

Application effect of multidisciplinary collaborative nursing process in emergency care of patients with hypertensive cerebral hemorrhage

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Abstract. – OBJECTIVE: The aim of the study was to analyze the effect of applying multidisciplinary collaborative nursing process (MCNP) in the emergency care of patients with hypertensive cerebral hemorrhage.

PATIENTS AND METHODS: A total of 124 patients with hypertensive cerebral hemorrhage admitted to Qinghai University Affiliated Hospital from January 2020 to January 2021 was divided into control group (treated with regular emergency care, n=64) and study group (treated with MNCP, n=58). The effect of emergency treatment was compared between the two groups.

RESULTS: Compared to the control group, initial treatment time, time of opening peripheral veins, first blood drawing time, time of imaging examination, emergency room treatment time, and hospital stay time were lower in MCNP group, the difference was significant ($p<0.05$). There were significant differences in Functional Independence Assessment (FIM) and National Institutes of Health Stroke Scale (NIHSS) scale scores between the control group and the MCNP group in treatment for 1 week in hospital ($p<0.05$). The level of total bile acid (TBA) and activated partial thromboplastin time (APTT) in the MCNP group were significantly lower than in the control group ($p<0.05$). The nursing satisfaction in MCNP was also improved compared to that in the control group ($p<0.05$).

CONCLUSIONS: MCNP enhances the rational improvement of patients' awareness, improves the comprehensive quality of emergency treatments and optimizes prognosis; therefore, it is worthy of clinical promotion and application.

Key Words:

Multidisciplinary collaborative, Emergency care, Hypertensive cerebral hemorrhage, Nursing satisfaction.

Introduction

Hypertensive cerebral hemorrhage (HCH), as one of the common diseases in the emergency department, is a relatively big threat to the life safety of patients¹. As one of the more serious complications of hypertension, the incidence rate of this disease is relatively high in the middle-aged and elderly population². For hypertensive patients, the strength of their blood vessel wall is often relatively low, and most elderly patients may have vascular wall rupture under the influence of emotional excitement or overwork, which may lead to HCH³. In the clinical treatment process, most patients are accompanied by vomiting, severe head pain, consciousness mode, and limited limb movement when they are suffering from HICH⁴. If emergency intervention cannot be carried out in time, the patient's life may be endangered.

Multidisciplinary collaboration (MC) refers to the development of standardized, continuous, and personalized diagnosis and treatment programs for certain diseases through multidisciplinary team cooperation such as oncology, renal failure, heart failure and other complex diseases^{5,6}, but it was not widely applied in clinical nursing. Therefore, we conducted a retrospective study to evaluate the clinical effectiveness of multidisciplinary collaboration nursing process (MCNP) in emergency care for patients with hypertensive cerebral hemorrhage.

Patients and Methods

Study Design

This research was designed as a retrospective study. All of 132 patients with hypertensive cerebral hemorrhage attended at Emergency Department of

our hospital from January 2020 to January 2021 were included. The study was approved by the Ethics Committee of our hospital, and the patients and their families all signed the informed consent form.

Patients' Selection

According to clinical nursing processes, 132 patients with HCH were divided into MCNP group (n=58) and control group (n=64). The characteristics of patients included in two groups are shown in Table I.

Inclusion and Exclusion Criteria

Inclusion criteria: (1) The patient's age was inferior to 80 years old; (2) The clinical diagnosis of the patients met the criteria of hypertensive cerebral hemorrhage; (3) The patients had no other major organic diseases.

Exclusion criteria: (1) Patients with malignant tumors; (2) Patients or their family members with objections to the research content; (3) Patients with a history of psychiatric diseases.

Nursing Process

In the control group, routine first-aid nursing mode was adopted; it mainly included monitoring the vital signs of patients, timely evaluating the

patient's condition, establishing venous channels and implementing preoperative preparations.

In the MCNP group, multidisciplinary cooperation and traditional emergency care were adopted, with the following contents: (1) establishing the cerebral hemorrhage multidisciplinary nursing team which was composed of the Emergency Department, Neurosurgery Department, Imaging Department, Laboratory Department, Severe Medicine Department, and Rehabilitation Department. (2) After the patients entered the emergency rescue room, MCNP was started immediately, blood samples were collected, rapid head CT were checked. During the period of waiting for hospitalization, basic living care and psychological care were provided for HCH patients.

Evaluation Indicators and Testing

Methods

(1) Treatment time: initial treatment time, time of opening peripheral veins, first blood drawing time, time of imaging examination, emergency room treatment time of the two groups were recorded. The initial treatment time is from the time of receiving the phone call to the time of transferring to the ambulance.

Table I. Characteristics of included patients.

Characteristic	Control group (n=64)	MCNP group (n=58)	p-value
Age (Mean±SD) (years)	56.84±8.16	56.57±7.88	0.113
Gender (n, %)			
Male	34 (53.13)	31 (53.45)	0.096
Female	28 (46.87)	27 (46.55)	
Blood pressure (mmHg)			
systolic pressure	179.26±12.33	181.88±11.87	0.084
diastolic pressure	105.45±11.46	106.71±12.31	0.105
Bleeding location			
lobus cerebri	15 (23.44)	16 (27.59)	0.138
basal ganglia and thalamus	18 (28.13)	15 (25.86)	
cerebellum	14 (21.88)	15 (25.86)	
brainstem	17 (26.55)	12 (20.69)	
Hematoma volume (ml)	15.23±2.17	16.08±3.44	0.078
GCS Scores			
≥12	58 (90.63)	54 (93.10)	0.063
9-11	4 (6.25)	3 (5.17)	
≤8	2 (3.12)	1 (1.73)	
History of cerebral hemorrhage			
Yes	16 (25.00)	14 (24.14)	0.057
No	48 (75.00)	44 (75.86)	
History of hypertension (years)	4.29±2.18	4.87±2.39	0.144

MCNP: multidisciplinary collaborative nursing process.

- (2) Relevant function score: before treatment and 1 week after treatment, the National Institutes of Health Stroke Scale (NIHSS)⁷ was used to evaluate the neurological function. The scale includes 15 items such as consciousness, visual field, movement, language and cognition. Each item has corresponding scoring criteria. The lower the total score, the better the neurological function. The daily functions of patients were evaluated with the Functional Independence Assessment (FIM) scale⁸, which included 18 items such as eating, grooming, etc. According to the degree of dependence, 7 grades were used, corresponding to 1 to 7 points, with a total score of 18 to 126 points. The higher the score, the better the independence of daily activities.
- (3) Laboratory Indices: Serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), total bilirubin (TBIL), total bile acid (TBA), albumin (ALB), creatine kinase (CK), creatine kinase isoenzyme (CK-MB), prothrombin time (PT) and activated partial thromboplastin time (APTT) were detected by a Hitachi 7600 automatic biochemical analyzer (Tokyo, Japan) and URIIT-600 coagulation analyzer (Guilin, China) in our hospital.
- (4) Nursing satisfaction: nursing satisfaction included very satisfied, more satisfied, generally satisfied and dissatisfied.

Statistical Analysis

SPSS v. 22.0 software (IBM Corp., Armonk, NY, USA) was used for data analysis. The continuous variable data were expressed in Mean±SD ($\bar{x}\pm s$). The data were compared by *t*-test, the multiple groups were compared by one-way ANOVA, and the pairwise comparison was performed by LSD *t*-test. Counting data is expressed in [case (%)], and data comparison is made by χ^2 test. $p < 0.05$ indicates that the difference is statistically significant.

Results

Comparison of Treatment Time

Compared to control group, initial treatment time, time of opening peripheral veins, first blood drawing time, time of imaging examination, emergency room treatment time, and hospital stay time were lower in MCNP group, the difference was significant ($p < 0.05$) (Table II).

Comparison of FIM and NIHSS Score Between MNCP Group and Control Group

As shown in Table III, there were significant differences in FIM and NIHSS scale scores between control group and MCNP group in treatment for 1 week in hospital ($p < 0.05$).

Comparison of Laboratory Indicators After 7 Days of Treatment

In laboratory indicators after 7 days of treatment, no significant differences were found in ALT, AST, TBIL, ALB, PT, CK, CK-MB between the control group and the MCNP group. The level of TBA and APTT in MCNP group were significantly lower than in control group ($p < 0.05$) (Table IV).

Comparison of Nursing Satisfaction Between MNCP Group and Control Group

The MNCP group rated nursing satisfaction as follows: very satisfied, 79.36%; more satisfied, 18.97%; generally satisfied, 1.72%; dissatisfied, 0.00%. the control group rated nursing satisfaction as follows: very satisfied, 51.56%; more satisfied, 25.00%; generally satisfied, 20.31%; dissatisfied, 3.13%. Table V showed the comparison of nursing satisfaction between the MNCP group and the control group.

Table II. Comparison of treatment time for two groups.

Treatment time	Control group (n=64)	MCNP group (n=58)	<i>t</i> -value	<i>p</i> -value
Initial treatment time (min)	28.47±6.35	16.29±4.58	8.439	<0.0001
Time of opening peripheral veins (min)	22.49±9.63	14.21±3.72	8.697	<0.0001
First blood drawing time (min)	26.31±7.77	15.34±2.96	9.329	<0.0001
Time of imaging examination (min)	52.58±4.19	31.45±5.27	7.256	<0.0001
Emergency room treatment time (min)	86.63±17.34	55.29±13.37	8.253	<0.0001
Hospital stay time (d)	17.54±3.86	11.95±4.46	7.798	<0.0001

MCNP: multidisciplinary collaborative nursing process.

Table III. Comparison of FIM and NIHSS scale scores for two groups.

Treatment time	Control group (n=64)	MCNP group (n=58)	t-value	p-value
FIM Scale				
newly-admitted patients without treatment	38.03±5.79	37.79±5.38	0.344	0.829
treatment for 1 week in hospital	54.49±7.38	48.13±9.87	4.957	<0.0001
NIHSS Scale				
newly-admitted patients without treatment	17.54±5.29	17.35±5.11	0.452	0.661
treatment for 1week in hospital	11.27±2.36	7.97±3.28	5.138	<0.0001

FIM: Functional Independence Assessment; NIHSS: National Institutes of Health Stroke Scale; MCNP: multidisciplinary collaborative nursing process.

Table IV. Comparison of laboratory indicators after 7 days of treatment.

Index	Control group (n=64)	MCNP group (n=58)	t-value	p-value
ALT (U/L)	335.22±74.38	309.46±58.79	-2.131	0.051
AST (U/L)	286.54±57.39	267.49±59.43	-0.624	0.613
TBIL (μmol/L)	33.49±5.98	29.17±4.88	-1.039	0.305
TBA (μmol/L)	19.67±4.32	16.65±3.14	-2.197	0.048
ALB (g/L)	36.58±3.36	36.28±3.39	-0.996	0.334
PT (s)	17.22±3.14	17.31±2.87	-0.854	0.361
APTT (s)	32.19±2.28	31.68±2.34	-2.535	0.013
CK (U/L)	166.75±26.38	165.43±27.17	-0.801	0.527
CK-MB (U/L)	19.98±4.53	21.38±4.34	1.549	0.132

MCNP: multidisciplinary collaborative nursing process, ALT: Serum alanine aminotransferase, AST: aspartate aminotransferase, TBIL: total bilirubin, TBA: total bile acid, ALB: albumin, CK: creatine kinase, CK-MB: creatine kinase isoenzyme, PT: prothrombin time, APTT: activated partial thromboplastin time.

Table V. Comparison of nursing satisfaction.

Nursing satisfaction	Control group (n=64)	MCNP group (n=58)	Z-value	p-value
Very satisfied	33 (51.56)	46 (79.31)	-3.116	0.004
More satisfied	16 (25.00)	11 (18.97)		
Generally satisfied	13 (20.31)	1 (1.72)		
Dissatisfied	2 (3.13)	0		

MCNP: multidisciplinary collaborative nursing process.

Discussion

HCH is a highly lethal and disabling cerebrovascular disease and its incidence rate is increasing in recent years⁹. Some studies¹⁰ have shown that the best treatment window for HCH is within 3-6 hours after the onset of the disease. Accurate and rapid disease identification are crucial to the prognosis of patients with HCH¹¹. The strategy of MNCP is a new emergency nursing model, which strives for more rescue time and survival opportunities for patients with HCH.

In this study, we applied the multidisciplinary collaborative nursing process for patients with HCH and found that the initial treatment time, time of opening peripheral veins, first blood drawing time, time of imaging examination, emergency room treatment time, and hospital stay time were lower in MCNP group compared to the control group. It was also better in FIM and NIHSS scale scores for patients in MCNP group. The results of this study also showed that there is significant difference in TBA and APTT between the two groups and other laboratory in-

dicators showed no significant difference. In this study, we also found that nursing satisfaction is improved in MNCP group, which also indicated a high nursing quality of MNCP. Consistent with our results, another study¹² reported that application of multidisciplinary collaborative nursing for patients with cervical cancer is effective and worthy of clinical application and promotion. A case study¹³ also suggested that multidisciplinary collaborative nursing process can help more clinicians to better understand how to work across multi-agency boundaries and to identify how to develop skills for collaborative inter-professional practice so that the capacity for nursing and other health care professionals to address public health issues does not rely on individual motivation.

The reason why MNCP can improve the quality of nursing for patients for HCH patients may be due to the following reasons: (1) in the past, the treatment of HCH patients was delayed due to the lack of contact among disciplines, such as untimely consultation, too long time waiting for inspection results and stay in the Emergency Department^{14,15}. Establishing a multidisciplinary cerebral nursing process strengthens cooperation among disciplines, increases discipline contact, and improves overall treatment efficiency. (2) MNCP is a standardized nursing process, which can guide the actual rescue work, improve the efficiency of first aid and shorten the waiting time. (3) MNCP can make consultation, examination and hospitalization more convenient by strengthening multidisciplinary cooperation, so that patients can get more professional and adequate diagnosis and treatment as soon as possible.

Limitations

Although we designed the present study as a retrospective study, there are still several limitations in this study. First, all patients included were Chinese, which may lead that the findings of this research may not be suitable for other people from different countries. Second, the sample size of this study was small. Further larger sample, multi-center studies should be conducted to confirm the conclusions of our study.

Conclusions

MCNP model for HCH patients can shorten the first aid time and hospitalization time and improve the recovery of nerve function and daily activity function. MCNP is worthy of clinical application.

Authors' Contributions

Guarantor of integrity of the entire study: Hongju Li; study concepts: Hongju Li; study design: Hongju Li; definition of intellectual content: Hongju Li; literature research: Yali Shen; clinical studies: Yali Shen; experimental studies: Yali Shen; data acquisition: Shou Liu; data analysis: Shou Liu; statistical analysis: Shou Liu; manuscript preparation: Xin Huang; manuscript editing: Xin Huang; manuscript review: Ping Yi.

Conflicts of Interest

The authors declared no conflicts of interest.

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None.

Ethics Approval

The study was approved by the Ethics Committee of Qinghai University Affiliated Hospital, Xining, 810001, Qinghai, China.

Informed Consent

Patients and their families signed the informed consent form.

References

- 1) Hu S, Sheng W, Hu Y, Ma Q, Li B, Han R. A nomogram to predict early hematoma expansion of hypertensive cerebral hemorrhage. *Medicine* 2021; 100: e24737.
- 2) Hu CL, Xin M, Zhang K, Zhang LC. Double-target longitudinal puncture by freehand on elderly patients with hypertensive cerebral hemorrhage. *J Biol Regul Homeost Agents* 2021; 35: 251-252.
- 3) Hori YS, Ohkura T, Ebisudani Y, Umakoshi M, Ishi M, Oda K, Aoi M, Inoue T, Furujo M, Tanaka H, Fukuhara T. Hypertensive Cerebral Hemorrhage in a Patient with Turner Syndrome Caused by Deletion in the Short Arm of the X Chromosome. *Pediatr Neurosurg* 2018; 53: 167-170.
- 4) Zheng P, Wang J, Ma Y, Xu J, Zhu Q. Analysis of the Effect of Cluster Nursing in Postoperative Hypertensive Cerebral Hemorrhage. *J Healthc Eng* 2021; 2: 3448979.
- 5) Saint-Pierre C, Herskovic V, Sepúlveda M. Multidisciplinary collaboration in primary care: a systematic review. *Fam Pract* 2018; 35: 132-141.
- 6) Sudore RL, Lum HD, You JJ, Hanson LC, Meier DE, Pantilat SZ, Matlock DD, Rietjens JAC, Korfage IJ, Ritchie CS, Kutner JS, Teno JM, Thomas J, McMahan RD, Heyland DK. Defining Advance Care Planning for Adults: A Consensus Definition From a Multidisciplinary Delphi Panel. *J Pain Symptom Manage* 2017; 53: 821-832.
- 7) Kwah LK, Diong J. National Institutes of Health Stroke Scale (NIHSS). *J Physiother* 2014; 60: 61.

- 8) Meyer C, Landwehrmeyer B, Schwenke C, Doble A, Orth M, Ludolph AC. Rate of change in early Huntington's disease: a clinicometric analysis. *Mov Disord* 2012; 27: 118-124.
- 9) Mao Y, Shen Z, Zhu H, Yu Z, Chen X, Lu H, Zhong F, Cheng H. Observation on therapeutic effect of stereotactic soft channel puncture and drainage on hypertensive cerebral hemorrhage. *Ann Palliat Med* 2020; 9: 339-345.
- 10) Yang G, Shao G. Clinical effect of minimally invasive intracranial hematoma in treating hypertensive cerebral hemorrhage. *Pak J Med Sci* 2016; 32: 677-681.
- 11) Zhang Y, Song L, Zhao J. Role of scalp hypothermia in patients undergoing minimally invasive evacuation of hypertensive cerebral hemorrhage. *Pak J Med Sci* 2019; 35: 1451-1455.
- 12) Han D, Wang D, Yang J, Li X. Effect of multidisciplinary collaborative continuous nursing on the psychological state and quality of life of patients with cervical cancer. *Am J Transl Res* 2021; 13: 6654-6661.
- 13) Procter S, Brooks F, Wilson P, Crouchman C, Kendall S. A case study of asthma care in school age children using nurse-coordinated multidisciplinary collaborative practices. *J Multidiscip Healthc* 2015; 8: 181-188.
- 14) Sun G, Li X, Chen X, Zhang Y, Xu Z. Comparison of keyhole endoscopy and craniotomy for the treatment of patients with hypertensive cerebral hemorrhage. *Medicine* 2019; 98: e14123.
- 15) Sun G, Fu T, Liu Z, Zhang Y, Chen X, Jin S, Chi F. The rule of brain hematoma pressure gradient and its influence on hypertensive cerebral hemorrhage operation. *Sci Rep* 2021; 11: 4599.