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The Application of Pain Care Based on CICARE Communication Model in Patients Undergoing Minimally Invasive Breast Surgery during the Day

Jiamin Li*

Deyang People's Hospital, Deyang 618000, Sichuan, China

**Author to whom correspondence should be addressed.*

Abstract: *Objective*: This study aims to investigate the effects of pain care based on the CICARE communication model on perioperative pain control, anxiety, and nursing satisfaction in patients undergoing minimally invasive breast surgery during the day. *Methods*: Using a randomized controlled trial design, 200 patients who underwent minimally invasive breast surgery at our hospital's day surgery center from January 2023 to June 2024 were selected and randomly divided into the experimental group and the control group, with 100 cases in each group. The control group received routine perioperative care, while the experimental group received standardized pain care based on the CICARE communication model in addition to routine care. The Visual Analogue Scale (VAS) was used to assess pain levels at 2 hours, 6 hours, and 24 hours after surgery, the State-Trait Anxiety Scale (STAI) was used to assess anxiety levels before and after the intervention, and a self-made nursing satisfaction questionnaire was used to evaluate patient satisfaction. *Results*: The VAS scores of the experimental group at 2 hours, 6 hours, and 24 hours after surgery [(3.2 ± 0.8) points, (2.1 ± 0.7) points, (1.2 ± 0.5) points] were significantly lower than those of the control group [(4.8 ± 1.1) points, (3.6 ± 0.9) points, (2.3 ± 0.6) points] ($P < 0.01$). After the intervention, the state anxiety score of the experimental group (38.5 ± 6.2) was significantly lower than that of the control group (46.8 ± 7.1) ($P < 0.01$). The total score of nursing satisfaction in the experimental group (94.2 ± 4.3) was significantly higher than that in the control group (82.6 ± 5.7) ($P < 0.01$). *Conclusion*: Pain care based on the CICARE communication model can effectively relieve postoperative pain in patients undergoing minimally invasive breast surgery during the day, reduce anxiety, and improve nursing satisfaction. It is worthy of promotion and application in day surgery care.

Keywords: Anxiety; CICARE communication mode; Minimally invasive breast surgery; Nursing satisfaction; Pain care

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1. Introduction

Day surgery has become the preferred option for minimally invasive resection of benign breast tumors due to its efficiency and convenience, but postoperative pain management remains a key factor affecting the patient experience and the quality of postoperative recovery. Minimally invasive breast surgery, though minimally invasive, can still cause varying degrees of pain after the operation. If not effectively controlled, it not only increases the patient's suffering but may also cause problems such as anxiety and sleep disorders, and even lead to the occurrence of chronic pain syndrome.

Effective pain management depends on precise pain assessment and good nurse-patient communication. In the traditional nursing model, nurses tend to focus on drug intervention for pain and lack a systematic communication process, easily neglecting patients' psychological feelings and individualized needs, resulting in problems such as insufficient pain assessment and untimely intervention.

The CICARE communication model is a communication tool characterized by process and standardization. Its six steps - Connect, Introduce, Communicate, Ask, Respond, Exit - provide a clear communication framework for healthcare workers, ensuring that every interaction with patients reflects respect and empathy. To build trust, obtain accurate information and implement effective interventions. The model has been widely used in foreign medical institutions and has been proven to significantly improve communication efficiency and patient satisfaction, but its application value in pain management, especially in short, efficient medical scenarios such as day surgeries, is still lacking in in-depth research and empirical support. Day surgery patients stay in the hospital for a short time and have limited nurse-patient contact opportunities, but building trust relationships accurately assess pain and implement personalized interventions within the limited time poses higher requirements for nursing work.

Therefore, this study aims to structuralize the CICARE communication model to the entire process of pain management for patients undergoing minimally invasive breast surgery during the day, improve the accuracy of pain assessment, the timeliness of intervention, and patient engagement through standardized communication, and systematically evaluate its impact on patient pain control, anxiety, and satisfaction. Lastly, to provide new ideas and evidence-based evidence for optimizing the practice of pain care in day surgery [1].

2. Data and methods

2.1. General information

200 patients who underwent ultrasound-guided minimally invasive breast resection at the day surgery center of our hospital from January 2023 to June 2024 were selected as the study subjects.

Inclusion criteria are as follows:

(1) Female aged 18 to 65 years;

(2) A benign breast tumor confirmed by preoperative pathological or imaging examination, with minimally invasive surgery scheduled;

(3) Conscious, without communication barriers, and able to complete the questionnaire independently;

(4) Voluntarily participate in this study and sign the informed consent form.

Exclusion criteria are as follows:

(1) Coexisting with other sites of malignancy or severe chronic pain disease;

(2) A history of mental illness or cognitive impairment;

(3) Allergic to analgesic drugs used in the study;

(4) Those who need to be transferred to the ward for further treatment after the operation.

Patients were randomly divided into the experimental group and the control group, with 100 cases in each group, using a random number table. There was no statistically significant difference ($P > 0.05$) between the two groups of patients in terms of general information such as age, tumor size, operation time and anesthesia method, and they were comparable. This study was approved by the hospital's Ethics Committee (Batch number: 2022-Yan Lun Shen - No. 088)[2].

2.2. Methods

The control group received routine perioperative care for day surgery, including preoperative routine health education, intraoperative cooperation, postoperative monitoring of vital signs, administration of analgesic drugs (such as ibuprofen sustained-release capsules) as prescribed by the doctor, and routine discharge guidance. The experimental group received standardized pain care based on the CICARE communication model in addition to routine care.

The specific plan is as follows:

(1) Establish a CICARE pain management team led by the head nurse and consisting of five key nurses from the day surgery center. Members of the group will receive two weeks of specialized training to master the CICARE communication process, pain assessment methods, non-pharmacological analgesia techniques and breast surgery expertise, and pass the scenario simulation assessment;

(2) CICARE process-oriented pain care intervention

(a) Preoperative (connection - introduction - communication)

(i) Connection: When the patient is admitted, the responsible nurse greets them proactively, introduces themselves, and creates a warm atmosphere;

(ii) Introduction: Introduce the day surgery process, the possibility of pain occurrence, and the pain management plan to the patient;

(iii) Communication: Communicate in plain language, inform the patient that pain is a normal postoperative reaction, encourage them to express their pain feelings actively, and explain how to use the pain assessment tool–VAS scale);

(b) Intraoperative (question-response)

(i) Question: Closely observe the patient's non-verbal pain signals such as frowning, clenching fists during the operation and proactively ask about their feelings: "How are you feeling now?" If you feel unwell, please let me know.";

(ii) Response: Respond promptly to the patient's needs and provide psychological support through verbal comfort, touching the arm, etc. and administer pain relief measures accurately as directed by the doctor;

(c) Postoperative (Inquiry - response - Leave)

(i) Inquiry: In the postoperative recovery room and rest room, at regular intervals (2 hours and 6 hours after surgery), use the VAS ruler to ask: "Please use this ruler to tell me the current degree of pain, 0 is no pain, 10 is the most painful.";

(ii) Response: Respond promptly based on the assessment results. For mild pain (VAS1-3 points), non-pharmacological interventions such as deep breathing, distraction (like listening to music), and cold

compresses are used; For moderate to severe pain (VAS ≥ 4), report to your doctor immediately and take medication as directed, and explain the effects and precautions of the medication);

(iii) Leave: Inform the patient of the next steps after each intervention: "I will keep an eye on your pain at all times. Please rest well." Upon discharge, provide detailed instructions on home-based pain management and follow-up visits;

(3) Provide patients with illustrated pain management manuals and VAS score cards for self-assessment and record-keeping after discharge [3].

2.3. Observation indicators

VAS was used to assess the degree of pain in patients 2 hours, 6 hours, and 24 hours after surgery (followed up by telephone) on a scale of 0 to 10, with a higher score indicating more severe pain.

The State Anxiety Subscale (S-AI) of the STAI was used for assessment before the intervention (1 hour before the operation) and after the intervention (at discharge), with a total score of 20 to 80, and a higher score indicated a more severe level of anxiety.

A self-made satisfaction questionnaire was used for the survey at discharge, which included four dimensions of service attitude, communication effect, pain management, and health guidance, with a total of 10 items, and a Likert 5-level score of 100 was used, with higher scores indicating greater satisfaction. The Cronbach'sα coefficient of the questionnaire was 0.912 [4].

2.4. Statistical methods

Data analysis was performed using SPSS25.0 software. Measurement data were expressed as mean ± standard deviation (SD), two independent sample t-tests were used for comparison between groups, and paired sample t-tests were used for comparison within groups; Count data were expressed as cases (%), and the χ^2 test was used for comparison between groups. A difference was considered statistically significant when $P < 0.05$.

3. Results

3.1. Comparison of VAS scores at each postoperative time point between the two groups of patients

The VAS scores of the experimental group were significantly lower than those of the control group at 2 hours, 6 hours, and 24 hours after surgery, and the difference was statistically significant ($P < 0.01$). See **Table 1**.

Table 1. Comparison of VAS scores at each time point after surgery between the two groups (mean ± SD, points)

Group	Number of cases	2 hours after surgery	6 hours after surgery	24 hours after surgery
Experimental group	100	3.2 ± 0.8	2.1 ± 0.7	1.2 ± 0.5
Control group	100	4.8 ± 1.1	3.6 ± 0.9	2.3 ± 0.6
t value		12.735	13.842	14.926
P value		< 0.001	< 0.001	< 0.001

3.2. Comparison of state anxiety scores before and after intervention

There was no statistically significant difference in state anxiety scores between the two groups before intervention

($P > 0.05$). After the intervention, the scores of both groups decreased compared with those before the intervention ($P < 0.05$), and the scores of the experimental group were significantly lower than those of the control group, with statistically significant differences ($P < 0.01$). See **Table 2**.

Table 2. Comparison of state anxiety scores before and after intervention between the two groups of patients (mean ± SD)

Group	Before intervention	After intervention	t value	*P* value
Experimental group	52.6 ± 7.8	38.5 ± 6.2 *#	15.327	< 0.001
Control group	51.9 ± 8.1	46.8 * 7.1 mm	5.642	< 0.001
t value	0.658	8.921		
P value	0.512	< 0.001		

* Note: Compared with the group before intervention, *P < 0.05; Compared with the control group after intervention, #P < 0.01.*

3.3. Comparison of nursing satisfaction between the two groups

The experimental group had significantly higher scores in service attitude, communication effect, pain management, health guidance and total score than the control group, and the difference was statistically significant ($P < 0.01$). See **Table 3**.

Table 3. Comparison of nursing satisfaction scores between the two groups of patients (mean ± SD)

Group	Service attitude	Communication effect	Pain management	Health guidance	Total score
Experimental group	23.8 ± 2.1	24.1 ± 1.8	23.5 ± 2.0	22.8 ± 1.9	94.2 ± 4.3
Control group	20.5 ± 2.5	20.8 ± 2.7	20.9 ± 2.4	20.4 ± 2.6	82.6 ± 5.7
t value	10.842	10.125	8.934	7.856	16.327
P value	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

4. Conclusion

The results of this study showed that applying the CICARE communication model to pain care for patients undergoing minimally invasive breast surgery during the day significantly improves pain management, alleviates patients' anxiety, and leads to higher care satisfaction. This achievement is mainly attributed to the standardization, humanization and precision of pain management achieved by the model.

The CICARE model has improved the accuracy of pain assessment and the timeliness of intervention. In traditional care, pain assessment often relies on unilateral observation by nurses or active complaints from patients, which is prone to underassessment or delay. The CICARE model, through the "inquiry" step, requires nurses to actively, standardly, and regularly use VAS tools for pain assessment, ensuring that pain is captured in a timely and quantified manner. The subsequent "response" step compelled nurses to respond immediately and hierarchically to the assessment results, whether it was non-pharmacological intervention or pharmacological analgesia, with evidence and rules to follow, thereby significantly reducing the intensity of patients' pain experience, which was consistent with the results of significantly reduced VAS scores at each time point after surgery in the experimental

group [5].

The CICARE model was effective in alleviating patients' anxiety. There is a widespread fear of unknown surgical procedures and postoperative pain among patients undergoing day surgery. The initial steps of the CICARE model, from "connection", "introduction" to "communication", establish a trusting and cooperative nurse-patient relationship with the patient before the operation. Continuous attention, proactive questioning, and empathetic responses throughout the process made patients feel respected and cared for, and their subjective feelings and emotional needs were fully valued. This psychological support greatly buffered the anxiety caused by surgical stress, as reflected in the significant decrease in state anxiety scores after intervention in the experimental group.

The CICARE model significantly enhanced the quality of nursing services and patient satisfaction. The model transforms communication into a structured care behavior, ensuring homogeneity and high levels of care services. Nurses naturally demonstrate good service attitude, professional communication skills and systematic health guidance by implementing standard procedures. Patients experienced consistent, professional and humanistic care throughout the perioperative period. Their sense of participation and control in the pain control process was enhanced, and their recognition of nursing work naturally increased significantly, which was reflected in the overall leading scores of the experimental group in all dimensions of nursing satisfaction and the total score.

In summary, pain care based on the CICARE communication model takes communication as the core nursing technique and ensures the professionalism and humanization of pain management through process-oriented steps. It is particularly suitable for promotion and application in short and efficient medical scenarios such as day surgery, providing an effective practical path for optimizing the patient experience and improving the quality of care.

Disclosure statement

The author declares no conflict of interest.

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