ANTICIPATORY NURSING FOR PREVENTING POSTOPERATIVE AGITATION: A CASE STUDY OF ADULT GENERAL ANESTHESIA ABDOMINAL SURGERY

Author：HeTing，Master's degree candidate, student
Supervisor：Neilya Ussebayeva, Doctor of Medicine，Farabi Kazakh National University，Almaty, Kazakhstan

Abstract: Postoperative restlessness after abdominal surgery under general anesthesia in adults is a common and highly concerning complication in clinical practice, with an incidence rate of approximately 10% to 30%. It not only leads to adverse events such as wound depicture, tube detachment, and bed fall in patients, but also prolongs hospital stays and increases medical burdens. This article takes an adult patient who underwent abdominal surgery under general anaesthesia as the research object, records his basic diagnosis and treatment information in detail, and systematically implements predictive nursing measures throughout the entire cycle before, during, and after the operation. By observing the occurrence of postoperative restlessness, recovery indicators, and the incidence of adverse events of the patient, the nursing effect is evaluated. The results showed that the patient did not experience obvious restlessness after the operation, the recovery process was smooth, all indicators were better than the average clinical level, and satisfaction with nursing was relatively high. This study confirmed that predictive nursing can effectively reduce the risk of postoperative restlessness in adult patients undergoing general anaesthesia abdominal surgery, optimize the postoperative recovery effect, and provide a reference for clinical nursing practice.

Key words: *Adult; General anesthesia Abdominal surgery; Postoperative restlessness; Predictive nursing Case study.*

1. Introduction

Postoperative restlessness, one of the most clinically challenging recovery complications after adult abdominal surgery under general anaesthesia, has a fluctuating incidence rate due to differences in surgical types, anaesthesia regimens, and patient groups. Multicenter studies at home and abroad have shown that the overall incidence of this complication ranges from 10% to 30%. Patients undergoing open abdominal surgery experience greater trauma and more severe postoperative pain. The incidence rate can reach 25% to 35%, while the incidence rate among patients undergoing minimally invasive surgeries such as laparoscopy is slightly lower (approximately 8% to 18%), but still requires

focused prevention and control[14][1]. From the perspective of pathophysiological mechanisms, postoperative restlessness is not caused by a single factor but is the result of the combined effect of multiple factors; the metabolic residue of an anesthetic drug is one of the core triggers. Although short-acting anesthetic drugs, such as propofol and remifentanil, can shorten the recovery time, some patients have delayed drug clearance due to differences in liver and kidney functions, which can easily lead to an imbalance in the excitability of the central nervous system. Postoperative pain, as the most direct triggering factor, has been confirmed by studies that when the NRS pain score is ≥4, the incidence of restlessness in patients is 2.8 times higher than that in patients with a score < 3. In addition, environmental stimuli during the recovery period (such as noise and strong light), preoperative anxiety, and underlying diseases (such as hypertension and mild cognitive decline) all significantly increase the risk of restlessness, forming a three-dimensional induction system of "physiologically–psychologically–environment".

Predictive nursing is an important direction in the development of the modern nursing discipline, and its core logic lies in "pre-intervention based on risk assessment", which is different from the passive model of "post-event handling" in traditional nursing[Error: Reference source not found]. This model has demonstrated significant value in the prevention and control of postoperative complications in surgery by establishing a closed-loop system of "risk identification - plan formulation - dynamic adjustment". For instance, in patients undergoing major orthopedic surgeries, the incidence of pressure ulcers can be reduced from 15% to 3.2% through preoperative assessment of pressure ulcer risk levels, intraoperative optimization of body position protection, and regular turning intervention after surgery[Error: Reference source not found]. In the prevention of deep vein thrombosis after gastrointestinal surgery, predictive anticoagulation care based on the Caprine risk score can maintain the incidence of thrombosis below 2% [Error: Reference source not found]. However, there are still obvious shortcomings in the

application of predictive nursing in the prevention and control of postoperative restlessness at present: Existing studies mostly focus on a single postoperative link (such as pain management and environmental intervention), lacking a full-cycle nursing plan covering "preoperative assessment - intraoperative monitoring - postoperative intervention". Moreover, most studies took the group intervention effect as the endpoint and did not formulate stratified nursing strategies for different risk factors (such as preoperative anxiety and sensitivity to an aesthetic drugs), resulting in a lack of precision and operability in clinical applications [Error: Reference source not found]. This study implemented full-course predictive nursing for an adult patient undergoing abdominal surgery under general anaesthesia and meticulously recorded the nursing measures and clinical outcomes. This study aimed to verify the practical effect of predictive nursing in preventing postoperative restlessness, summaries the key points of nursing and implementation experience, and provide a practical plan for clinical nursing staff to refer to. The quality and safety of care for patients undergoing abdominal surgery under general anaesthesia should be further improved.

2. Case data

2.1 Basic Patient Information

The patient was a 52-year-old male, 175 cm tall and weighing 72 kg. I have a history of hypertension for 5 years. I have been taking nifedipine sustained-release tablets regularly for a long time (20 mg each time, twice a day), and my blood pressure has been controlled at 130-140/80-90 MMHG. No other underlying diseases such as diabetes or coronary heart disease were observed. Preoperative physical examination revealed a body temperature of 36.5 °C, pulse rate of 78 beats per minute, respiratory rate of 18 breaths per minute, and blood pressure of 135/85 MMHG. There were no obvious abnormalities in the heart and lung functions. The laboratory test results of liver and kidney functions, electrolytes, and coagulation functions were all within the normal range [Error: Reference source not found]. The American Society of Anesthesiologists (ASA)

classification is grade II, with good physical function and the ability to tolerate surgical treatment.

2.2 Surgical and Anesthesia information

The patient was admitted to the hospital due to "chronic cholecystitis with gallstones ". After completing the preoperative examination, laparoscopic cholecystectomy was performed under general anaesthesia on the third day of admission. The operation lasted for 75 min. General anaesthesia with tracheal intubation was administered. The aesthesia induction drugs were propofol (2 mg/kg), sufentanil (0.5μg/kg), and rocuronium bromide (0.6 mg/kg). An aesthetic maintenance drugs were propofol (4-6 mg·kg⁻¹·h⁻¹) and remifentanil (0.1-0.2 μg ·kg⁻¹·min⁻¹). During the operation, the dosage was dynamically adjusted based on the intensity of the surgical stimulation and the patient's vital signs. No allergic or abnormal reactions to an aesthetic drugs occurred throughout the process.

2.3 Preoperative comprehensive assessment results

The preoperative psychological state of the patients was evaluated using the Self-Rating Anxiety Scale (SAS), with a score of 58 indicating mild anxiety. The main concerns were the safety of the surgery, postoperative pain, and recovery effect. Cognitive function assessment was conducted using the Mini-Mental State Examination (MMSE), with a score of 27. The cognitive function was normal, and there was no cognitive impairment. The patient had no previous history of abdominal surgery. There was one history of upper limb fracture surgery. Intrathecal anaesthesia was used during surgery [Error: Reference source not found]. No abnormal reactions such as restlessness occurred after the operation, and there was no history of adverse anaesthesia reactions. The comprehensive assessment results showed that the patient had preoperative anxiety, a potential risk factor for postoperative restlessness, which requires focused intervention during the nursing process.

3. Predictive nursing measures and nursing effects

3.1 Preoperative predictive nursing measures

Based on the core risks of mild anxiety (SAS 58 points), history of hypertension, and insufficient cognition of surgery of the patients, a three-stage nursing process of "assessment - intervention - reinforcement" was constructed _{Error: Reference source not found}. Health education adopts a "phased + multi-media" model: On the first day of admission, an illustrated manual is distributed, highlighting the incision locations of laparoscopic cholecystectomy (three 0.5-1 cm incisions around the umbilicus and in the upper right abdomen), the operation duration (estimated 60-90 minutes), and anaesthesia recovery process. On the second day of admission, the surgical steps were demonstrated using 3D animation. Combined with the 24-hour recovery videos of similar patients after surgery, the "fear of the unknown" was eliminated. At the same time, in light of the patient's history of hypertension, a special explanation on "The Association between postoperative blood pressure fluctuations and restlessness" was supplemented. Emphasize the importance of regular medication before the operation (for example, 20 mg of nifedipine sustained-release tablets need to be taken late before the operation to avoid sudden increases in blood pressure). Psychological intervention adopts the strategy of "cognitive behavioral therapy + family collaboration": Conduct a 30-minute one-on-one communication once a day. Sort out the patients' concerns through the "Worry list" (such as "Will postoperative pain cause uncontrolled blood pressure?") and respond with evidence-based data (such as "Multimodal analgesia can make the postoperative NRS score ≤ 3 points and control the blood pressure fluctuation range within $\pm 10\%$ of the baseline value"). Simultaneously, guide family members to participate in psychological support, such as assisting the patient with 10-minute mindfulness breathing training (abdominal breathing + progressive muscle relaxation) on the night before the operation, and monitoring the patient's preoperative sleep quality (falling asleep for ≤ 30 minutes and waking up at night for ≤ 1 time is considered qualified). After the intervention, the SAS score of the

patient dropped to 45 points, and the sleep quality met the standard. Preoperative preparation optimization focuses on "pain assessment and environmental adaptation": The NRS scoring method is trained through "scenario simulation + practical operation assessment," allowing patients to simulate the expression scenarios of "painless (0 points), mild pain (3 points), and unbearable pain (8 points)" in a quiet environment to ensure precise feedback after the operation. One day before the operation, the patient was familiarized with the operating room (temperature 22-24℃, humidity 50%-60%) and anaesthesia recovery room environment. Introduce the functions of the monitor and tracheal intubation. At the same time, adjust the ward lighting to warm yellow (brightness 150-200lux), and place the patient's commonly used cushions in advance to reduce the stimulation of the unfamiliar environment after the operation.

3.2 Intraoperative predictive nursing measures

Centering on the core goal of "anesthesia safety + physiological stability", the intervention of "dynamic monitoring + precise protection" was implemented. Anesthesia is combined with an "individualized dose adjustment" strategy: Before the operation, the patient's liver and kidney functions (alanine aminotransferase 28U/L, serum creatinine 75μmol/L, both normal) and drug allergy history were shared with the anesthesiologist. The dosage of an aesthetic induction drugs (propofol 145 mg, fentanyl 36μg, rocuronium 43 mg) was determined. Vital signs were recorded every 5 min during the operation. When the patient's heart rate rose to 85 beats per minute (baseline value 78 beats per minute) and blood pressure rose to 145/90 mmHg, assist the anesthesiologist in increasing the maintenance dose of propofol from 5 mg $\cdot kg^{-1} \cdot h^{-1}$ to 5.5 mg $\cdot kg^{-1} \cdot h^{-1}$. After 10 min, the indicators returned to the normal range. Body temperature protection adopts a "multi-stage insulation" solution. Before the operation, the operating table was preheated to 38 °C. During the operation, a warm air blanket was used (with the temperature set at 38 °C, covering the non-surgical area). The intravenous infusion fluid and irrigation fluid were heated to

37 °C by a heater. The core body temperature was monitored in real time through an esophageal temperature probe (maintained at 36.0-36.5℃). Avoiding the delayed metabolism of an aesthetic drugs caused by hypothermia (hypothermia can reduce the clearance rate of propofol by 15–20%). Postural care: Optimized pressure protection for patients weighing 72 kg The surgical position of "head higher and feet lower at 15°+ right lateral position" was adopted. A 5 cm thick memory foam soft pillow was placed in the sacrosacrotail and scapular region (with a pressure of less than 30 mmHg to avoid pressure sores). When the wrist was fixed with a restraint band, a cotton dressing was placed under it, with tightness that could accommodate one finger, to prevent postoperative restlessness caused by limb compression.

3.3 Predictive postoperative nursing measures

With "safety during the recovery period + pain control + complication prevention" as the core, a "refined monitoring + multi-dimensional intervention" system was constructed [Error: Reference source not found]. The recovery period monitoring adopts a "three-level early warning" mechanism: after being transferred to the anesthesia recovery room, heart rate, blood pressure, blood oxygen saturation and consciousness state are recorded every 5 minutes (Ramsay sedation score: 1 point - irritability, 6 points - deep sleep), set warning thresholds (heart rate > 100 beats per minute, blood pressure > 150/95 MMHG, blood oxygen < 95%, Ramsay score ≤2 points), and prepare first aid supplies (such as antihypertensive drug urapidil, sedative drug midazolam); During the patient's awakening process (with the Ramsay score dropping from 6 to 3), the nurse remained by the patient's side throughout, using a "soft awakening + directional guidance" approach (such as "You have successfully completed the surgery and are now in the recovery room. I am your nurse") to prevent sudden stimulation from causing restlessness. Pain intervention was implemented with "multimodal analgesia + dynamic adjustment": PCIA (sufentanil 100 μg + tropisetron 5 mg + normal saline to 100 ml) was initiated immediately after the operation, with a

background infusion rate of 2 ml/h, a single compression dose of 0.5 ml, and a locking time of 15 minutes. The NRS score was dynamically evaluated at 1, 2, 4, and 8 h after the operation. In this case, the NRS score of the patient 1 h after the operation was 3 points, and no additional compression dose was required. The score rose to 4 points 6 h after the operation. After evaluation by the physician, the background infusion rate was increased to 2.5 ml/h, and the score dropped to 2 points 30 minutes later. Environmental and safety care focuses on "sensory protection + risk prevention and control": The noise in the recovery room is kept at no more than 40 decibels (such as turning off the alarm sounds of unnecessary instruments and communicating softly), light-blocking curtains are used to control the brightness (200-300lux), and cotton earplugs are worn after the patient wakes up. Safety protection measures include "double guardrails + fixed pipelines + dedicated accompaniment" The guardrails on both sides of the hospital bed are fully raised (50 cm in height). The drainage tube (gallbladder fossa drainage tube) is fixed by the "Y-shaped fixation method" (the proximal end is fixed to the abdominal wall with 3M pressure tape, and the distal end is fixed to the outside of the patient's gown with a safety needle to avoid pulling). The urinary catheter was connected to the anti-reflux urine bag and fixed to the bedside hook (the height was lower than the bladder level). Within six hours after the operation, family members should be arranged to wait in the visiting area. The nurse should check the fixation of the pipeline every 15 min to prevent accidental dislocation.

3.4 Evaluation of Nursing Effects

The nursing effect was carried out from three aspects: "quantitative recovery indicators", "safety incident prevention and control", and "patient subjective satisfaction". It was compared and analyzed in combination with the clinical standards and data of similar cases [Error: Reference source not found]. The results are presented in a structured table to visually reflect the intervention value of predictive nursing.

3.4.1 Comparison of Core Indicators for Postoperative Recovery

The speed and quality of postoperative recovery are key quantitative dimensions for evaluating the effect of nursing. Four core indicators, namely "awakening time, extubating time, time to get out of bed for activities, and length of hospital stay", were selected. Referring to the recommended standards in the "Evaluation Guidelines for Postoperative Recovery Quality of Adult General Anesthesia Abdominal Surgery" and the average data of patients undergoing laparoscopic cholecystectomy in the department in the past year, the actual recovery of the patient in this case was compared, and the results are shown in Table 1.

Table 1 Comparative Analysis Table of Core Indicators for Postoperative Recovery

Indicator category	Specific indicators	The actual outcome of the patient	Clinical recommendation criteria	Average reference value of the department	The difference rate from the average value of the department
Indicators related to awakening	Postoperative recovery time (min)	35	≤60	58±12	-39.7%
	Tracheal extubating time (min)	45	≤90	72±15	-37.5%
Functional recovery indicators	The first time to get out of bed and move around (h	12	≤24	36±8	-66.7%
Hospitalization cycle indicator	Total length of hospital stay (d	5	≤10	7.5±1.8	-33.3%
	Time of first feeding after surgery (h)	6	≤12	10±3	-40.0%

It can be seen from Table 1 that all recovery indicators of the patients were better than the clinically recommended standards and the average level of the department. Among them, the difference in the time of the first out-of-bed

activity was the most significant (66.7% shorter than the average level of the department), suggesting that the measure of "early postoperative activity guidance + pain control" in predictive nursing was effective. The recovery and extubating times were shortened by over 35%, which is closely related to precise intraoperative temperature protection and individualized adjustment of an aesthetic drugs, reducing the problem of delayed anaesthesia metabolism caused by hypothermia.

3.4.2 Monitoring of Safety and Satisfaction Indicators

Safety indicators focus on "the incidence of adverse events and the stability of physiological indicators", while satisfaction is evaluated using standardized scales. By combining the dual dimensions of "objective monitoring data and subjective scoring", a comprehensive assessment of nursing safety and patient experience was conducted. No adverse events occurred postoperatively. The blood pressure fluctuations and inflammatory indicators were all within the safe range, demonstrating the effectiveness of the measures of "intraoperative temperature protection + postoperative safety protection". In the satisfaction survey, the dimensions of pain control and psychological support scored the highest (95 points and 98 points, respectively), which were directly related to preoperative pain assessment training, postoperative PCIA dynamic adjustment, and cognitive behavioral intervention [Error: Reference source not found]. This confirmed the intervention concept of "patient-centered" in predictive nursing. Patients reported that "postoperative pain is tolerable, and medical staff respond to needs in a timely manner." This further verified the clinical practicality of the nursing measures.

4. Discussion

4.1 Analysis of the Mechanism of Predictive Nursing

In this case study, predictive nursing effectively prevented the occurrence of postoperative restlessness through full-cycle and multidimensional intervention measures. The mechanism of action is mainly reflected in the

following three aspects. In the preoperative stage, through personalized health education and psychological intervention, patient awareness of surgery and anaesthesia is enhanced, preoperative anxiety is alleviated, and the possibility of restlessness induced by psychological factors is reduced. Simultaneously, pain assessment tool training and environmental adaptation guidance were provided in advance to help patients build the ability to cope with postoperative discomfort, laying a good foundation for postoperative recovery.

During the intraoperative stage, standardized anaesthesia coordination and real-time vital sign monitoring ensured the accuracy of an aesthetic medication and avoided excitation of the central nervous system caused by the metabolic residues of an aesthetic drugs. Scientific postural care and warming measures reduce the impact of physical stimulation and hypothermia on the body and lower the risk of restlessness. In the postoperative stage, refined recovery period monitoring can promptly detect changes in the patient's state of consciousness, providing a basis for early intervention. The implementation of multimodal analgesia regimens effectively controlled postoperative pain and reduced the occurrence of restlessness from the core causes. The quiet and comfortable environment and comprehensive safety protection measures further reduce the risk of external stimuli and unexpected events, ensuring the safety and stability of patients' postoperative recovery.

4.2 Key Points and Difficulties in Nursing Response

During the implementation of the nursing care in this case, the focus was mainly concentrated on three aspects: first, a comprehensive and precise preoperative risk assessment, especially the evaluation of the patient's psychological state and pain tolerance, which is the basis for formulating personalized nursing plans; second, the precise intervention of postoperative pain. Pain is the main inducing factor of postoperative restlessness and needs to be effectively controlled using multimodal analgesic methods. The third aspect is meticulous monitoring and safety protection during the recovery period. At

this stage, the patient's consciousness gradually recovers, and they are prone to agitated behaviors. Therefore, it is necessary to enhance monitoring and protection to prevent unexpected incidents.

The main difficulty faced in the nursing process is the adjustment of the nursing plan caused by individual differences among patients. Different patients have varying tolerances to an aesthetic drugs, pain sensitivity, and psychological states. It is necessary to dynamically assess patients' conditions during the nursing process and adjust nursing measures in a timely manner. To address this challenge, this study established a dynamic assessment mechanism. The patients' pain scores, consciousness states, and emotional changes were evaluated every hour after the operation. Based on the assessment results, the dosage of analgesic drugs and methods of nursing intervention were flexibly adjusted to ensure the pertinence and effectiveness of the nursing measures. At the same time, enhance communication and collaboration among nursing staff, anesthesiologists, and attending physicians, promptly obtain information on changes in patients' conditions, and jointly optimize the nursing plan.

4.3 Feasibility Study on Clinical Promotion

The predictive nursing model has high clinical promotion feasibility in adult patients undergoing abdominal surgery under general anaesthesia. From the perspective of implementation conditions, this nursing model does not require special equipment. It mainly relies on the professional knowledge and clinical skills of the nursing staff. It can be achieved by standardizing the nursing process and strengthening detailed management and is suitable for promotion and application in the surgical wards of hospitals at all levels. From the perspective of application effects, this study confirmed that it can effectively reduce the incidence of postoperative restlessness, shorten the hospital stay of patients, decrease the occurrence of adverse events, improve the quality of nursing and patient satisfaction, and simultaneously lower medical costs. Therefore, it has significant clinical value and social benefits. During the clinical

promotion process, the following matters should be noted: first, strengthen the professional training of nursing staff to enhance their ability to identify postoperative restlessness risk factors, formulate predictive nursing plans and handle emergencies, ensuring the standardized implementation of nursing measures; second, in light of the actual situation of the department, formulate standardized predictive nursing procedures and operation norms, clarify the key points and responsibility division of each link of nursing, and avoid the arbitrariness of nursing work. Third, we should pay attention to individual differences among patients and avoid homogenizing nursing measures. Personalized nursing plans should be formulated based on factors such as patient age, underlying diseases, and psychological state. Fourth, we established a mechanism to evaluate the effectiveness of nursing. By regularly collecting data and analyzing the results, the nursing plan can be continuously optimized to enhance the quality of nursing.

5. Conclusion

The results of this case study show that implementing predictive care for adult patients undergoing abdominal surgery under general anaesthesia can effectively reduce the incidence of postoperative restlessness, shorten the postoperative recovery time, tracheal extubating time, and total hospital stay, reduce the occurrence of adverse events such as wound decency and tube detachment, improve patient satisfaction with care, and is of great significance for optimizing the postoperative recovery effect of patients. The core points of predictive nursing in clinical application include conducting a comprehensive and precise risk assessment before surgery, identifying the potential causes of restlessness in patients, and formulating personalized nursing plans. During the operation, standardized anaesthesia cooperation, real-time vital sign monitoring, and scientific body position and warmth care were implemented. After the operation, meticulous monitoring during the recovery period, precise pain intervention, comfortable environment care, and comprehensive safety

protection should be strengthened. Simultaneously, a dynamic assessment mechanism should be established to adjust nursing measures in a timely manner according to the patient's recovery situation. As a single-case study, this research has limitations, such as a small sample size and limited representativeness of the research results, and thus cannot comprehensively reflect the nursing effects of patients in different populations and with different surgical types. In the future, large-sample and multi-center clinical controlled studies need to be carried out to further verify the effectiveness and safety of predictive nursing, explore personalized nursing plans for different types of adult patients undergoing general anaesthesia abdominal surgery, provide a more comprehensive and scientific reference basis for clinical nursing practice, and promote the continuous improvement of postoperative nursing quality in surgery.

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