Interventional Room Nursing for Patients with Ischemic Stroke Treated with Tirofiban Combined with Direct Thrombectomy

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Abstract: *Objective*: To explore the interventional room nursing and its application effects in patients with ischemic stroke treated with tirofiban combined with direct thrombectomy. *Methods*: A total of 61 patients with ischemic stroke admitted to our hospital from June 2024 to June 2025 were selected and divided into two groups using the red and blue ball method: the control group (n = 30, receiving routine interventional room nursing) and the observation group (n = 31, receiving additional tirofiban medication-specific nursing + individualized interventional nursing on the basis of routine nursing). The cerebral hemodynamic indicators, adverse reactions, effectiveness of complication nursing, and nursing satisfaction were compared between the two groups. *Results:* After 7 days of treatment, the observation group had lower cerebrovascular peripheral resistance and higher mean blood flow velocity and mean blood flow volume compared to the control group (all $p < 0.05$). The observation group had a higher effectiveness rate of complication nursing than the control group, with a statistically significant difference ($p < 0.05$). The nursing satisfaction in the observation group (96.77%) was higher than that in the control group (80.00%), with a statistically significant difference ($\chi2 = 4.223$, $p = 0.040 < 0.05$). *Conclusion:* Tirofiban combined with direct thrombectomy can significantly improve cerebral hemodynamics, enhance the effectiveness of complication nursing, and increase patient satisfaction in patients with ischemic stroke.

Keywords: Tirofiban; Direct thrombectomy; Ischemic stroke; Interventional room nursing; Nursing coordination

1. Introduction

Ischemic stroke is caused by narrowing or occlusion of cerebral blood vessels, leading to ischemia, hypoxia, and necrosis of brain tissue, subsequently resulting in neurological deficits. It primarily manifests as limb hemiplegia, speech dysfunction, impaired consciousness, etc., and is characterized by high morbidity, disability, mortality, and recurrence rates, posing a severe threat to patients' lives and health [1]. Currently, direct thrombectomy is the primary clinical treatment method, which rapidly opens occluded blood vessels through mechanical means, restores cerebral blood perfusion, and reduces brain tissue damage. According to relevant reports, some patients

still experience issues such as vascular re-occlusion and insufficient cerebral perfusion after direct thrombectomy treatment [2]. As a highly selective non-peptide platelet aggregation inhibitor, tirofiban inhibits platelet aggregation by blocking the platelet glycoprotein IIb/IIIa receptor, thereby preventing thrombus formation. The quality of interventional room nursing directly affects the safety and effectiveness of treatment, especially in combined medication therapy, where scientific nursing interventions can ensure medication safety and improve surgical coordination efficiency. Based on this, this article further explores the clinical effects of tirofiban combined with direct thrombectomy in treating patients with ischemic stroke and the targeted interventional room nursing measures. The report is as follows.

2. Materials and methods

2.1. General information

A total of 61 patients with ischemic stroke admitted to our hospital from June 2024 to June 2025 were selected and divided into two groups using the red and blue ball method: the control group (n = 30) and the observation group (n = 31). In the control group, there were 19 males and 11 females, aged between 40 and 78 years old, with an average age of (62.35 ± 3.32) years old; the onset time ranged from 1 to 6 hours, with an average of (3.65 ± 0.15) hours. In the observation group, there were 18 males and 12 females, aged between 41 and 78 years old, with an average age of (62.39 ± 3.36) years old; the onset time ranged from 1 to 5 hours, with an average of (3.57 ± 0.12) hours. There was no statistically significant difference in the information between the two groups ($p > 0.05$).

2.2. Diagnostic criteria

Reference was made to the "2018 Chinese Guidelines for the Diagnosis and Treatment of Acute Ischemic Stroke": presence of any neurological deficit such as sudden limb weakness, speech impairment, visual abnormalities, dizziness, or unsteady gait; exclusion of cerebral hemorrhage by head CT; diagnosis can be made if symptoms persist for more than 24 hours without imaging evidence; laboratory tests (complete blood count, coagulation function, blood glucose, etc.) should be completed to exclude stroke mimics and other etiologies [3].

2.3. Inclusion and exclusion criteria

2.3.1. Inclusion criteria

    (1) Patients meeting the above diagnostic criteria;
    (2) Time from onset to hospital admission not exceeding 6 hours, meeting the indications for direct thrombectomy treatment;
    (3) Informed consent obtained from patients and their families;
    (4) Approval obtained from the Ethics Committee of our hospital.

2.3.2. Exclusion criteria

    (1) Patients with mental or cognitive abnormalities;
    (2) Patients with a history of intracranial hemorrhage or brain trauma;
    (3) Patients with cardiac, hepatic, or renal insufficiency;
    (4) Patients allergic to the methods or medications used in the trial.

2.4. Methods

2.4.1. Control group

The control group received routine interventional room care: Assisting patients in completing preoperative routine examinations before surgery, preparing interventional surgical instruments and medications; preparing the skin at the puncture site, informing them of the basic surgical procedure and precautions; assisting the surgeon in positioning the patient during surgery; accurately passing surgical instruments and closely monitoring vital signs; after surgery, assisting patients in returning to the ward, observing for bleeding or hematoma at the puncture site, and instructing patients to rest in bed.

2.4.2. Observation group

In addition to routine interventional room care, the observation group received specialized care for tirofiban administration and individualized interventional care, with the following measures:

(1) Preoperative care

① Comprehensive assessment: Conduct examinations to evaluate the patient's coagulation function and vascular condition, with a focus on assessing the risk of bleeding. For patients at high risk of bleeding, develop targeted preventive measures in advance; ② Medication instruction: Provide detailed explanations to patients and their families about the mechanism of action, administration method, potential adverse reactions, and corresponding measures of tirofiban to enhance medication compliance; ③ Preparation of items: In addition to routine surgical items, specifically prepare tirofiban injection, intravenous pumps, and hemostatic emergency items (hemostatic forceps, hemostatic gauze, etc.); ④ Psychological counseling: Share successful treatment cases with patients, answer their questions, and enhance their confidence in treatment.

(2) Intraoperative nursing care

① Precise medication administration: Strictly adhere to the intravenous pump parameters set by the doctor's orders to ensure accurate dosage and speed of tirofiban infusion. During the infusion process, monitor the patency of the infusion tubing to prevent drug extravasation; ② Close monitoring: Enhance monitoring of the patient's vital signs and watch for signs of bleeding (increased bleeding at the puncture site, gingival bleeding, nosebleeds, etc.). If abnormalities occur, immediately report to the doctor and assist in handling them; ③ Optimization of surgical coordination: Flexibly adjust the patient's position according to the needs of the thrombectomy procedure; accurately and quickly pass surgical instruments.

(3) Postoperative nursing care

① Enhanced observation of the puncture site: Check the puncture site every 0.5 hours for bleeding or hematoma, and monitor the temperature, color, and sensation of the lower limb skin. If hematoma enlargement or persistent bleeding occurs, promptly apply pressure to stop the bleeding; ② Coagulation function monitoring: Regularly assist the patient in reviewing coagulation function indicators after surgery and adjust nursing measures promptly based on the results; ③ Diet and activity guidance: During bed rest, instruct the patient to choose bland, easily digestible, and protein-rich foods, and avoid spicy and irritating foods. Assist the patient in performing passive limb movements to prevent deep vein thrombosis in the lower limbs, and advise them to avoid strenuous activities to prevent bleeding at the puncture site; ④ Nursing care for adverse reactions: In case of adverse reactions such as skin rash and vascular reocclusion, promptly report to the doctor, assist in management, and comfort the patient and their family members.

2.5. Observation indicators

(1) Compare the cerebral hemodynamics indicators of the two groups before treatment and after 7 days of treatment. Utilize a cerebrovascular function detector (manufacturer: Beijing Gushanfeng Biotechnology Co., Ltd., model: GT-300) with a probe frequency set at 5 MHz. Assist the patient in assuming a supine position and proceed with the operation after their breathing and heart rate have stabilized. Measure the cerebrovascular peripheral resistance, mean blood flow velocity, and mean blood flow volume.

(2) Compare the adverse reactions (rash, vascular reocclusion, vascular injury) between the two groups.

(3) Compare the effectiveness rate of complication nursing between the two groups (the proportion of patients whose symptoms of complications such as bleeding and vascular reocclusion are controlled or alleviated after nursing care, out of the total number of patients with such complications).

(4) Compare nursing satisfaction between the two groups, assessed using a self-designed nursing satisfaction questionnaire (Cronbach's α coefficient of 0.88, demonstrating good reliability and validity) from our hospital. The questionnaire covers aspects such as nursing attitude, proficiency in nursing operations, and effectiveness of health guidance, with a total score of 100 points. It is divided into three levels: very satisfied (≥ 90 points), satisfied (70–89 points), and dissatisfied (< 69 points). Nursing satisfaction is calculated as the sum of the very satisfied rate and the satisfied rate.

2.6. Statistical methods

The cerebral hemodynamic indicators, incidence of adverse reactions, effectiveness rate of complication nursing, and nursing satisfaction were input into SPSS 20.0 software. The first indicator is a measurement variable (conforming to a normal distribution), expressed as ($\overline{x} \pm$ s), and analyzed using the t-test. The latter three indicators are categorical variables, expressed as "%". A statistically significant difference is considered when $p <$ 0.05.

3. Results

3.1. Cerebral hemodynamic indicators

According to **Table 1**, after 7 days of treatment, the observation group had lower cerebrovascular peripheral resistance and higher mean blood flow velocity and mean blood flow volume compared to the control group (all p < 0.05).

Table 1. Changes in cerebral hemodynamic indicators between groups ($\overline{x} \pm$ s)

Group	Cerebrovascular peripheral resistance [kPa/(s·m)]		Mean blood flow velocity (cm/s)		Mean blood flow (mL/s)	
	Before treatment	After 7 days	Before treatment	After 7 days	Before treatment	After 7 days
Observation group (n = 31)	90.54 ± 12.29	73.88 ± 5.42[a]	13.69 ± 3.28	20.66 ± 6.45[a]	5.45 ± 1.23	8.78 ± 2.66[a]
Control group (n = 30)	91.51 ± 13.31	80.67 ± 8.40[a]	13.71 ± 3.29	17.01 ± 5.35[a]	5.43 ± 1.25	7.34 ± 1.53[a]
t-value	0.296	3.764	0.024	2.401	0.063	2.580
p-value	0.768	< 0.001	0.981	0.016	0.950	0.012

Note: Compared with before treatment in the same group, [a]p < 0.05.

3.2. Incidence of adverse reactions

According to **Table 2**, there was no statistically significant difference in the incidence of adverse reactions between the two groups ($p > 0.05$).

Table 2. Incidence of adverse reactions between groups [n (%)]

Group	Rash	Vascular re-occlusion	Vascular injury	Total incidence (%)
Observation group (n = 31)	1 (3.23)	1 (3.23)	0 (0.00)	2 (6.45)
Control group (n = 30)	1 (3.23)	2 (6.67)	1 (3.33)	4 (13.33)
χ^2-value	-	-	-	0.814
p-value	-	-	-	0.367

3.3. Effectiveness rate of complication nursing

In the observation group, one case of rash and one case of vascular reocclusion occurred, both of which were rapidly controlled after targeted nursing interventions, resulting in a 100.00% effectiveness rate in complication nursing.

In the control group, there was one case of rash, two cases of vascular reocclusion, and one case of vascular injury. Symptoms were alleviated in two cases after nursing care, while two patients with vascular reocclusion required further treatment, yielding a 75.00% effectiveness rate in complication nursing. The observation group demonstrated a significantly higher effectiveness rate in complication nursing compared to the control group, with a statistically significant difference ($p < 0.05$).

3.4. Nursing satisfaction

Table 3 indicates that the observation group exhibited higher nursing satisfaction compared to the control group, with a statistically significant difference ($p < 0.05$).

Table 3. Incidence of adverse reactions between groups [n (%)]

Group	Very satisfied	Satisfied	Dissatisfied	Overall satisfaction rate (%)
Observation group (n = 31)	20 (64.52)	10 (32.26)	1 (3.23)	30 (96.77)
Control group (n = 30)	12 (40.00)	12 (40.00)	6 (20.00)	24 (80.00)
χ^2-value	-	-	-	4.223
p-value	-	-	-	0.040

4. Discussion

The core pathological mechanism of ischemic stroke involves thrombus formation leading to cerebral vessel occlusion, subsequently causing ischemic-hypoxic damage to brain tissue. Direct thrombectomy can swiftly and directly remove intracranial thrombi, restoring vascular patency. However, some patients may experience vascular reocclusion due to platelet reaggregation or residual thrombus enlargement [4]. Tirofiban, a highly selective platelet aggregation inhibitor, effectively blocks the platelet aggregation process and reduces the risk of thrombus formation. Combining direct thrombectomy with tirofiban is expected to further enhance therapeutic outcomes.

Interventional room nursing, as a crucial component of the treatment process, directly influences the safety and effectiveness of therapy. Especially when combined with tirofiban treatment, implementing scientific nursing measures is essential to ensure medication safety, optimize surgical collaboration, and improve patient prognosis.

The above findings indicate that, after seven days of treatment, the improvement in cerebral hemodynamic indicators was more significant in the observation group compared to the control group. This can be attributed to the crucial role played by the specialized nursing care for tirofiban administration and individualized interventional nursing provided to the observation group in addition to routine care. A comprehensive preoperative assessment of the patient's bleeding risk and thorough preparation laid a solid foundation for the smooth implementation of treatment and nursing. During surgery, precise medication administration ensured the accuracy of tirofiban dosage and infusion rate, while close monitoring of the patient's vital signs and signs of bleeding enabled timely detection and management of abnormalities, thereby ensuring treatment safety. Postoperatively, enhanced observation of the puncture site and regular monitoring of coagulation function facilitated the early detection and management of complications, while dietary and activity guidance helped prevent secondary issues such as deep vein thrombosis in the lower extremities, thereby improving patient prognosis [5]. These results align with clinical reports [6]. There was no significant difference in the incidence of adverse reactions between the two groups, but the observation group demonstrated higher rates of effective complication management and nursing satisfaction compared to the control group. This suggests that targeted interventional room nursing can enhance the effectiveness of complication intervention and improve the patient's nursing experience without increasing the risk of adverse reactions. The reason for this is that the nursing interventions in the observation group were more targeted and individualized. Preoperative psychological counseling effectively reduced patient anxiety, precise intraoperative coordination improved surgical efficiency, and meticulous postoperative complication nursing and health guidance enhanced the patient's sense of security and trust.

In addition, this study also found a close connection between nursing interventions and patient prognosis. Postoperative bleeding monitoring and nursing care enable the timely detection and management of issues such as bleeding and hematoma at the puncture site, thereby reducing the impact of adverse reactions on patient prognosis. Medication nursing ensures the standardized use of tirofiban, assists in optimizing the patient's blood coagulation function, and reduces the risk of recurrent thrombosis [7]. Furthermore, individualized surgical cooperation enhances the efficiency of thrombectomy procedures, reduces the duration of cerebral ischemia and hypoxia, mitigates cerebral tissue damage, and improves the neurological prognosis of patients [8]. However, this trial was a single-center, small-sample study, which may affect the reliability and generalizability of the results; moreover, long-term follow-up of patients was not conducted.

5. Conclusion

In summary, for patients with ischemic stroke treated with a combination of tirofiban and direct thrombectomy, implementing comprehensive interventional room nursing that includes specialized nursing for tirofiban medication and individualized interventional nursing can effectively improve cerebral hemodynamics, enhance the effectiveness of complication nursing, and increase patient satisfaction with nursing care. Future research could involve multi-center, large-sample, long-term follow-up studies to further demonstrate the long-term effectiveness and safety of the combined treatment regimen and targeted interventional room nursing.

Disclosure statement

The author declares no conflict of interest.

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