

Reflection on Nursing Outcomes of 96 Patients after Extraventricular Drainage Surgery

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Abstract: This study explores the nursing effects on patients after external ventricular drainage (EVD) surgery and evaluates the influence of nursing measures on treatment outcomes. Ninety-six patients undergoing EVD surgery were observed and nursed, with records of vital signs, intracranial pressure, drainage conditions, and complications. Nursing measures including skin care, infection control, pain management, along with psychological support and rehabilitation care were provided. After the implementation of nursing measures, patients' vital signs stabilized, intracranial pressure was effectively controlled, drainage was unobstructed, skin condition was good, infection rate was low, and the incidence of complications was reduced, with effective pain relief. The study found that the implementation of psychological support and rehabilitation nursing helped improve patients' quality of life. Nursing measures for patients after EVD surgery significantly influence treatment outcomes. Through effective nursing measures, patients' quality of life can be improved, complications reduced, and recovery promoted.

Keywords: External Ventricular Drainage; Subdural Effusion; Nursing

1. Introduction

Intracranial pressure refers to the pressure state within the brain tissue, which is crucial for the normal regulation of brain function and cerebral blood flow. Elevated intracranial pressure may manifest in various brain disorders such as traumatic brain injury, brain tumors, and intracerebral hemorrhage. Its hallmark is abnormal elevation of intracranial pressure, which can have serious repercussions on human health, involving impairments across multiple functions. Firstly, elevated intracranial pressure can directly compress and damage brain tissue, resulting in abnormal brain function such as headache, nausea, vomiting, and altered consciousness. Secondly, it can adversely affect the nervous system, causing visual disturbances, exophthalmos, and in severe cases, blindness. Additionally, elevated intracranial pressure can impact the respiratory and circulatory systems, leading to difficulties in breathing, as well as cardiac and respiratory failure. Moreover, intracranial pressure-induced brain edema or tumors can exert pressure on intracranial space, resulting in brain herniation, disrupting normal cerebral circulation, causing cerebral hypoxia, ischemia, and consequent ischemic brain lesions and neurological dysfunction. Therefore, accurate measurement and timely reduction of intracranial pressure are crucial for the treatment and recovery of patients.

External ventricular drainage (EVD) device for intracranial pressure is a therapeutic method used to reduce intracranial pressure. Its primary clinical application aims to accurately measure intracranial pressure and drain cerebrospinal fluid. The device involves inserting a fine tube into the brain ventricle to drain excess cerebrospinal fluid, alleviating elevated intracranial pressure caused by cerebral edema, intracerebral hemorrhage, and other conditions. By draining cerebrospinal fluid, intracranial pressure can be reduced, reducing the degree of brain edema, improving cerebral blood flow and oxygen supply, thereby ameliorating patient symptoms and brain function. Additionally, intracranial pressure measurement can assess brain tissue metabolism, determine the severity of brain injury, and monitor changes in intracranial pressure.

2. Clinical Profile

2.1 General Information

Clinical data were collected from 96 patients who underwent intracranial pressure measurement and external ventricular drainage for subdural effusion following craniotomy in the Department of

Neurosurgery of our hospital from May 2021 to August 2021. Among them, there were 50 males and 46 females, with ages ranging from 21 to 64 years and a mean age of 45 years. The distribution of diseases was as follows: 24 cases of cerebral aneurysm, 32 cases of tumors, 10 cases of hypertensive intracerebral hemorrhage, and 30 cases of traumatic brain injury. The duration of illness ranged from 5 to 15 days.^[1]

2.2 Puncture Procedure

The procedure was performed by experienced clinicians using materials including intracranial pressure measurement and external ventricular drainage devices (Shandong Dazheng Medical Equipment Co., Ltd., National Medical Device Registration No. 20193071850). Typically, the external ventricular drainage device is placed on the patient's head, most commonly in the frontal or lateral ventricle, depending on the specific condition of the patient and the recommendation of the physician.^[2] At the selected drainage site, the skin was cleaned, disinfected, and covered with sterile drapes to reduce the risk of infection. Local anesthetic was then administered to the patient's skin to minimize pain and discomfort.^[3] A specific needle or catheter was used to puncture the patient's scalp and insert it into the ventricle or brain tissue. After puncture, the tubing of the external ventricular drainage device was connected to the puncture site for draining fluid from the patient's head. Once connected, the device was secured to the patient's head using skin sutures or other fixation methods to ensure stability and safety. Upon completion of fixation, the drainage device was ready to operate, continuously monitoring intracranial pressure and draining fluid in real-time.^[4]

3. Results

Among the 96 patients in this study, 88 patients successfully resolved subdural effusion and had their drainage tubes successfully removed. Among them, 2 patients experienced drainage tube obstruction, which was resolved by replacing the tube after 2-3 days of puncture interval, ultimately achieving recovery. One patient experienced drainage tube dislodgement, which was resolved by replacing the tube after 2-3 days of puncture interval, ultimately achieving recovery.^[5] Another patient experienced cerebrospinal fluid leakage around the drainage tube, which ceased after suturing the puncture site, ultimately resulting in recovery. Additionally, 2 patients experienced inadequate drainage, which was resolved by moderate aspiration with an empty needle, and the drainage tubes were subsequently removed upon recovery. Furthermore, 1 patient developed an infection at the puncture site, necessitating the removal of the drainage tube. After infection control measures and replacement of the puncture interval, the drainage tube was successfully reinserted, leading to recovery. Moreover, 1 patient experienced low-pressure headaches, which were alleviated by adjusting the height of the drainage tube and controlling the drainage rate.^[6]

Based on the clinical data above, it is evident that the intracranial pressure external ventricular drainage device is a crucial method for assessing and monitoring intracranial pressure in patients. By inserting catheters or sensors, it allows for direct measurement of intracranial pressure changes.^[7] This is valuable for monitoring patients' neurological status, assessing the degree of intracranial pressure elevation, and guiding clinical treatment, offering significant clinical advantages. The device utilizes advanced sensors and monitoring technology to provide accurate intracranial pressure data in real-time, aiding in the timely detection of elevated intracranial pressure and facilitating appropriate intervention to prevent potential neurological damage. Rigorously validated and certified, the device demonstrates high safety and reliability. Its relatively simple usage obviates the need for complex surgical procedures, thereby reducing patient discomfort and trauma.^[8] Additionally, the drainage flow can be adjusted and customized according to the patient's specific condition, enabling personalized treatment. In summary, intracranial pressure measurement and external ventricular drainage devices offer irreplaceable clinical advantages in assessing and treating patients with elevated intracranial pressure. They provide accurate intracranial pressure measurement and effective fluid drainage, aiding clinicians in making accurate diagnoses and treatment decisions, improving patient prognosis, and reducing the risk of complications.^[9]

4. Nursing Care and Reflection

4.1 Preoperative Care

4.1.1 Psychological Counseling

During the preoperative period, nursing staff need to provide emotional support and understand the anxiety and fear patients may face. Clear explanation of the surgical process, answering patients' and families' doubts, and establishing trust are essential. Timely and accurate provision of information about the disease, treatment, and care to patients and families helps them understand the condition and treatment process, reducing anxiety and fear.^[10] Additionally, respecting the feelings and opinions of patients and families, listening to their concerns and worries, and providing emotional support and comfort are crucial. Encouraging patients and families to express their emotions and feelings, including fear, pain, and anger, and providing emotional support and understanding are essential. Furthermore, maintaining good communication with the medical team, patients, and families, responding to their questions and needs promptly, ensuring information flow and understanding, and regularly inquiring about their situation and needs are necessary. Psychological counseling measures help alleviate patients' and families' anxiety and stress, enhance their confidence and willingness to cooperate, promote recovery, and improve quality of life. Nursing staff themselves need to possess good communication and listening skills, empathy, and patience to provide comprehensive psychological support to patients and families.^[11]

4.1.2 Preoperative Examination

Preoperative examination is a crucial part of intracranial pressure measurement and external ventricular drainage device treatment. Before the examination, nursing staff should communicate with patients, explain the purpose, process, and possible discomfort of the examination, help patients understand the importance of the examination, and alleviate tension. Ensuring the environmental safety of the examination area, such as the stability of the examination table, bedside rails, and adequate lighting, to prevent accidents during the examination is important. Nursing staff should prepare the skin of the examination site, including cleaning and disinfection, to reduce the risk of infection.^[12] Confirming the patient's identity and examination site, ensuring the patient is in the appropriate position, and effective teamwork with other medical staff to ensure patient safety and comfort are necessary. Before surgery, nursing staff need to comprehensively assess the patient's physical condition, understand the patient's basic health status, and special factors related to the surgery, such as allergy history and medication use. Additionally, ensuring patients undergo comprehensive laboratory tests before surgery, including blood tests, electrolyte levels, and coagulation function, is essential. Nursing staff should provide guidance to patients on preoperative fasting, medication, and special precautions to ensure patients prepare according to medical advice.^[13]

4.2 Intraoperative Nursing

4.2.1 Condition Observation

During surgery, nursing staff should closely monitor changes in the patient's condition and treatment effects, monitoring vital signs such as blood pressure, heart rate, respiratory rate, and temperature. Special attention should be paid to abnormal conditions such as elevated or decreased blood pressure, irregular or rapid heart rate, rapid breathing, or elevated body temperature, and any abnormalities should be promptly reported to the doctor. Additionally, changes in intracranial pressure should be monitored continuously to detect and address any abnormalities promptly. Regular recording of intracranial pressure monitoring data and joint assessment of treatment effects with doctors is essential. It is also important to maintain the patency of the external ventricular drainage device to ensure that the drainage tube is not compressed or obstructed. Furthermore, attention should be paid to monitoring the flow rate and nature of the drainage fluid for any significant increase or decrease in drainage volume, changes in drainage fluid color, or drainage tube blockage. Nursing staff need to be capable of crisis management, responding quickly to potential complications. For instance, checking the patient's head and neck skin for any abnormalities such as redness, swelling, discharge, or infection is necessary. Nursing staff should promptly record and report changes in the patient's condition to doctors for timely adjustment of treatment plans and the provision of effective nursing care. These observations and recordings are crucial for assessing the patient's condition, guiding treatment, and preventing complications to provide the best nursing outcomes for patients.

4.2.2 Infection Control

Preventing infection during external ventricular drainage surgery is essential. Nursing staff should strictly adhere to aseptic techniques, including wearing sterile gloves, sterile clothing, using sterile instruments, and dressings to prevent bacterial growth. Regular replacement of fixation straps and dressings should be done to ensure the stability and safety of the drainage device. Moreover, strict adherence to aseptic operation specifications, maintaining cleanliness of the drainage device and surrounding environment, and regular replacement of the drainage device are essential to prevent infection. Nursing staff should regularly check the patency and sealing of the drainage system to ensure that the drainage tube is unobstructed and there are no leaks. Additionally, attention should be paid to maintaining the cleanliness and proper placement of the drainage bag to avoid the risk of infection. Furthermore, nursing staff should regularly check the skin around the drainage device, keeping it dry and clean to prevent infection. Regular replacement of fixation straps and dressings to ensure the stability and safety of the drainage device is essential. Nursing staff should strictly adhere to aseptic operation specifications, maintain cleanliness of the drainage device and surrounding environment, and regularly replace the drainage device to prevent infection. Nursing staff should ensure that patients receive comprehensive and effective care during surgery to improve treatment outcomes and patient quality of life.^[14]

4.3 Postoperative Nursing

4.3.1 Drainage Care

In the context of treating patients who develop subdural effusion after craniotomy, employing intracranial pressure measurement and external ventricular drainage device treatments are critical interventions. The postoperative care, crucial for patient recovery and treatment outcomes, involves meticulous attention from the nursing staff. The nurses are tasked with closely monitoring the patient's overall condition, conducting regular assessments of neurological status, vital signs, skin condition, and the operational status of the drainage system to promptly identify and address any irregularities. They must watch for symptoms of intracranial hypertension such as headaches, vomiting, and alterations in consciousness. It is essential for nurses to ensure the drainage system remains clear, checking it regularly to prevent any blockages and to avoid any leakage. They must also position the drainage bag correctly to prevent the tubing from being compressed or bent. Following the physician's orders, nurses should measure and document the intracranial pressure regularly. They must also monitor any fluctuations in intracranial pressure and, when necessary, adjust the drainage system's pressure promptly to keep the intracranial pressure within a safe range.^[15]

4.3.2 Infection Prevention

In hospitals, the nursing team plays a vital role in ensuring that patients who have undergone surgical procedures like craniotomy receive comprehensive and personalized care. The nurses are responsible for maintaining stringent hand hygiene and environmental cleanliness to prevent infections. They must frequently wash their hands with soap and water or use alcohol-based hand sanitizers. Additionally, it's part of their duties to routinely change the dressings associated with the drainage system as per medical orders and hospital policies to prevent infections near the drainage tube. Nurses should also conduct regular inspections of the skin surrounding the drainage device, keeping it dry and clean to further prevent infection. Monitoring the patient's surgical incision and adjacent skin for signs of infection such as redness, swelling, or pain is crucial, and any abnormalities should be quickly communicated to the doctor. The nurses must check the drainage system's patency and sealing to confirm that the tube remains unblocked and leak-free, and they need to keep the drainage bag clean, reporting any signs of infection immediately. They are also tasked with providing pain relief based on the patient's reported pain levels and the doctor's instructions to ensure patient comfort and to closely observe the patient's pain status. Furthermore, nurses are required to monitor the patient's fluid balance, making sure the patient consumes adequate water and administers intravenous fluids as ordered by the doctor to help stave off infections. They must be vigilant for potential complications like infection, bleeding, or intracranial hypertension, promptly informing the doctor and assisting in necessary examinations and treatments to ensure patient safety and recovery.

5. Discussion

The clinical application of external ventricular drainage devices for intracranial pressure

management holds significant clinical significance. It aids in the diagnosis and treatment of various intracranial diseases such as traumatic brain injury, brain tumors, and cerebral hemorrhage, thereby enhancing treatment outcomes and quality of life for patients. Moreover, the device offers clinical advantages such as high precision measurement, real-time monitoring, safety, reliability, ease of operation, and personalized treatment options.

Furthermore, by monitoring changes in intracranial pressure, treatment plans can be adjusted promptly, reducing potential damage to brain tissue caused by increased intracranial pressure. Real-time intracranial pressure monitoring data assists doctors and nurses in assessing changes in patients' conditions and treatment efficacy, effectively preventing and managing complications associated with intracranial hypertension, thus improving patients' quality of life.

The analysis and summary of the general information, puncture methods, results, and nursing outcomes of the 96 patients who underwent external ventricular drainage can provide valuable insights into the effectiveness of nursing interventions and potential areas for improvement. Strengthening nursing observation and actively preventing infections can reduce the occurrence of complications, thereby enhancing the quality of nursing care during clinical processes. Additionally, reviewing the nursing outcomes of the 96 patients can provide empirical evidence and lessons learned regarding nursing interventions, guiding clinical practice, helping nurses and doctors improve nursing practices, and enhancing disease management and recovery outcomes for patients.

6. Conclusion

The nursing outcomes of patients undergoing external ventricular drainage directly impact their recovery and quality of life. Through standardized nursing measures, complications can be effectively managed, patient pain can be alleviated, and the success rate of surgical treatment can be improved. Emphasizing the importance of collaborative teamwork and comprehensive patient care is crucial. Furthermore, recommendations for improvement points and optimization strategies in postoperative care should be proposed to elevate the level of care for patients undergoing external ventricular drainage. Overall, by deeply researching nursing outcomes, more precise and personalized nursing protocols can be developed to better serve the recovery of patients undergoing external ventricular drainage.

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