CASE REPORT

Identification and Nursing Care of a Stroke Patient with Internal Iliac Artery Branch Rupture and Bleeding

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ABSTRACT

To summarize the experience of identifying and caring for a stroke patient with ruptured internal iliac artery branch bleeding. The experience was summarized in 3 aspects, including how to recognize the presence of active bleeding in the patient, confirmation of the diagnosis and treatment of the bleeding point, prevention of postoperative complications, and rehabilitation care. After aggressive treatment and care, the patient was discharged after 30 days of hospitalization and improved. (*Altern Ther Health Med.* 2024;30(1):129-133).

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INTRODUCTION

Ruptured iliac artery branch hemorrhage is a rare disease,[1] with an insidious onset and a vicious bleeding pattern. It lacks characteristic features, making it easy to overlook and difficult to diagnose. Once it occurs, the condition becomes critical and can lead to death. The diagnosis of iliac artery rupture relies on clinical symptoms, signs, and relevant ancillary investigations. Because of the deeper anatomical location[2] and atypical symptoms, and lack of specificity at the onset, it is not easy to detect and is easily missed, and treatment is delayed, so the mortality rate is high.[3] For inpatients, nurses should closely observe the patient's vital signs to detect changes in their condition in time to gain treatment time for the patients, which is conducive to the patients passing the dangerous period and recovering as early as possible. In February 2023, a stroke patient with a stroke was admitted to our hospital and suffered a ruptured iliac artery branch hemorrhage during hospitalization. This paper provides a retrospective analysis of the occurrence, development, treatment and care of this case, with a view to providing a basis for the identification, treatment, and care of this disease. The Ethics Committee of Wenling First People's Hospital reviewed and approved this study, ethics number: KY-2023-2016-01.

CLINICAL DATA

General information

The patient, the female, 70 years old, was admitted to the hospital on 2023-2-6 with "55 days of impaired left limb movement". The patient had a sudden cerebral hemorrhage on 2022-12-13 and underwent "decompression of intracerebral hematoma in the right basal ganglia region". During her hospitalization, she was found to be "hypertensive" and was regularly treated with "alpine benzoate tablets 5mg Qd orally." Amlodipine benzoate tablets 5mg Qd orally "was prescribed as antihypertensive treatment. On admission, body temperature was 37.1°C, pulse 74 beats/min, respiration 20 breaths/min, blood pressure 150/84mmHg, clear consciousness, mental competence, slurred speech, incoherent replies, muscle strength of right limb grade 5, left upper limb and left-hand grade 0, left lower limb grade 2^{-}. hyperalgesia, tendon reflexes ++ on both sides, left baroreflex (+), puddlefield drinking test grade 4, sitting balance grade 3, standing balance grade 0, ADL score 20, heavy dependence on self-care.

Treatment and Regression

After admission, the patient was given a rehabilitation routine, secondary care, low salt diet, blood pressure monitoring, gastric protection and other medication, exercise therapy, balance function training, swallowing dysfunction training and other rehabilitation training, and VTE (venous thromboembolism) prevention. 7 February blood test results: hemoglobin 107 g/L, coagulation function (including D dimer):

activated portion Prothrombin time 43.9 s, prothrombin time 34.2 s, D dimer 0.78 mg/L. Ultrasound findings on February 8: Intermuscular vein thrombosis in both lower legs. Bilateral lower limbs were braked and dalteparin sodium injection 5000 units Q12h was given subcutaneously. After 2 weeks of bed rest, the thrombus mechanized, and the patient was released from bed on 22 February. At 20:50 on the same day, the patient complained of persistent pain in the upper part of the left lower limb with an NRS score of 4. The nature of the pain could not be described, and there was no visible swelling or change of color. At 11:35 the following day, the patient was mentally soft, with a painful face. The pain in the left thigh was worse than before, and swelling was evident without petechiae or ecchymosis. At 15:00, the nurse found that the patient was mentally soft, with pale lips and weakness, and complained of persistent swelling and pain in the left thigh. At 15:00, the nurse found that the patient was mentally soft, with a pale face and lips and obvious weakness, complaining of persistent swelling and pain in the left thigh, with an NRS (numerical rating scale) score of 6. The temperature was 36.5, heart rate 118 beats/min (basal heart rate around 70 beats/min), blood pressure 108/79, SPO2 98%, random gross glucose 13.2 mmol/L was measured, heart rate was significantly faster than before, and pulse pressure difference was slightly reduced from before. Immediately, oxygen was administered, emergency blood was sent for testing, compounded diclofenac injection 2ml intramuscular injection, and intravenous rehydration therapy. At 16:30, heart rate was 119 beats/min, blood pressure was 128/87 mmHg, pulse pressure difference was further reduced, haemoglobin was 76g/L and pain was not significantly improved. At 17:28, heart rate was 121 beats/min, blood pressure was 110/95 mmHg, hemoglobin was 72 g/L, pulse pressure differential was reduced to 15 mmHg, and shock index (heart rate/systolic blood pressure) was 1.1. Femoral arteriography + femoral artery embolization (signs of contrast spillage in a branch of the left internal iliac artery under the gluteal artery) was performed. After the procedure, the right lower limb (punctured side) was restrained, the puncture site was bandaged with pressure, and the patient was treated with fluids, blood pressure control, analgesia and other symptomatic treatments.

On March 2, the patient was lucid and mentally competent, the swelling in the left leg had subsided, the muscle strength of the right limb was grade 5, that of the left upper limb and left hand was grade 1, and that of the left lower limb was grade 2. Brunnstrom's stage: stage 2 of the left upper limb, stage 2 of the left hand, and stage 3 of the left lower limb. Haemoglobin 87g/L, recovery was good, and he was discharged.

CARE

Recognition of active bleeding

Mental and psychiatric changes and progressive pain. Timely recognition of the danger signs of the disease and detection of changes in the patient's condition is a prerequisite for early intervention to stop further deterioration and save the patient's life.[4] Early recognition and timely intervention can improve the prognosis. During rounds, nurses should closely observe the patient's vital signs, including changes in demeanor, mental condition, heart rate, respiration and blood pressure, and provide good psychological care. The patient's speech was slurred in this condition, and he could not accurately express his discomfort. Changes in mental and psychiatric status and the increase in pain were key to identifying active bleeding. The first time the patient complained of pain in the left thigh, there was no significant change in skin color or leg circumference at the time of examination, and because of the patient's poor mobility of the left limb, no bleeding was considered; no bleeding was found on CT or ultrasound examination, and it was considered that the muscle strain might have been caused by exercise, and after pain management and cold therapy, the pain improved slightly. However, the patient's mental state gradually deteriorated, with a progressive pallor and marked weakness. Considering that the use of anticoagulant drugs is one of the risk factors for bleeding, and as the patient had a history of cerebral hemorrhage, the first consideration was whether there was a recurrence of cerebral hemorrhage as the patient showed a change in condition after 2 weeks of anticoagulation with low molecular heparin. Since the patient had no headache complaint and vomiting, there was no obvious change in speech expression compared with the previous one, and the patient had pain and swelling in the left lower limb, recurrent cerebral hemorrhage was ruled out. Combined with the sharp drop in hemoglobin and the persistent thickening of the left thigh, the presence of active bleeding in the left thigh was considered. Considering that the patient had been bedridden for a long time, the fact that she increased the exercise time on her own when she got out of bed to perform exercises and exerted too much force during the exercise may have been the main cause of this bleeding. In addition, the patient received anticoagulant therapy for two weeks, which may have been a contributing factor to this bleeding.

Significant increase in heart rate. Heart rate is the number of contractions of the heart per minute and can respond to the body's response to internal and external stimuli.[5] It has been reported that when a patient is hypovolemic[6] the parasympathetic impulse is weakened, the sympathetic impulse is increased, the peripheral arteries contract ,the heart rate increases, and blood is shunted to vital organs.[7] In this case, the patient's heart rate increased significantly compared to his basal heart rate, and the nurse, after excluding the patient's fever After ruling out fever and hypoglycemia, the nurse suspected active bleeding and immediately worked with the physician to take further tests and examinations and to establish intravenous access for rehydration therapy. The increase in heart rate, in this case, was probably due to the possibility of a large bleed from a ruptured branch of the internal iliac artery, which led to changes in the body's internal environment and cardiac autonomic nerves, which in turn increased the heart rate. The identification of active haemorrhage is a prerequisite for further intervention and is key to preventing death from haemorrhagic shock. In

this case, it is possible that bleeding from the ruptured iliac artery bleeding caused a reduction in peripheral blood volume, which triggered arterial pressure receptors to activation of the sympathetic nervous system by arterial pressure receptors , triggering the release of circulating vasomotor hormones. The increased heart rate is the body's response to the reduction in blood volume and is an important indicator of the detection of occult haemorrhage in this case.

In addition, the shock index is a good predictor of bleeding, with a normal range of 0.5-0.7. A perinatal shock index of ≤1.1 is considered normal,[8] but for the general population, >0.9 is considered a serious abnormality. In this case, at 17:28 the patient had a heart rate of 121 beats/min, a systolic blood pressure of 110 mmHg, a shock index of 1.1, and a pale face, which was very dangerous.

Gradual decrease in pulse pressure difference. The pulse pressure difference is the difference between systolic and diastolic blood pressure, and the average pulse pressure difference is typically 40 mmHg. A pulse pressure difference of less than 25% of systolic blood pressure is defined as a reduction in pulse pressure difference.[9] The literature reports[10] that pulse pressure difference is closely related to the risk of cardiovascular events and death. There are three reasons for a reduced pulse pressure difference; firstly, the arteries are very elastic, and the more elastic the vessels are, the more energy is stored in the vessels during systole and the higher the pressure in the vessels during diastole. The second is that peripheral vascular resistance increases, which reduces the transfer of blood to the body during systole, while during diastole, there is still more blood in the blood vessels, and the diastolic pressure increases. Thirdly, the faster the heart rate, the shorter the interval between heartbeats, and the more the pressure pulse between the aorta and brachial artery increases,[11] causing the diastolic pressure to increase. The increased heart rate may be an important reason for this patient's reduced pulse pressure difference. In addition, when cardiac output is reduced, the body secretes antihypertensive substances such as norepinephrine and angiotensin II, which cause peripheral vasoconstriction and increase total peripheral resistance. With this combined effect, there is no significant increase in systolic blood pressure, while diastolic blood pressure rises, resulting in a decrease in pulse pressure difference.[12] This patient had a decrease in effective circulating blood volume due to bleeding from a ruptured iliac artery, with a consequent decrease in cardiac output. In the early stages of blood loss, the patient's systolic blood pressure did not change significantly, probably due to compensatory vasoconstriction, but diastolic blood pressure gradually increased. In this case there was no petechiae or ecchymosis on the skin surface of the patient due to haemorrhage. Continuous monitoring of the patient's blood pressure, which revealed a gradual decrease in pulse pressure difference, was also key to identifying this change in condition.

Confirmation of diagnosis and treatment of bleeding points

Ultrasonography can find out whether the patient has stenosis or occlusion of the arteries in the lower limbs and provide a clinical basis for diagnosis by observing the size, morphology, and blood flow of the diseased vessels. However, ultrasonography cannot reflect the patient's collateral circulation, so ultrasonography has little clinical significance for the diagnosis of this disease. In this case, when the patient had significant pain, the ultrasound examination of the arteries and deep veins of both lower limbs did not reveal any ruptured bleeding from the lateral branches of the iliac arteries, which also illustrates the inadequacy of ultrasound examination in such cases.

Digital subtraction angiography (DSA), one of the most important methods available for diagnosing iliac artery dissection, clearly shows the shape and density of small vessels[13] and is the gold standard for diagnosing iliac artery stenosis and occlusion. It is important in the diagnosis of iliac artery dissection because it provides good image quality and is sensitive to showing vascular lesions that clearly show the common iliac artery and its branches. Arterial embolization is an effective method of controlling bleeding.[11] A left-sided iliac-femoral arteriogram was performed on the patient, and intraoperative signs of contrast spillage were seen in a branch of the left internal iliac artery under the gluteal artery, see Figure 1. After confirming the bleeding point, the bleeding vessel was embolised with a microspring ring, and the signs of contrast spillage disappeared, achieving rapid hemostasis.

In this case, the timely identification of the bleeding point by femoral arteriography and embolization of the bleeding point by angioembolization was key to stopping the further progression of the disease when ultrasonography was inconclusive.

Nursing care and rehabilitation

Psychological care. Studies have shown that mental health symptoms such as anxiety and depression are common in stroke patients and their carers due to the high burden of care and concerns about prognosis.[14,15] Therefore, close attention should be paid to the patient's psychological situation during his hospitalization. This patient left behind left limb mobility impairment after a stroke, and this hospitalisation hospitalization was hoped to improve the left limb's muscle strength and activities of daily living and improve the quality of life. However, due to a sudden thrombosis in the left lower limb, the patient was bedridden for 2 weeks, which affected the rehabilitation progress. The patient and his family became anxious about missing the best time for recovery and affecting the prognosis. Later, a rupture and bleeding of a branch of the iliac artery in the left lower limb caused severe pain to the patient and again delayed the recovery process. The rehabilitation nursing concept of integrated medical care and treatment was adopted during this process. The patient and his family were taught about the disease, nursing, and rehabilitation; the patient's anxiety and depression levels were assessed in a timely manner; psychological guidance was provided using narrative nursing, the patient was taught skills such as breathing and relaxation, and other patients' recovery cases were explained to enhance their confidence in recovery.

The patient and family were informed of the purpose of the operation, precautions and the need for immediate surgery before the operation. After the operation, the limb on the puncture side was braked for 24h to avoid flexion so as to avoid bleeding from the puncture site. The patient in this case had normal anxiety and depression scores, except for mild anxiety during bed rest for nearly 2 weeks and when he had a ruptured arterial bleed.

Prevention of postoperative complications. The patient had a history of cerebral hemorrhage, hypertension, intermuscular venous thrombosis, a complex condition, and poor underlying conditions. After surgery, the patient was closely monitored for mental status, respiration, blood pressure, pulse rate, and coagulation function, and attention was paid to the prevention of re-bleeding, venous thrombosis, and other common complications to achieve the goal of early recovery. To enhance the prevention of re-bleeding, the following nursing measures were focused on. Closely observe changes in the patient's blood pressure, pulse, and respiration, and check the puncture site every half hour for bleeding, hematoma formation, or oozing blood for 3 hours after surgery. Thereafter, monitor once every hour for six consecutive times. The puncture site is dressed with local pressure and compressed with a sandbag for 6h, and the limb on the puncture site is restrained for 24h to avoid flexion of the punctured limb. Watch for fluctuations in the dorsalis pedis artery to avoid excessive pressure affecting the blood supply to the lower limb and too little pressure making the puncture site prone to bleeding.

Venous thromboembolism is a common perioperative vascular complication.[16] Coupled with a history of thromboembolism, the patient has a postoperative Caprini score of 7 and is at high risk of venous thrombosis, which is prevented by the following modalities: Implementing basic and physical prophylaxis, including drinking greater than 1500ml of water daily, elevating the lower limb and avoiding flexion of the limb on the puncture side. Twenty-four hours after surgery, patients are encouraged to perform active exercises on the right upper limb, assisted exercises on the left upper limb and active and passive ankle pump exercises on both lower limbs at a frequency of ≥60 beats/min, 10-15 times a day for 20-30 sets, in order to effectively increase blood flow velocity, produce optimal blood flow and effectively promote venous blood return.[17] Patients are instructed to cough and breathe deeply. Drug therapy is a common method of preventing venous thrombosis, but drug prophylaxis is withheld due to the presence of contraindications to anticoagulation in patients who have had a bleeding event. Most of the literature shows that gradient compression stockings effectively prevent venous thrombosis.[18,19] It has also been noted[20] that gradient compression stockings are unnecessary for most patients undergoing elective surgery for venous thrombosis prophylaxis. However, the patient was not given a gradient compression stocking in this case because of swelling in the left thigh and a right groin puncture. The patient had no further thrombotic events postoperatively until discharge.

Care for pain. Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.[21] As the fifth most important vital sign, it can respond to changes in the physical condition and injuries encountered, thus limiting the patient's activities and avoiding further damage, but pain also has a serious impact on the patient's quality of life.

After the patient's left internal iliac artery rupture, the leg circumference 15 cm above the left patella increased from 38.5 cm to 45 cm, with significant swelling. The patient's pain was assessed using the Numerical Pain Rating System (NRS) with an NRS score of 5. The pain was severe and interfered with sleep and eating. A quiet environment was created, and the patient was instructed to distract himself and given celecoxib capsules 0.2g orally and cold therapy. Cold therapy is a physiotherapy method that can reduce the permeability of capillaries by local cooling, reduce exudation and oxygen consumption of tissues, and reduce the nerve conduction velocity of nociception, which has analgesic, cooling, swelling, and hemostatic effects.[22,23] On the first day after surgery, there was still persistent swelling and pain in the left thigh, with an NRS score of 2. Cold therapy was continued, the leg's circumference was measured every 4 h at 15 cm above the patella, and the skin color and dorsalis pedis artery pulsation were recorded to compare whether there was any change in swelling to determine whether there was still active bleeding. The pain was completely gone on day 4 of surgery.

Integrated medical, nursing, and therapeutic progressive rehabilitation. We used the integrated rehabilitation model of medical care and treatment to provide progressive rehabilitation care for the patient.[24] We focused on tripartite discussions and enhanced communication to develop prevention, treatment, care and rehabilitation plans for patients. The patient was left with left-sided hemiplegia after a stroke. When resting in bed, the patient was given good limb positioning, including a supine position, healthy side position, affected side position, and position change. In the supine position, the patient's head is directed to the affected side, and soft pillows are placed under the shoulder and hip joints to achieve joint abduction, as this position tends to cause a tense neck reflex and stimulate abnormal reflex activity, reinforcing the spasm of the upper limb flexors and lower limb extensors on the affected side. In the healthy-side position, the healthy side is on the bottom. The affected side on the top, supported by a soft pillow on the back and a soft pillow under the upper limb on the affected side at shoulder level, with the shoulder joint flexed forward, the scapular band extended forward, the elbow joint extended. The wrist joint in a neutral position with the fingers naturally extended and the palm down. The lower limb is flexed at the hip and knee, the torso is kept at 90° to the bed, the ankle is placed in a neutral position, a soft pillow is placed under the leg, and the healthy limb is placed in a comfortable position. In the affected side position, the affected side is underneath, a soft pillow is placed on the back, the affected shoulder is flexed forward at 100°, the scapular band is extended

forward, the elbow is extended, the wrist is in a neutral position, the fingers are naturally extended with the palm upwards, the lower limb is extended at the hip and knee, and a soft pillow is placed under the healthy leg. This position reduces or relieves spasticity, puts pressure on the paralyzed joint ligaments, promotes sensory input, and allows free movement of the healthy limb, so patients are encouraged to use this position more often.

On the first postoperative day, bed rest and prevention of bleeding from the puncture site were the main focus. Turning and patting the back were implemented for Q2h, and the patient was taught to cough effectively and breathe abdominally to promote hemodynamic stability for 15-20min each time, 2-3 times/day, so as not to cause discomfort to the patient. By the second day after surgery, the patient's puncture site had healed well, and there was no blood or fluid leakage. The patient was positioned according to the key points of good limb positioning for stroke patients, and the activities were mainly upper limb activities, including active, assisted, and passive movements, and the activities included joint mobility training and hand function training. On the third postoperative day, the patient's vital signs were stable, and on the premise of ensuring safety, active and passive lower limb training, and bedside sitting balance training was added on the basis of the previous day's exercise program, with each activity lasting 15-20 min.

SUMMARY

In this paper, a patient with a ruptured hemorrhage from a branch of the inferior gluteal artery of the internal iliac artery in stroke is used as an example to review the development of the disease and the process of nursing care and treatment and to share the experience of detection, care, and treatment of ruptured internal iliac artery hemorrhage. In this case, after 2 weeks of bed rest, the patient was out of bed for 1 day and developed a ruptured hemorrhage from a branch of the internal iliac artery. The nurse identified a possible active hemorrhage by changes in the patient's demeanor, mental state, heart rate, blood pressure, pulse pressure difference, and pain, identified an active bleeding site in the patient's body by a sharp drop in hemoglobin, confirmed the location of the bleeding site by femoral arteriography and performed arterial embolization for treatment. During this time, the patient was provided with integrated medical care and progressive rehabilitation, and after careful treatment, care, and rehabilitation, the patient was discharged.

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CONFLICT OF INTEREST

There is no conflict of interest between Yang Xiaoyan, Li Wangyong, and He Lianping, thanks to the financial support given by Wenling City's 2021 Social Development Science and Technology Project (2021S00209).

AUTHOR CONTRIBUTION

Yang Xiaoyan and Li Wangyong made important contributions to the research design, collation, and writing of this paper, and He Lianping and Ling Zijun provided important help and support for the research design, collation, and writing of this paper.

DATA AVAILABILITY STATEMENT

After identifying the patient's identity information, the individual data collected in this study can be applied. It is recommended to apply directly to the first author, and the data requester needs to sign a data access agreement to gain access.

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