

Management Measures for Preventing Postoperative Incision Infections in General Surgery at Primary Hospitals

Jianqiang Yang*

Lanzhou Modern Vocational College, Lanzhou New District, Lanzhou 730300, Gansu Province, China

*Corresponding author: Jianqiang Yang, ysy18907545567@163.com

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Abstract: *Objective:* To analyze the management measures and effects of preventing postoperative incision infections in the general surgery department of primary hospitals. *Methods:* Forty-nine surgical patients with 11 healthcare workers who were admitted to the general surgery department of the primary hospital between August 2021 and August 2022 were selected as the routine group for routine incision infection management. Forty-nine surgical patients with 11 healthcare workers admitted to the same department between September 2022 and September 2023 were selected as the prevention group for prophylactic management of postoperative incision infections. The incision infection rate, knowledge, attitude, and practice (KAP) scores, and management satisfaction of the patients as well as the management skill scores of healthcare workers were compared between the two groups. *Results:* The rate of postoperative incision infection in the prevention group was lower than that in the routine group; after implementing management measures, patients in the prevention group had higher KAP scores than those in the routine group; patients in the prevention group were more satisfied with the management than those in the routine group; and healthcare workers in the prevention group had higher scores than those in the routine group, with $P < 0.05$ for the comparison between the groups. *Conclusion:* The implementation of preventive management for general surgery patients in primary hospitals can reduce the incidence of postoperative incision infection and improve the KAP of patients, with higher management satisfaction. It can also enhance the management skills of healthcare workers, thus improving their overall management level.

Keywords: Primary hospital; General surgery; Postoperative incision infection; Management measures

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1. Introduction

General surgery often involves procedures on the gastrointestinal tract, biliary system, anorectal area, and pancreas, encompassing a wide variety of surgical types with relatively high risks^[1]. For primary hospitals, the limited professional expertise of healthcare personnel, functionality of medical equipment, and level of departmental management can significantly increase the likelihood of incision infections in general surgery. This, in turn, can complicate subsequent treatments and potentially lead to adverse outcomes, including

increased mortality. Therefore, it is essential to implement systematic management for general surgery patients in primary hospitals. This involves a comprehensive analysis of risk factors for incision infections and the development of preventive management measures. Such an approach aims to maximize surgical safety and reduce postoperative treatment time for patients [2]. Based on this, 98 general surgery patients with 22 healthcare workers were selected in this study to evaluate the role of implementing preventive management measures.

2. General information and methods

2.1. General information

The routine group had 49 surgical patients with 11 healthcare workers who were admitted to the general surgery department of the primary hospital between August 2021 and August 2022. Among the surgical patients, there were 26 male patients and 23 female patients; their ages ranged from 26 to 75 years old, with a mean of 45.68 ± 4.91 years old. Among the healthcare workers, 5 were male and 6 were female; their ages ranged from 24 to 41 years, with a mean of 32.56 ± 3.18 years old. The prevention group consisted of 49 surgical patients and 11 healthcare workers who were admitted to the same department between September 2022 and September 2023. Among the surgical patients, 28 were male and 21 were female; their ages ranged from 24 to 73 years, with a mean of 45.79 ± 4.68 years old. Among the healthcare workers, 4 were male and 7 were female; their ages ranged from 23 to 40 years, with a mean of 32.43 ± 3.61 years old. Comparison of data between the two groups yielded no statistically significant difference, $P > 0.05$.

Inclusion criteria: Patients met the indications for general surgery; normal communication and cognitive abilities; complete clinical data; and healthcare workers with more than 3 years of working experience.

Exclusion criteria: Contraindications to surgery; the presence of malignant tumors or other major diseases; the presence of psychiatric disorders; withdrawal in the middle of the study; healthcare workers involved in other studies.

2.2. Methods

The routine group received routine incision infection management. Healthcare personnel assessed the patients' incision status at regular intervals, observed whether there was any oozing, bleeding, redness, swelling, or other abnormalities, and promptly changed dressings to ensure that the site remained dry and clean.

The prevention group implemented preventive incision infection management. A prevention management team was established and a comprehensive analysis of patients' basic data was conducted, analyzing the risk factors of incisional infections, such as operation time, incision type, patient age, etc., and developing preventive measures.

- (1) Improving regulations and standards: Air quality, hand hygiene, and the sterility of medical instruments are key factors that can trigger incision infections. It is necessary to optimize departmental regulations by clearly outlining details such as air disinfection frequency, hand hygiene protocols, and instrument sterilization standards. Evaluation metrics should be established based on the specific conditions of the department. Relevant experts are invited to comprehensively assess the scientific validity and practicability of these metrics and make appropriate improvements. Healthcare personnel should provide regular feedback on the implementation of these metrics and report the results to identify management issues and develop improvement plans. A contamination zone within the department is designated for the centralized handling of medical waste, establishing a clean zone where healthcare workers must wear protective equipment and strictly adhere to hand hygiene protocols when entering

and exiting. Unscheduled assessments of the effectiveness of zone management are conducted and linked to the performance bonuses of healthcare staff.

- (2) **Cultivating infection prevention awareness:** Training is provided in tiers based on the professional skills of healthcare personnel. For those with 3 to 5 years of experience, infection prevention knowledge is disseminated through lectures, seminars, and distributed printed materials, allowing them to study independently and understand risk factors and preventive measures for incision infections, the six-step handwashing technique, and the infection prevention role of hand sanitizers. For those with 5 to 10 years of experience, the focus is on explaining the difficulties of infection prevention and enhancing their ability to recognize early and latent infections. For those with over 10 years of experience, they are expected to serve as role models by actively sharing their infection prevention experiences and providing timely guidance to less experienced staff. Monthly skill assessments are conducted to evaluate both theoretical knowledge and practical skills of the healthcare personnel to improve their professional level. Additionally, training on responsibility and professional ethics is provided to stimulate proactive management awareness, making them practitioners and overseers of infection prevention management.
- (3) **Antibiotic management:** Bacterial cultures are promptly performed on patients' oral secretions, urine samples, and blood samples to identify the pathogen species. Sensitivity tests are then conducted to determine the appropriate antibiotics based on the test results. During the course of antibiotic therapy, which lasts 7 to 10 days, the use of antibiotics is monitored dynamically. If no improvement is observed after this period, a fungal infection test is conducted, and subsequent anti-infection measures are formulated.
- (4) **Disinfection and isolation management:** The disinfection and isolation protocols are improved by detailing the disinfection procedures for surgical instruments and the disposal methods for medical waste. The ward is cleaned using a wet mopping method, with disinfectants applied to indoor facilities and floors, and cleaned twice daily. Ultraviolet light is used for continuous disinfection for over 4 hours each night to control bacterial levels in the ward. Isolation rooms are established to manage infected and non-infected patients separately to prevent cross-infection.
- (5) **Strengthening health education for patients:** Face-to-face discussions with patients are conducted to provide detailed explanations of incision infection triggers, symptoms, self-monitoring methods, and treatment plans. Family members are encouraged to regularly observe the incision site and report any abnormalities to healthcare personnel immediately to detect infection signs early. Additionally, postoperative care instructions for general surgery are explained, including maintaining a light diet, engaging in moderate activity, and ensuring a positive mood, to help patients develop self-management skills.

2.3. Observation indexes

- (1) **Postoperative incision infection rate:** The incidence of postoperative incision infection was counted in the two groups of patients.
- (2) **Knowledge, attitude, and practice (KAP) scores:** A questionnaire on knowledge, attitude, and practice was issued to patients after management, with 22 items for knowledge, counting 0–22 points; 17 items for attitude, counting 17–85 points; 14 items for practice, counting 14–56 points, with positive scoring.
- (3) **Management satisfaction:** A self-developed management satisfaction questionnaire was distributed to patients after management to assess the implementation of management by healthcare workers,

containing management attitude, communication frequency, and management content, with a total of 100 points; more than 75 points for very satisfied, 50 to 75 points for satisfied, 25 to 49 points for basically satisfied, and less than 25 points for dissatisfied.

- (4) Management skill scores: A self-developed management skills questionnaire was issued by the management team to healthcare workers, containing familiarity with rules and regulations, knowledge of infection prevention, rational use of antibiotics, disinfection and isolation procedures, and methods of health education, all of which were 100 points and positively scored.

2.4. Statistical analysis

The data were analyzed by using SPSS28.0 software, the measurement value was compared and tested by *t* value, the count value was compared and tested by χ^2 value, and the statistical significance was counted as $P < 0.05$.

3. Results

3.1. Comparison of postoperative incision infection rate between the two groups

The postoperative incision infection rate of the prevention group was 4.08% (2/49), which was significantly lower than 18.37% (9/49) in the routine group ($\chi^2 = 5.018$, $P = 0.025$).

3.2. Comparison of KAP score between the two groups

After management, the KAP scores of the prevention group were significantly higher than those of the routine group ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of KAP scores of the two groups [mean \pm standard deviation (SD), points]

Groups	Knowledge	Attitude	Practice
Prevention group ($n = 49$)	15.23 \pm 1.88	67.22 \pm 5.41	46.33 \pm 4.51
Routine group ($n = 49$)	13.01 \pm 1.84	63.75 \pm 5.36	42.18 \pm 4.42
<i>t</i>	5.907	3.189	4.600
<i>P</i>	0.000	0.002	0.000

3.3. Comparison of management satisfaction between the two groups

The management satisfaction of patients in the prevention group was significantly higher than that of the routine group ($P < 0.05$), as presented in **Table 2**.

Table 2. Comparison of management satisfaction between the two groups [n (%)]

Groups	Very Satisfied	Satisfied	Basically satisfied	Dissatisfied	Total satisfaction
Prevention group ($n = 49$)	28	11	8	2	47 (95.92)
Routine group ($n = 49$)	20	12	7	10	39 (79.59)
χ^2	-	-	-	-	6.078
<i>P</i>	-	-	-	-	0.014

3.4. Comparison of management skill scores between the two groups

The management skill scores of the healthcare workers in the prevention group were higher than those of the routine group ($P < 0.05$), as shown in **Table 3**.

Table 3. Comparison of management skill scores between the two groups (mean \pm SD, points)

Groups	Familiarity with rules and regulations	Infection prevention knowledge	Rational use of antibiotics	Disinfection and isolation procedures	Methods of health education
Prevention group ($n = 11$)	92.36 \pm 4.15	91.88 \pm 4.37	93.15 \pm 3.36	92.53 \pm 4.11	92.82 \pm 4.47
Routine group ($n = 11$)	86.14 \pm 4.20	85.28 \pm 4.33	89.17 \pm 3.31	88.19 \pm 4.07	89.13 \pm 4.41
<i>t</i>	7.374	7.510	5.907	5.252	4.114
<i>P</i>	0.000	0.000	0.000	0.000	0.000

4. Discussion

General surgery procedures are prone to postoperative incision infections, and the risk factors for infection are as follows: (1) Age: Elderly patients often have diminished physical functions and reduced resistance to various pathogens. Additionally, the surgical procedure itself can trigger numerous stress responses, further lowering the patient's immune system and increasing the likelihood of incision infections ^[3]. (2) Type of incision: Postoperative incision infections in general surgery are often exogenous, with a significant correlation to Type III incisions. These types of incisions are prone to harboring pathogens, which can subsequently lead to infection. (3) Surgical duration: Prolonged surgical procedures can lead to extended exposure of organs and tissues to air, thereby increasing the risk of bacterial infection ^[4]. Additionally, in primary hospitals, where medical equipment may be relatively outdated, treatment environments less advanced, and healthcare personnel's professional abilities vary, the likelihood of postoperative incision infections in general surgery is higher. However, these types of infections are highly preventable, and their incidence can be reduced through refined and targeted management measures ^[5].

Preventive management measures are tailored to the specific conditions of primary hospitals, taking into full account the causes of postoperative incision infections in general surgery. By screening for patients' infection risk factors and providing professional guidance, these measures help prevent incision infections. This management approach is comprehensive, effectively improving regulations, enhancing the skill levels of healthcare personnel, and achieving the institutionalization and systematization of general surgery management ^[6,7]. Healthcare personnel's awareness of infection prevention directly impacts their management behavior. Therefore, layered training in infection prevention knowledge can enhance their management skills, encouraging them to regulate their behavior proactively and actively prevent infection risks. Prophylactic use of antibiotics can significantly reduce the rate of incision infections, but there is a notable tendency for misuse. As a result, it is crucial to strengthen the management of bacterial cultures and sensitivity testing to improve the rational use of antibiotics ^[8]. Disinfection and isolation management are powerful measures to prevent cross-infection, reducing the risk of incision infection and comprehensively improving the quality of general surgery management. Health education, directed at patients, aims to enhance their self-management awareness, enabling early identification and handling of incision infections, thereby preventing the progression of infection ^[9,10]. The results showed that the rate of postoperative incision infection in the preventive group was lower than that in the routine group; the KAP score after management in the preventive group was higher than that in the routine

group; the management satisfaction in the preventive group was higher than that in the routine group; and the management skill scores of healthcare workers in the preventive group were higher than that in the routine group ($P < 0.05$). It can be seen that preventive management has high practicality and feasibility.

5. Conclusion

In conclusion, the implementation of preventive management measures for general surgery patients in primary hospitals can reduce the chance of incision infection, improve patients' knowledge, attitude, and practice and management satisfaction, and increase the professional skills of medical and nursing staff, so the management effect is significant.

Disclosure statement

The author declares no conflict of interest.

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