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Original Article

Evidence-based nursing versus routine nursing in preventing surgical incision infection

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Abstract: Objective: To explore the effects of evidence-based nursing and routine nursing in preventing surgical incision infection. Method: 64 patients underwent surgery in our hospital were randomly divided into observation group and control group. The observation group received the evidence-based nursing during the perioperative period. The control group received routine care during the perioperative period. The incision infection rate, VAS score, and SAS and SDS psychological negative emotions of the two groups were evaluated. The hospitalization time and costs of the two groups of patients were compared. The QLQ-C30 life quality measurement scale was used to evaluate the life quality of the two groups of patients after 1 week of nursing, and the patient's satisfaction with the nursing was evaluated. Results: The incision infection rate in the observation group was significantly lower than that in the control group ($P<0.05$). The VAS scores of the observation group, SAS and SDS scores were significantly lower than that of the control group ($P<0.05$). The hospitalization time and costs of the observation group were significantly lower than those of the control group ($P<0.05$). The life quality score of patients after 1 week of treatment was significantly higher than that of the control group ($P<0.05$). The nursing satisfaction of the observation group was significantly higher than that of the control group ($P<0.05$). Conclusion: The application of evidence-based nursing in surgical patients can significantly reduce the patient's incision infection rate, improve the negative emotions and life quality of patients. At the same time, it can shorten the hospitalization time of patients and reduce the hospitalization costs, relieve the economic pressure of patients and their families, which is worthy of promotion and application in clinical surgical patients.

Keywords: Evidence-based nursing, routine nursing, incision infection

Introduction

There is a high rate of incision infection after surgery, accounting for 13% to 40% of the total infection in hospitals, and its infection rate is only lower than that of respiratory infection [1]. Once the incision is infected, it may lead to severe complications such as multiple organ failure and systemic infection [2, 3]. When the patient has an incision infection or even a serious complication, the patient may also experience negative emotions such as anxiety and depression. This not only has a serious impact on the life quality of patients, but also increases the financial burden and social burden of patients and their families [4]. Therefore, for patients undergoing surgery, if an effective nursing program is adopted to prevent postoperative incision infection, it will have important clinical significance for improving the surgical efficacy of patients, and promoting postoperative rehabilitation of patients and the life quality of patients after surgery [5, 6].

Evidence-based nursing is a concept of care derived from evidence-based medicine [7]. Evidence-based nursing deem that any care program has a scientific basis to follow. The most appropriate patient care plan should be developed in conjunction with the best available care research resources and evidence, personal professionalism and clinical experience of the caregiver, and the patient's thoughts and realities. It also requires caregivers to strictly adhere to the liability system to provide patients with a complete, high-quality service to improve patient's care satisfaction [8, 9]. Studies have reported that the use of evidence-based nurs-

ing in patients with heart failure can not only significantly improve the patient's heart function, but also relieve the patient's anxiety [10].

Although there are reports [11] on the application of evidence-based nursing in the prevention of surgical site infections in spinal instrumental surgery, there is currently no relevant research report on evidence-based nursing in the prevention of surgical incision infection. Therefore, we conducted a comparative analysis of the effects of evidence-based nursing and routine care in preventing surgical incision infection, in order to provide more options for postoperative care of surgical patients.

Materials and methods

General information

64 patients who underwent surgery in our hospital were selected, including 33 male patients and 31 female patients, with an average age of (39.73±5.29) years. Among all patients, 21 had hepatobiliary surgery, 17 had appendectomy, 9 had anorectal surgery, 10 had breast surgery, and 7 had other surgical procedures. Patients were randomly divided into observation group and control group, with 32 cases in each group. Observation group received the evidence-based nursing model during the perioperative period, and control group received routine nursing mode during the perioperative period. Inclusion criteria: Patients who underwent surgery and met the criteria for general surgery were included. Exclusion criteria: patients with surgical contraindications were excluded; patients with severe liver and kidney dysfunction were excluded; patients with severe infection were excluded; patients with severe coagulopathy were excluded; patients with cognitive impairment and communication impairment were excluded; patients who did not cooperate with the experiment were excluded. All patients and their families agreed to this study and signed informed consent. This study has been approved by the ethics committee.

Nursing methods

Nursing intervention began after admission and ended after discharge. The control group received routine care, including the following: various preparations were given before surgery; during the surgery, the patient was transferred to the anesthesiologist, given routine ECG monitoring and other vital signs detection, and cooperated with the doctor in nursing; after the surgery, the patients were given regular diet instructions and rehabilitation instructions.

The observation group received the evidence-based nursing as follows: (1) The intervention-based nursing intervention team was then established and underwent professional evidence-based nursing training. The patient was first evaluated from a variety of aspects in terms of physical, psychological and social values and culture. Then the relevant literature of evidence-based nursing was reviewed and the patient data was analyzed in detail. Reasonable nursing measures were formulated in combination with the literature, actual nursing experience and the actual situation of the patients. (2) Preoperative care: The nursing staff explained carefully the operation of the patient before the operation according to the specific operation mode of the patient. The nursing staff communicated with the patient and explained to the patient related matters during the operation and postoperative rehabilitation, to reduce the psychological burden of the patient. Patients were given an IV infusion of cephalosporin antibiotics to prevent infection before surgery. (3) Intraoperative nursing: During the operation, the nursing staff closely monitored the patient's vital signs, constantly asked the patient's situation and specific feelings during the operation, and carefully cooperated with the doctor to complete the operation. (4) Postoperative care: Patients were given pain care after the end of the operation. And after the operation, it was necessary to regularly replace the clean sterile dressing to ensure that the drainage tube of the incision remained unobstructed. When helping patients turn over or perform other activities, caregivers were careful not to cause squeezing or folding of the drainage tube. The color and amount of the drainage fluid were very closely detected. The patient's body electrolytes were concerned, and the fluid was supplemented according to the patient's specific conditions.

Outcome measures

(1) The incision infection rates of the two groups of patients were recorded at two weeks after surgery. (2) The VAS score [12] was used to evaluate the postoperative pain level of the two groups at third day after surgery: A score of 0

Table 1. Baseline data

	Test group n=32	Control group n=32	X^2/t	P
Gender			0.063	0.823
Male	17 (53.13)	16 (50.00)		
Female	15 (46.87)	16 (50.00)		
Age (years)			0.064	0.800
≤39	13 (40.63)	14 (43.75)		
>39	19 (59.38)	18 (56.25)		
BMI (kg/m^2)			0.063	0.803
≤22	16 (50.00)	15 (46.87)		
>22	16 (50.00)	17 (53.13)		
History of smoking			0.066	0.798
Yes	13 (40.63)	12 (37.50)		
No	19 (59.38)	20 (62.50)		
Type of surgery			0.360	0.986
Hepatobiliary surgery	11 (34.38)	10 (31.25)		
Appendectomy	8 (25.00)	9 (28.13)		
Anorectal surgery	5 (15.63)	4 (12.50)		
Breast surgery	5 (15.63)	5 (15.63)		
Others	3 (9.38)	4 (12.50)		
Blood transfusion history			0.087	0.768
Yes	7 (21.88)	8 (25.00)		
No	25 (78.13)	24 (75.00)		
History of diabetes			0.110	0.740
Yes	5 (15.63)	6 (18.75)		
No	27 (84.38)	26 (81.25)		
History of respiratory diseases			0.071	0.790
Yes	11 (34.38)	10 (31.25)		
No	21 (65.62)	22 (68.75)		
Liver function index				
Serum total protein g/L	69.27±2.39	69.19±2.42	0.133	0.895
Glutamic pyruvic transaminase μmol/L	26.33±4.31	26.26±4.35	0.065	0.949
Total bilirubin μmol/L	11.69±2.55	11.71±2.73	0.030	0.976

indicated no pain, a score of <3 indicated mild pain was tolerable, a score of 4-6 indicated it was tolerable but had influence on sleep, and a score of 7 indicated it was unbearable. (3) The Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS) [13] were used to evaluate the psychological negative emotions of the two groups of patients 1 week after surgery. The specific evaluation criteria can be found in the reference literature. (4) The hospitalization time and costs of the two groups of patients were compared. (5) The QLQ-C30 life quality measurement scale [14] was used to evaluate the life quality of the two groups of patients after 1 week of care. The table included five aspects: role function, physical function, emotional function, cognitive function and social function, with a total of 30 items. The higher the score, the higher the life quality. (6) The patient's satisfaction with the nursing was evaluated in the form of a questionnaire at the time of discharge. The evaluation includes three levels: very satisfied, satisfied and unsatisfied.

Statistical methods

In this experiment, SPSS 20.0 statistical software (Beijing ND Times Technology Co., Ltd.) was used for statistical analysis of experimental data. Independent t test was used for the

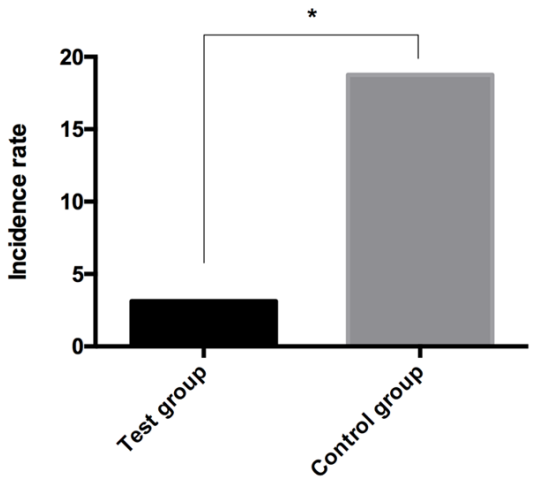

Figure 1. Comparison of incision infection rates between the two groups of patients. The incidence of postoperative incision infection rate in the observation group was significantly lower than that in the control group (P<0.05). Note: *indicated P<0.05.

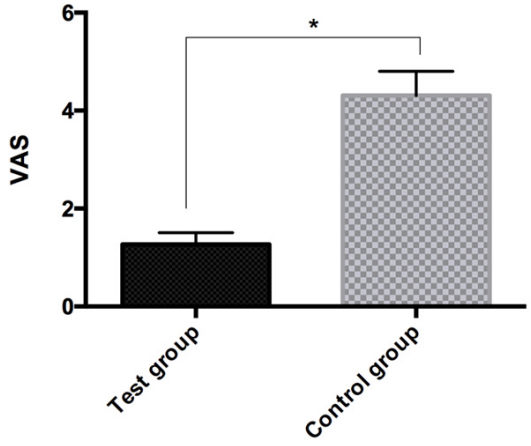

Figure 2. Comparison of postoperative VAS scores between the two groups. The VAS scores of the experimental group were significantly lower than those of the control group (P<0.05). Note: *indicated P<0.05.

comparison of measurement data, and chi-square test was used for the comparison of counting data. P<0.05 indicated that the difference was statistically significant.

Results

Baseline data

There were no significant differences in gender, age, and type of surgery between the two groups (P>0.05), which were comparable (**Table 1**).

Incision infection rate of the two groups of patients

There were 6 patients with incision infection in the control group, and the incision infection rate was 18.75%. There were 1 patient with incision infection in the control group, and the incision infection rate was 3.13%. The incidence of postoperative incision infection in the observation group was significantly lower than that in the control group (P=0.045) (**Figure 1**).

Comparison of postoperative VAS scores between the two groups

The VAS score of the experimental group was (1.27±0.24), which was significantly lower than that of the control group (4.31±0.49) (P=0.000). This indicated that the postoperative pain of the experimental group was more obvious than that of the control group (**Figure 2**).

Comparison of SAS and SDS scores 1 week after operation in both groups

The SAS and SDS scores of the experimental group were (21.54±3.14) and (21.79±4.25), respectively, which were significantly lower than those of the control group, which were (36.23±4.85) and (35.91±4.74) (P=0.000), respectively (**Table 2**).

Comparison of hospitalization time and costs between the two groups of patients

The hospitalization time of the experimental group was (7.22±1.45) d, which was significantly lower than that of the control group (12.98±2.31) d (P=0.000). The hospitalization cost of the experimental group was (4.42±1.83) thousand yuan, which was significantly lower than that of the control group (5.91±2.04 thousand yuan) (P=0.003) (**Figure 3**).

Evaluation of the life quality of the two groups of patients one week after discharge from hospital

The role function, emotional function, physical function, cognitive function and social function scores of the experimental group were (80.95±2.41), (81.22±2.47), (81.53±2.55), (79.88±3.15), and (80.25±2.61), respectively. It was significantly higher than those of the control

Table 2. Comparison of SAS and SDS scores in 1 week after surgery in both groups

Project	Test group n=32	Control group n=32	t	P
SAS	21.54±3.14	36.23±4.85	14.38	<0.001
SDS	21.79±4.25	35.91±4.74	12.55	<0.001

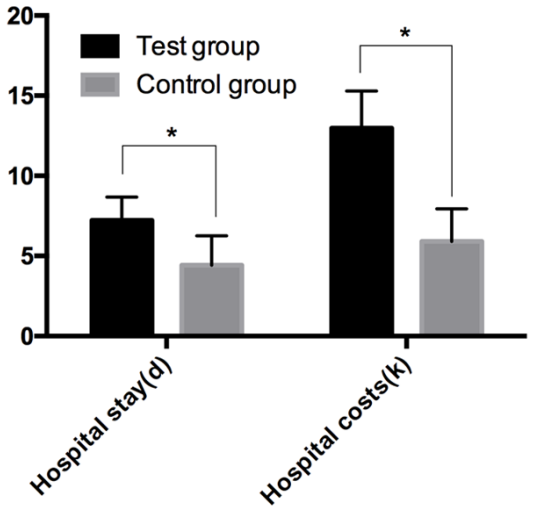

Figure 3. Comparison of hospitalization time and costs between the two groups of patients. The hospitalization time and costs of the experimental group were significantly lower than those of the control group (P<0.05). Note: *indicated P<0.05.

group, which were (61.20±2.33), (62.17±2.63), (61.43±3.23), (62.86±2.98), and (61.59±2.54) (P=0.000) (**Table 3**).

Comparison of nursing satisfaction between the two groups of patients

The number of patients in the experimental group who were very satisfied, satisfied, and dissatisfied was 27, 4, and 1 respectively. Those in the control group were 15, 9, and 8, respectively. The nursing satisfaction of the experimental group was 96.72%, which was significantly higher than that of the control group (71.93%) (P=0.012) (**Table 4**).

Discussion

In surgical procedures, surgical incisions are important means of adequately exposing the surgical field of view. Although the surgical incision facilitates the smooth operation of the procedure, it also causes some trauma to patient and is very prone to incision infection. Incision infection may further lead to serious complications such as systemic infection, which poses a serious threat to the patient's life safety [15, 16]. Surgical patients may have an incision infection, and the traditional nursing model does not have targeted nursing measures for this feature, which has certain limitations [17]. Therefore, how to carry out scientific and reasonable nursing is of great significance for reducing the incision infection of patients with surgery and improving the life quality [18]. Evidence-based nursing is a new type of nursing model developed on the basis of evidence-based medicine [19], also known as empirical nursing.

In this experiment, patients were not only injected with antibiotics to prevent infection before surgery, but also underwent nursing interventions depending on their specific conditions, including psychological, rehabilitation, and nutrition. The incision infection rates of the first two groups of patients were compared. The results showed that the incision infection rate of the observation group was significantly lower than that of the control group (P<0.05), which suggested that the application of our evidence-based nursing in patients with surgery can effectively reduce the patient's incision infection rate. Some studies [20, 21] indicated that comprehensive nursing intervention can effectively reduce the incision infection rate of surgical patients when exploring the application effect of comprehensive nursing intervention in preventing surgical incision infection. Although there is a certain difference between comprehensive nursing intervention and evidence-based nursing, it is a combination of psychological and various interventions to treat patients with nursing intervention, which also demonstrated our conclusions.

Then, VAS scores, SAS and SDS scores, length of hospital stay and hospitalization costs, quality of care for 1 week of care, and care satisfaction were recorded and compared. The results showed that the VAS score, SAS and SDS scores of the observation group were significantly better than those of the control group (P<0.05). Moreover, the hospitalization time and costs of the observation group patients were significantly lower than those of the control group (P<0.05). The life quality and nursing satisfaction of the observation group patients after 1 week of treatment were significantly

Table 3. Comparison of quality of life between the two groups of patients after 1 month of nursing

Project	Test group n=32	Control group n=32	t	P
Role function	80.95±2.41	61.20±2.33	33.33	<0.001
Emotional function	81.22±2.47	62.17±2.63	29.87	<0.001
Physical function	81.53±2.55	61.43±3.23	27.63	<0.001
Cognitive function	79.88±3.15	62.86±2.98	22.20	<0.001
Social function	80.25±2.61	61.59±2.54	28.98	<0.001

Table 4. Comparison of nursing satisfaction between the two groups of patients

Satisfaction level	Test group n=32	Control group n=32	X^2	P
Very satisfied	27 (84.37)	15 (46.88)		
satisfied	4 (12.50)	9 (28.12)		
Not satisfied	1 (3.13)	8 (25.00)		
Nursing satisfaction rate	31 (96.88)	24 (75.00)	6.335	0.012

higher than those of the control group (P< 0.05). The reason for the analysis may be that in the evidence-based nursing intervention, a series of reasonable nursing measures keep the patient's incision in a good state, which can promote the recovery of the incision, improve the patient's negative emotions and reduce the hospitalization costs. This ultimately improved the patient's life quality and patient care satisfaction [22, 23]. At present, there is no relevant research on the application of evidence-based nursing in the prevention of incision infection. However, there have been studies on the application of evidence-based nursing in elderly traumatic patients, and it has been shown that evidence-based nursing may be the best treatment for elderly trauma patients, which also confirms our conclusion [24]. Another study [25] showed that evidence-based nursing can significantly improve the depression status of patients with depression, which explained the improvement of SAS score and SDS score in our observation group. Other studies [26] have shown that when patients were in a good psychological mood, they had a positive response and implementation for surgical treatment and postoperative care and rehabilitation, so as to achieve therapeutic and nursing goals and improve patients' life quality. This is consistent with our conclusions.

In summary, the application of evidence-based nursing in surgical patients can significantly reduce the patient's incision infection rate, improve the negative emotions of patients and the life quality of patients. At the same time, it can shorten the hospitalization time of patients and reduce the hospitalization costs, relieve the economic pressure of patients and their families, and it is worthy of promotion and application in clinical surgical patients. However, this study still has certain limitations. First, the small sample size made the experimental conclusion still need further confirmation. Moreover, many other nursing programs and evidence-based nursing programs have not been compared, which makes the optimal care of prevention-based nursing for preventing incision infection in surgical patients still needs further exploration. However, in the future experiments, we will carry out large-scale multi-center research as much as possible, and further verify our experimental conclusions.

Disclosure of conflict of interest

None.

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