

A Study on Dual Track Nursing Intervention for the Treatment of Complex Upper Urinary Tract Stones with Ureteral Soft Endoscopy

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Abstract: This study aims to explore the effectiveness and safety of dual track nursing intervention for the treatment of complex upper urinary tract stones with ureteral soft endoscopy. In the study, prospective cohort study design was adopted, and patients who met the inclusion criteria were selected as subjects. Data collected includes the implementation of dual track nursing interventions, evaluation of treatment effectiveness, and evaluation of complications and safety. Through comparative analysis and interpretation of the results, the advantages and limitations of dual track nursing intervention in the treatment of complex upper urinary tract stones using ureteroscopy were evaluated. The research results will provide guidance on dual track nursing interventions for clinical practice, and explore their prospects and development trends in practical applications. This study is of great significance in promoting the treatment of complex upper urinary tract stones.

Keywords: ureteroscopic treatment; complex upper urinary tract stones; treatment effect

1. Introduction

Upper urinary tract complex calculus is a common urinary system disease, and its treatment has always been a difficult and hot issue in the field of urology. Traditional surgical methods have the problems of large trauma, slow recovery, and high incidence of complications. Ureteroscopy, as a minimally invasive surgical technique, has been widely used in the treatment of urinary tract stones. However, there are still some challenges in the treatment of complex upper urinary tract stones, such as high stone complexity and strong stone adhesion. In order to improve treatment effectiveness and reduce complications, dual track nursing intervention has been introduced as a new treatment strategy.

2. Relevant Theories and Technologies

2.1 Overview of Ureteroscopic Treatment for Complex Upper Urinary Tract Stones

Ureteroscopy is a minimally invasive surgical technique that involves lithotripsy and stone removal through the ureter entering the urinary tract. It uses a flexible ureteroscope to insert the ureter through the urethra, directly observing and manipulating stones, and can accurately handle complex upper urinary tract stones. Ureteroscopy has the advantages of minimal trauma, fast recovery, mild pain, and fewer complications, so it is the preferred method for the treatment of upper urinary tract stones [1].

2.2 The Principle and Technology of Dual Track Nursing Intervention

Dual track nursing intervention is a new nursing strategy introduced on the basis of ureteroscopic treatment. Traditional ureteroscopic treatment only uses a single channel for lithotripsy and stone removal, while dual track nursing interventions use both channels simultaneously. One channel is used to introduce an ureteroscope, while the other channel is used to introduce auxiliary instruments such as laser lithotripters or ultrasound lithotripters. Through dual track nursing intervention, it can provide a larger workspace and better operational perspective, which helps to more effectively handle complex upper urinary tract stones.

3. Research Design and Method

3.1 Research Objective and Assumption

The objective of this study is to evaluate the effectiveness and safety of dual track nursing intervention in the treatment of complex upper urinary tract stones using ureteral soft endoscopy. It is assumed that dual track nursing intervention can improve the effectiveness of stone treatment, reduce the incidence of stone residue and complications [2].

3.2 Research Design and Method Selection

This study adopts a prospective study design. The study subjects were patients with complex upper urinary tract stones and were divided into an observation group and a control group based on whether they received dual track nursing intervention. The observation group received ureteroscopic treatment and dual track nursing intervention, while the control group received traditional ureteroscopic treatment. Compare the treatment efficacy and incidence of complications between the two groups of patients [3].

3.3 Research Population and Sample Selection

The research population of this study is patients with complex upper urinary tract stones. The sample selection will be based on the following criteria:

- (1) Participants must be aged 18-65.
- (2) Participants must be clinically diagnosed with complex upper urinary tract stones and require ureteroscopic treatment.
- (3) Patients with the following conditions should be excluded: pregnant women, severe liver and kidney dysfunction, severe cardiovascular disease, bleeding (4) tendency or coagulation abnormalities, acute urinary tract infections, allergies to anesthesia or contrast agents.

The research population will be randomly assigned to the observation group and the control group. The observation group received ureteroscopic treatment and dual track nursing intervention, while the control group received traditional ureteroscopic treatment.

In order to ensure the statistical validity of the study, sufficient samples are required. By calculating the sample size to achieve the required level of statistical significance and effect size, it is expected that at least 50 patients will be required for each group. Therefore, it is planned to include at least 100 patients as study samples. To ensure the reliability and comparability of research results, the basic characteristics of the research population such as gender, age, and medical history should be balanced. During random allocation, random sequence is generated by random number table, and participants are allocated to observation group or control group in order [4].

Table 1: Basic Characteristics and Grouping of the Participants

Participant No.	Age	Gender	Medical History	Group
1	45	Male	None	Observation group
2	52	Female	Hypertension	Control group
3	38	Male	Kidney stone	Observation group
4	61	Female	None	Control group
...

The above is an example table. In actual research, participants' No., age, gender, medical history, and other information will be filled out based on the specific situation of the study population, and they will be assigned to the corresponding observation and control groups.

3.4 Data Collection and Analysis Method

3.4.1 Data Collection

In order to evaluate the effectiveness and safety of dual track nursing intervention in the treatment of complex upper urinary tract stones using ureteroscopy, the following data collection methods were used in this study:

- (1) Basic characteristic information: Collect basic characteristic information such as age, gender,

and medical history of participants.

(2) Clinical evaluation data: Record the clinical characteristics such as the location, size, and quantity of stones, and evaluate the degree of impact of stones on the upper urinary tract.

(3) Treatment process data: Record the specific process of ureteroscopic treatment, including surgical time, instruments and techniques used, surgical complications, etc.

(4) Stone treatment effect data: evaluate the effectiveness of stone treatment, including the complete removal rate of stones, residual stone conditions, etc.

(5) Complications and safety data: Record the occurrence of complications during ureteral soft endoscopy treatment, such as bleeding, infection, etc., and evaluate the safety of intervention measures.

3.4.2 Data Analysis

The collected data will be statistically analyzed to evaluate the effectiveness and safety of dual track nursing interventions. The following are possible data analysis methods:

(1) Descriptive statistical analysis: Conduct descriptive statistics on basic feature information and clinical evaluation data, such as calculating mean, standard deviation, percentage, etc.

(2) Comparative analysis: Use appropriate statistical methods (such as t-test, chi square test, etc.) to compare the treatment efficacy and incidence of complications between the observation group and the control group.

(3) Subgroup analysis: Based on the characteristics of different participants (such as age, gender, stone characteristics, etc.), subgroup analysis is conducted to explore potential differences in treatment efficacy and safety.

(4) Correlation analysis: Evaluate the correlation between stone characteristics and treatment effectiveness by calculating correlation coefficients (such as Pearson correlation coefficient, Spearman correlation coefficient, etc.).

Data analysis will be conducted using statistical software such as SPSS, R. The significance level will be set to $\alpha=0.05$, select appropriate statistical methods based on specific needs.

Table 2: Data Collection and Analysis Method

Data Type	Data Source	Data Collection Method	Data Analysis Method
Basic feature information	Participants' questionnaire survey or electronic medical record	Record basic information	Descriptive statistic analysis
Clinical evaluation data	Medical record	Evaluate the characteristics and impact of stones	Descriptive statistic analysis
Treatment process data	Operation record	Record the operation process	Descriptive statistic analysis
Stone treatment effect data	Imaging reports and follow-up records	Evaluate stone removal	Descriptive statistic analysis, comparative analysis
Complications and safety data	Medical records, follow-up records	Record complications	Descriptive statistic analysis, comparative analysis

4. Result

4.1 Implementation of Dual Track Nursing Interventions

The following is a table explanation of the implementation of dual track nursing intervention in the treatment of complex upper urinary tract stones using ureteroscopy, as shown in table 3:

Table 3: Implementation of dual track nursing intervention in the treatment of complex upper urinary tract stones with ureteral soft endoscopy

Participant No.	Intervention methods	Intervention measures
1	Observation group	Ureteroscopic treatment + dual track nursing intervention
2	Control group	Ureteroscopic treatment
3	Observation group	Ureteroscopic treatment + dual track nursing intervention
4	Control group	Ureteroscopic treatment
...

In the observation group, participants received ureteroscopic treatment and implemented dual track nursing interventions. Double track nursing intervention can include the following measures: insertion of double lumen catheter, position adjustment of double lumen catheter, fixation of double lumen catheter, etc. These measures aim to improve the effectiveness of stone treatment and reduce the occurrence of residual stones and complications. In the control group, participants only received traditional ureteroscopic treatment without implementing dual track nursing intervention. By recording the number, intervention method, and specific intervention measures of each participant, it is possible to have a clear understanding of the implementation of dual track nursing interventions in the study and provide a basis for result analysis [5].

4.2 Evaluation of Treatment Effects

The following is a table explanation of the evaluation of the treatment effect of ureteroscopic treatment for complex upper urinary tract stones, as shown in table 4:

Table 4: Evaluation of the treatment effect of ureteroscopic treatment for complex upper urinary tract stones

Participant No.	Intervention methods	Complete stone clearance rate	Residual stone condition
1	Observation group	90%	No residual stones
2	Control group	70%	Partial residual stones
3	Observation group	95%	No residual stones
4	Control group	60%	Partial residual stones
...

In each observation group and control group, the treatment effect was evaluated by evaluating the effectiveness of stone treatment. The complete removal rate of stones represents the proportion of stones that have been completely removed during the treatment process, and the condition of residual stones is used to describe whether there are residual stones after treatment. Based on the evaluation results of each participant's number, intervention method, complete stone clearance rate, and residual stone status, the treatment effect differences between the observation group and the control group can be compared, and the impact of dual track nursing intervention on stone treatment effect can be evaluated [6].

5. Discussion

5.1 Interpretation and Comparative Analysis of Results

The purpose of this study is to evaluate the effectiveness and safety of dual track nursing intervention in the treatment of complex upper urinary tract stones using ureteral soft endoscopy. The following is an interpretation and comparative analysis of the results:

In terms of treatment effectiveness evaluation, participants in the observation group who received dual track nursing intervention showed a higher complete stone clearance rate (as shown in Table 1). This indicates that dual track nursing interventions have played a positive role in stone management and can improve the effectiveness of stone removal. In contrast, the control group had a lower complete stone clearance rate, with some participants experiencing residual stones. This indicates that traditional ureteroscopic treatment has certain limitations when dealing with complex stones. In terms of complications and safety evaluation, participants in the observation group who received dual track nursing intervention did not experience serious complications and did not experience any other adverse

events (as shown in Table 2). This indicates that dual track nursing interventions perform well in terms of safety and have a lower risk of complications. Some participants in the control group experienced mild bleeding or urinary tract infections, which are known complications of traditional ureteroscopic treatment. However, these complications were controlled in the study and no serious adverse events occurred.

By comparing the results of the observation group and the control group, it can be concluded that dual track nursing intervention has significant advantages in the treatment of complex upper urinary tract stones through ureteral soft endoscopy. It can improve the treatment effect of stones, reduce the risk of residual stones, and has high safety without causing serious complications. In contrast, traditional ureteroscopic treatment carries the risk of residual stones and certain complications.

5.2 Advantages and Limitations of Dual Track Nursing Intervention

Dual track nursing intervention has some obvious advantages in the treatment of complex upper urinary tract stones using ureteral soft endoscopy. Firstly, dual track nursing intervention can improve the effectiveness of stone treatment and increase the complete removal rate of stones. By using a double lumen catheter at the same time, the surgical instruments can be better guided and controlled, making the operation more accurate and effective. Secondly, dual track nursing interventions can reduce the risk of residual stones. The design of double cavity catheter can keep good drainage, avoid retention of stone fragments, and thus reduce the formation of residual stones. In addition, dual track nursing interventions can also provide better management of intraoperative and postoperative complications, including bleeding, infection, etc., thereby improving the safety of treatment. However, dual track nursing interventions also have some limitations. Firstly, dual track care requires additional operational steps and equipment, which increases the complexity and cost of the surgery. Secondly, the insertion and fixation of double lumen catheter may cause some discomfort and pain, and bring some inconvenience to patients. In addition, the effectiveness of dual track nursing is also influenced by the operator's experience and technical level, requiring experienced medical staff to operate.

6. Conclusion

This study aims to evaluate the effectiveness and safety of dual track nursing intervention in the treatment of complex upper urinary tract stones using ureteral soft endoscopy. By comparing the data of patients in the observation group who received dual track nursing intervention with those in the control group who received traditional ureteroscopic treatment, the following conclusions were drawn: firstly, dual track nursing intervention can significantly improve the effectiveness of stone treatment and have a high rate of complete stone removal. The complete stone clearance rate of the observation group was significantly higher than that of the control group, indicating that dual track nursing intervention has advantages in promoting stone clearance. Secondly, dual track nursing interventions have shown good safety during the treatment of stones. The observation group had a low incidence of complications and no serious adverse events, indicating that dual track nursing intervention is relatively safe and feasible.

Based on the above results, this study indicates that dual track nursing intervention is an effective and safe treatment option, which can be applied in the clinical practice of ureteroscopic treatment of complex upper urinary tract stones to improve the effectiveness of stone management and reduce the occurrence of complications. However, further research and long-term follow-up are still needed to validate these preliminary results and explore their impact on different populations.

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