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Nursing Experience of Percutaneous Nephrolithotomy in the Treatment of Complex Renal Calculi

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Abstract: The objective is to investigate the nursing experience of percutaneous nephrolithotomy (PCNL) in the treatment of complex renal calculi and provide references for improving the quality of life (QOL) of patients. We selected 37 patients with complex renal calculi who were admitted to our hospital from March 2023 to March 2024 and treated them with percutaneous nephrolithotomy (PCNL). During the treatment, comprehensive nursing was provided based on the actual conditions of the patients and the surgical plan. Subsequently, the curative effect was analyzed. PCNL combined with comprehensive nursing care in the treatment of complex renal calculi is a complex and systematic process to provide patients with high-quality and efficient medical services and promote the recovery of these patients.In this study, patients were treated with PCNL and appropriate nursing, and the effective rate was 94.59% (35/37), with no complications such as infection and secondary bleeding. These patients recovered and were discharged from the hospital. Therefore, PCNL is worthy of being popularized and applied in clinical practice.

1. Introduction

Renal calculi are a common and frequent urinary system disease, which is formed by the mixed growth of various inorganic salts and organic substances according to certain rules[1].The occurrence of kidney stones is closely related to occupation, dietary structure, living environment, genetics, etc. , which is the result of a combination of factors in the internal and external environment of the body[2]. There were generally more male patients than female patients[3]. Complex renal calculi are a special type of renal calculi, which include multiple calculi, staghorn renal calculi, horseshoe renal calculi, etc., which are difficult to treat, have the characteristics of low stone extraction rate and high recurrence, are prone to lumbar and abdominal pain, nausea, vomiting and other symptoms, and pose a threat to the patient's life and health[4,5].

With the improvement of medical treatment and scientific and technological level and the continuous improvement of surgical operation, the techniques for the treatment of renal calculi become diversified, of which percutaneous nephrolithotomy (PCNL) can be applied in the treatment of complex renal calculi, which can remove the broken calculi using the principle of vacuum aspiration while lithotripsy, thereby improving the stone clearance rate [6].Although this treatment is effective, the risk of postoperative complications cannot be ignored. As one of the most serious complications after PCNL, hypersepsis is dangerous and has a high mortality rate after the

occurrence of the disease. Patients become less confident in treatment and prognosis when they learn of their complex disease and need to bear high surgical risks and expenses. A variety of monitoring equipment and pipelines, coupled with a certain degree of physical discomfort they cause, will make patients feel nervous, anxious, fearful and have other adverse psychological reactions. Medical staff can effectively reduce the surgical risk of hypersepsis and improve perioperative safety through comprehensive preoperative, intraoperative, and postoperative meticulous care [7]. It has also been shown that with the development and emergence of modern nursing, the application of comprehensive nursing in complex renal calculi reduces the incidence of postoperative complications such as infection and high fever, and can promote wound healing, as well as shorten the length of hospital stay[8]. Therefore, the complexity and importance of complex kidney stone care should not be ignored. In the present study, the nursing experience of PCNL in the treatment of complex renal calculi was comprehensively analyzed to provide references for improving the QOL of the patients. The study was reported below.

2. Materials and Methods

2.1. General Data

A total of 37 patients with complex renal calculi admitted to our hospital between Mar. 2023 and Mar. 2024 were selected. There were 26 males and 11 females, with an age of 25-65 (46.73±1.12) years old; and 22 patients with single stones and 15 with multiple stones. The patients could be responsible for their own behaviors, with normal communication skills, and voluntarily participate in the study. This study was reviewed and approved by the Ethics Committee.

2.2. Methods

Medical professionals conducted comprehensive examinations of the patients, analyzed their conditions, and provided PCNL treatment. Epidural anesthesia was given to ensure that the patients cooperated well with the treatment. The operation area was checked and the location of the bladder stones was confirmed. The ureteral opening was expanded by hydraulic pump water pressure, an ureteroscopy was inserted into the bladder, and the bladder was flushed using appropriate water pressure. The gentle and professional operation was maintained, and lithotomy forceps were used to remove the stones. If the stones were large and difficult to remove, they were crushed by an air compression pump before removal. Comprehensive nursing was carried out according to the actual conditions of the patients and the operation plan, and described as follows:

(1) Preoperative preparation: Medical staff checked the basic data and treatment plan of the patients, and explained the surgical procedure and precautions to them. Medical staff should communicate with the patients sincerely to understand and address the concerns of the patients with their professional knowledge and technologies, and instruct the patients to read books and listen to music to relax their bodies and minds and adjust their mental state. They should encourage the patients and gain their trust, and help the patients build confidence to fight against the disease.

(2) Intraoperative nursing: Medical staff adjusted the position of the patients according to the surgical requirements and to help the patients cooperate with the operation to reduce the risk of tube detachment. Items such as cotton pads were used to protect the heads of the patients, and the hands of the patients were placed at the sides of their heads. During the treatment, saline irrigation should be repeatedly performed, and medical staff should always watch for the vital parameters of the patients, and provide precautionary measures to maintain body temperature. The temperature of the flushing solution was adjusted to be close to the body temperature as much as possible, and exposure of the body surface skin was reduced.

(3) Postoperative nursing: The equipment and items used in surgery were cleaned and maintained accordingly. The patients were safely sent to the ward and the changes in postoperative vital parameters were monitored. When discharge criteria were met, patients were instructed to follow the medical advice for medication, regularly visit the hospital for follow-up, and pay close attention to the daily diet structure.

2.3. Outcome Measures

The postoperative changes and improvement of the physical conditions of the patients were observed. If the physical conditions were good with no complications such as infection or secondary bleeding, and the symptoms of the disease disappeared, the treatment was considered effective; otherwise, it was ineffective[9].

2.4. Statistical Analysis

SPSS 28.0 software was used for data analysis, and the effective rate of the two groups of patients was analyzed. Enumeration data were presented as [n (%)], and χ^2 test was conducted. P values were used to determine the statistical significance of differences.

3. Results

Patients were treated with PCNL and appropriate nursing, and the effective rate was 94.59% (35/37), with no complications such as infection and secondary bleeding. These patients recovered and were discharged from the hospital.

4. Discussion

Renal calculi are characterized by high incidence and difficult treatment in clinical practice, with metabolic abnormalities and poor diet as the main pathogenic factors. Patients involved usually suffer from lower back and abdominal pain and discomfort, and impaired QOL. The pathogenesis of renal calculi has not yet been clarified. With the improvement of economic level, the change of people's dietary structure, and the increased proportions of protein, dairy products, and sugar in food, the excretion of urinary calcium, urinary oxalic acid and uric acid is significantly increased, and then renal calculi are easier to form[10]. Conventional open surgery is associated with severe trauma and poor prognosis, and its efficacy is easily affected by various factors. With the advancement of medical technology, PCNL has become an established technique that is mostly concerned with the public. With the advantages of less trauma, fast recovery and favorable rehabilitation, PCNL can effectively improve the stone-free rate and the condition of the patients, and is one of the commonly used minimally invasive surgeries at this stage[11,12].

Although PCNL has a higher stone-free rate compared with traditional open surgery, complex renal calculi can easily recur after treatment with this technique, and the recurrence will increase the difficulty of treatment after recurrence, which seriously affects the quality of life of patients and also increases economic pressure, and may have different degrees of physical and psychological impact on patients [4]. Some studies have found that stone recurrence rate is associated with BMI, diabetes, age, and smoking by univariate analysis[13]. The recurrence rate of renal calculi can be effectively reduced by using continuous nursing combined with knowledge, belief and practice health education model to improve the self-efficacy and compliance behavior of patients after renal calculi surgery [14]. In addition, the use of the control of complications after minimally invasive surgery is the focus of kidney stone treatment. By using predictive care in the perioperative period

of complex kidney stone treatment, the investigators significantly improved the prognosis of children, reduced the incidence of complications, while reducing the pain of children [12]. The concept of rapid recovery has also been applied to perioperative care in PCNL, which effectively reduces postoperative complications and has been recognized by patients[10].Many studies have shown that medical staff also need to take comprehensive nursing combined with surgical treatment to improve the prognosis of patients, promote its treatment efficiency, reduce recurrence and complications, and improve the quality of life of patients.

In the present study, 37 patients with complex renal calculi received PCNL and appropriate nursing care, the effective rate was 94.59%, and all patients recovered and were discharged from the hospital, indicating the favorable efficacy of PCNL combined with comprehensive nursing in clinical practice, i.e., PCNL can improve the treatment efficiency and protect the life and health of the patients.

In summary, PCNL combined with comprehensive nursing care in the treatment of complex renal calculi is a complex and systematic process to provide patients with high-quality and efficient medical services and promote the recovery of these patients, which is worthy of application in clinical practice.

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