for mental disorders in patients with hypertensive intracerebral hemorrhage following neurosurgical treatment

Fei Li, Qian-Xue Chen *

Department of Neurosurgery, Renmin Hospital of Wuhan University, Wuhan City, No. 99, Zhang Zhidong Road, Wuchang District, Wuhan, 430060, Hubei Province, China

ARTICLE INFO

Article history:
Received 10 March 2014
Received in revised form 23 March 2014
Accepted 14 April 2014
Available online 25 April 2014

Keywords:
HICH
Mental disorders
Neuropsychiatric
Neurosurgical treatment
Psychiatric disorders
Risk factors

ABSTRACT

Background: Mental disorders are commonly observed among surgically treated patients with hypertensive intracerebral hemorrhage (HICH), leading to serious negative impacts on the patient's treatment, rehabilitation, and prognosis. The study aimed to establish the prevalence rates and risk factors for mental disorders following the surgical treatment of HICH.

Methods: This was a prospective study. Surgically treated patients with HICH were assessed 6 months following surgical treatment. The sociodemographic data were obtained from each subject, and clinical characteristics were collected for each patient from his or her hospital records. Mental disorder-related risk factors were examined using unpaired *t*-tests for continuous variables and χ^2 for categorical data, respectively, followed by multiple logistic regression analysis.

Results: A total of 96 patients were recruited for this study. The incidence of mental disorders following surgical treatment of HICH was 32.3%. Univariate analysis revealed that the occurrence of postoperative mental disorders was correlated with gender, income, social interaction, relationship between family members, hematoma localization, hematoma volume, preoperative Glasgow Coma Scale (GCS) score, surgical approach, Barthel Index, hospitalization time, and discharged patients' caregivers. Multivariate logistic regression analysis indicated that female patients, social barriers, surgical treatment with a craniotomy, and bad relationship between family members were the independent risk factors for mental disorders following surgical treatment of HICH.

Conclusions: Postoperative mental disorders in patients with HICH were more likely to occur in female patients and patients who faced social barriers, those who were treated with a craniotomy, and those who experienced bad relationships between their family members. More attention and supports should be provided to this group of patients.

1. Introduction

Hypertensive intracerebral hemorrhage (HICH) is a severe neurological problem associated with high morbidity and mortality rates in developed countries of the world [1,2]. Among survivors, over 50% have significant disabilities, and in clinical practice, neuropsychiatric disturbances are also frequent [3,4]. Mental disorders are one of the most common psychiatric complications experienced following an operation in patients with HICH, having serious negative impacts on the patient's treatment, rehabilitation, and prognosis. It has been concluded that post-stroke psychosis is associated with greater 10-year mortality [5]. However, surgeons often pay more attention to the surgical treatment of HICH and the prevention of postoperative complications, such as pulmonary infections, surgical-site infections, reflux esophagitis, gastrointestinal hemorrhage, hypoalbuminemia, and electrolyte disturbances. This means that little attention is paid to patients' mental disorders, leading patients with these conditions to miss out on timely and effective treatment.

Until now, studies reporting the relative factors associated with mental disorders following the surgical treatment of HICH have been lacking, and there has been an absence of well-established evidence regarding the effects of neurosurgical treatment and other relative factors, along with their interactive effects, on the incidence rate of mental disorders in surgically treated patients with HICH.

This study was designed to identify the relative risk factors associated with mental disorders following the surgical treatment of HICH by analyzing the correlation between mental disorders that occur after surgical treatment of HICH and a variety of other relative factors. The results of this present study could be useful in promoting our knowledge about the effects of relative factors on postoperative mental disorders among patients with HICH, and this can be utilized to prepare neuropsychiatric rehabilitation protocols following an HICH.

This study was conducted in accordance with the Declaration of Helsinki. To protect the patients' personal privacy, their identifications were scrambled for further public access to the research. The protocol of this study was approved by the Medical Ethics Committee of the

* Corresponding author at: No. 99, Zhang Zhidong Road, Wuchang District, Wuhan, 430060, Hubei Province, China. Tel.: +86 13607141618; fax: +027 88041911 82237.
E-mail address: chenqx666@sohu.com (Q.-X. Chen).

http://dx.doi.org/10.1016/j.jns.2014.04.021
0022-510X/

Renmin Hospital of Wuhan University. Due to the presence of mental disorders, the participants did not have the ability to consent, and there was a surrogate consent procedure (e.g., whereby next of kin or legally authorized representative) consented on the behalf of participants.

2. Materials and methods

2.1. Data collection

This research was conducted in the Renmin Hospital of Wuhan University, Hubei Province, People's Republic of China. HICH patients were recruited from January 2012 to July 2013. The diagnosis of HICH was confirmed in every patient via computed tomography scanning and/or magnetic resonance imaging and neurosurgery.

We excluded patients who: (1) had a history of hearing disturbance, visual impairment, aphasia, comprehension disorders, unconsciousness, mental retardation or organic brain disease and mental illness prior to HICH; (2) died in the early stages following neurosurgery, or were lost to follow-up after they had been discharged from hospital; (3) had heart, liver, kidney, and other organ dysfunction; (4) were in a long-term unconsciousness or vegetative state after neurosurgery; and (5) did not provide consent to enter the study for any reason.

According to the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), mental disorders were defined as ICD-9-CM 290-319, and each patient was referred to a psychologist for a psychological evaluation. The diagnoses were carefully validated by rechecking them against the diagnostic criteria for psychiatric disorders that resulted from cerebrovascular disease, according to the Chinese Classification and Diagnostic Criteria of Mental Disorders (CCMD-3), which is in accordance with Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). All of the information from the neuroimaging and neurosurgical treatment was blinded to the psychologist; therefore, the non-blinded outcome assessment bias or diagnostic suspicion bias could be reduced.

The baseline demographics data (age, gender, marital status, occupation, and past medical history), and the data pertaining to the operating records and neuroimaging studies, were collected for each patient from his or her hospital records. The subjects were screened for mental disorders using the Common Mental Disorders Screening Questionnaire (CMD-SQ) at 6 months. The questionnaire has a scale that included detailed information about 28 sections that covered the patients' educational status, economic status, the relationship between family members, the patient's caregivers, and so on. The time needed to complete the questionnaire was 20 to 40 min, depending on the amount of problems reported. Based on whether or not the respondents had suffered from mental disorders, the patients were assigned into either a mental disorder group or a control group. This decision was based on the diagnostic criterion of the presence of psychiatric disorders due to cerebrovascular disease, and the correlated risk factors associated with mental disorders were analyzed using multiple logistic regression analysis.

2.2. Statistical analysis

SPSS version 20.0 for Windows (SPSS Inc, Chicago, IL) was used in all of the statistical analyses. Measurement data were expressed as the mean ± standard deviation ($\bar{x} \pm SD$), and numerical data were expressed as frequencies (%). The tests for normality were the goodness-of-fit tests. All statistical analyses for the differences between two groups were performed by *t*-test or chi-square test, when the data could not be rejected as fitting the normal distribution. Data with skewed distributions were analyzed using the Wilcoxon rank–sum test, and Fisher's exact test was performed when the sample size was too small. Multivariate logistic regression analysis was performed to identify the independent risk factors for postoperative mental disorders among patients with HICH. Statistical significance was defined as $p < 0.05$.

3. Results

3.1. Patient characteristics

There were a total of 96 patients recruited in this study: 49 men and 47 women, with an average age of 57 ± 11.8 years (range: 39–71 years). Six months after the surgical treatment of HICH, 31 cases met the diagnostic criteria for mental disorders following the surgical treatment of HICH, showing that the incidence rate at this time point was 32.3%. All of the patients with mental disorders suffered from at least one psychological disorder, of which 18 suffered from mental retardation, 8 suffered from organic neurosis-like syndrome, 6 had psychotic symptoms, 5 had personality changes, and 2 suffered from forgotten syndrome.

3.2. Univariate analysis

In this study, the factors that were correlated with mental disorders following the surgical treatment of HICH included gender, age, education level, occupation, income, marital status, the relationship between family members, and the discharged patient's caregivers, hematoma localization, surgical approach, and the Barthel Index (BI) score.

We found that between the two groups, the differences in age, education level, marital status, occupation type, and underlying diseases such as diabetes, hypertension, and hyperlipemia had no statistically significant relationship ($p > 0.05$). We also found that the proportion of female patients, social barriers, a bad relationship between family members, and treatment with a craniotomy were significantly higher in the mental disorder group than that in the control group ($p < 0.05$), while in the mental disorder group, the average Barthel Index score, the level of household income, and the proportion of people being cared for by family members were significantly lower than that in the control group ($p < 0.05$). In addition, the difference in preoperative hematoma localization between the two groups was statistically significant ($p < 0.05$). The average hospitalization time for patients suffering from mental disorders following the surgical treatment of HICH was significantly longer than that of the control group ($p < 0.05$). The patients' descriptive statistics are presented in Tables 1 and 2.

3.3. Multivariate logistic regression analysis

We performed multivariate logistic regression analysis using the variables that were found to differentiate between the mental disorder group and the control group at a significance level of 0.05. The variables included gender, income, preoperative hematoma localization, surgical approach, BI, hospitalization time, discharged patients' caregivers, social interaction, and relationship between family members. Of these variables, only gender, social interaction, relationship between family members, and surgical approach were individually significant correlated factors of mental disorders following the surgical treatment of HICH ($p < 0.05$) (Table 3). The correlated factor had an Exp(B) that was significantly less than 1.0, indicating that among patients with postoperative mental disorders, there were more female patients, patients who had experienced social barriers, those treated with a craniotomy, and those that had a bad relationship between their family members.

4. Discussion

A mental disorder is a frequent complication following HICH surgery. It can interfere with the function recovery of stroke patients and it can affect their quality of life. However, little or no attention has been paid to the possible psychiatric morbidity that could complicate these problems among survivors. The present study aimed at evaluating mental disorders, while especially focusing on the risk factors experienced among HICH survivors following neurosurgical treatment.