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Application of Continuous Quality Improvement of Nosocomial infections in central sterile supply department

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ABSTRACT

Objective *To analyze the application of continuous quality improvement in hospital infection management in modern nosocomial infections, and to effectively control hospital infection.* ***Methods*** *In January 2017, advanced computer and bar code technology were used to record the process of disinfection items in the nosocomial infections one by one, and the quality management traceability system of disinfection items was realized. The continuous quality improvement system of modern nosocomial infections was established, and the control effect of continuous quality improvement on hospital infection was observed.* ***Results*** *There were 22465 sterilized items in 2017, which was higher than that in 2016. The loss rate of sterilized items in 2017 was 0.26%, which was significantly lower than that in 2016 (χ^2=221.18, P<0.05). The cycle time of sterilized items in 2017 was (3.46 ±0.8).d, shorter than in 2016 (6.52±1.8) d, The incidence of nosocomial infection due to equipment problems was 3.8% in 2017, which was significantly lower than 13.7% in 2016 (χ^2 = 9.34, P < 0.05).* ***Conclusion*** *The establishment of continuous quality improvement management in nosocomial infections can ensure the quality of disinfection supplies and is an effective means to control nosocomial infection.*

Keywords *:* Nosocomial infections; Continuous Quality Improvement Management; Traceability System; Hospital Infection

INTRODUCTION

Hospital nosocomial infections is responsible for the control of hospital infection. With more and more invasive operations in diagnosis and treatment activities, the disinfection and sterilization of operating instruments has become the most important part of the control of hospital infection. Quality management of nosocomial infections has become the focus of daily work. On December 27, 2016, the Ministry of Health issued several health industry standards, such as "Standards for the Management of Hospital Nosocomial infections". It is required that the nosocomial infections should establish a quality control process record and traceability system [1].To this end, our hospital introduced the record and traceability system of quality control process into the continuous quality improvement system. Since January 2017, we have carried out traceable quality management of all instruments and dressings sterilized in our central sterile supply department, and optimized the continuous quality improvement management program. We compared the instruments handled by the central sterile supply department within one year before and after January 1, 2017.Disinfection

of bags and dressing bags and nosocomial infections caused by instruments are reported as follows.

MATERIALS AND METHOD

Continuous Quality Improvement Management

Improving the relevant system and establishing a perfect and effective management system are the foundation of controlling hospital infection and ensuring medical safety. Since its establishment, the central sterile supply department of our hospital has gradually established many rules and regulations, such as "Standards for the Management of Hospital Central Sterile Supply Department ", "Monitoring System of Sterilized Items", "System of Disinfection and Isolation" and "Principles of Sterile Operation". In accordance with the requirements of the Ministry of Health and the Ministry of Health, the contents of these rules and regulations have been continuously improved. In addition, experts with rich experience in management of superior hospitals are invited to conduct on-site investigation and guide the continuous improvement of quality management of nosocomial infections so as to keep pace with the times in system, clarify the responsibilities of personnel at all levels, conduct regular personnel training and assessment, and standardize the management of nosocomial infections.

In recent years, the training of personnel in nosocomial infections has increased the legal awareness of patients, and the division of responsibility for medical disputes has become more and more detailed and clear. Such a social environment requires that the work of nosocomial infections must achieve clear responsibilities and traceability of disinfection materials. At the same time, it also requires staff of nosocomial infections to study laws and regulations and enhance legal awareness and responsibility concept [2].In view of the problems such as obsolete professional knowledge and lack of knowledge in hospital infection management of personnel in nosocomial infections in the past, personnel training should be carried out pertinently, while understanding the national laws and regulations, we should also be familiar with the various systems formulated by our hospital, master the use of traceability system for disinfection items, fill in traceability records scientifically and responsibly, and accomplish the process of goods management. The importance of continuous quality improvement management should be deeply understood through ordering.

The quality traceability system of nosocomial infections was introduced in our hospital to control the process of recovery, classification, cleaning, disinfection, packaging, sterilization, storage, distribution and use of equipment package or dressing bag. First, it can improve the efficiency and quality of nosocomial infections, and second, it can realize traceable management of sterilized items. It plays an important role in reducing the storage time of aseptic packages in departments and improving the turnover utilization rate.

Traceable Quality Management

The Recycling and Classified Nosocomial infections scans the recycled equipment packages and dressing packages one by one, checks whether the recycled information is consistent with the information issued, checks whether the equipment and dressing are damaged, traces the responsibility accurately to the use department, implements the compensation system for damage of items, and classifies the recycled equipment and dressing into the next link.

Cleaning registration should select appropriate cleaning methods, cleaning agents and cleaning equipment according to the different items, and mechanical automatic cleaning can be carried out for common used instruments; manual cleaning for complex precision instruments or heavily polluted instruments; and pressure water gun and air gun are used for cleaning pipeline instruments.

Cleaning materials should be fully in contact with water flow, axle joints of instruments should be fully opened, and removable parts should be disassembled. Fine and sharp instruments should be fixed. Soft water should be used for washing, washing and rinsing, purified water should be used for final rinsing and disinfection, and water temperature in pre-washing stage should be less than 45 C. Lubricants, plastics and soft metal materials should be used in the final non-rinsing process of metal instruments. Acidic detergents and lubricants should not be used. After washing, the items should be soaked in multi-enzyme lotion, washed in normal and pure water, dried and maintained to ensure the cleanliness and no residual stains, and the unqualified items should be re-cleaned in time.

Sterilization is usually carried out by thermal disinfection method for cleaning items, and chemical disinfection method for special items should be strictly set in accordance with national standards, methods and time, etc.

Packing disinfected items should be packed according to the need, and checked again before packing. Those who do not conform to packing specifications should be found and replaced in time to avoid affecting clinical use and causing unnecessary inconvenience. Strictly implement the check-up system, place chemical indicator cards in the package, paste chemical indicator tape outside the package, and indicate the name of the items in the package, sterilization date, pot number and packer's name during the validity period. Packaging should conform to the national standard (volume of pulsating vacuum steam sterilizer is less than 30 cm x 30 cm x 50 cm, weight of metal package is less than 7 kg, dressing).Pack < 5kg [3].After packaging, bar codes are pasted one by one, and scanned and registered. Information about the types or quantities of instruments in packaging is registered in the information system for checking.

Sterilization according to the operation specifications, select appropriate sterilization methods for different products. Sterilization operators are required to be on duty with double certificates, strictly abide by the process, do not leave their jobs without permission, keep in mind the physical parameters such as pressure, temperature and time required for sterilization, and carry out chemical and biological monitoring according to the specifications. The qualified rate is 100.0%.Regular inspection, maintenance and maintenance of the sterilizer to ensure its good operation, annual inspection certificate, good cleaning and maintenance of the sterilizer to ensure good performance of the instrument. Sterilized aseptic items should be stored in a clean and dry environment at temperatures of 20-25 C and relative humidity of less than 60%. They should be arranged according to the type and date of sterilization. For aseptic items sent out, whether used or not, they should be re-sterilized[4].

The issuance adheres to the principle of "first in, last out", scans the barcode of items, and after confirmation by the receiving department, issues the records, prints the issuance records (in duplicate), and saves the records after the joint signature and confirmation by the recipient and the issuer for retrospective management.

The Registry Department will scan the items one by one through the scanner in the department, register them into the department, and set up a special person responsible for the management to ensure that the use of the items is implemented to the individual.

Strengthen the monitoring of disinfection and sterilization effect. Empty pot B-D test of pulsating vacuum pressure steam sterilizer before daily sterilization and biological monitoring at least once a week are carried out. The test results can be used only after they conform to the Technical Standards for Disinfection. The air colony culture test was conducted once a month in the operation area to ensure that the total number of colony in the packaging area and storage area was less than 200

CFU/m3 and the total number of colony in the operation table was less than 5 CFU/cm2.Colony culture tests were carried out on items after sterilization from time to time, which ensured that the eligible rate of sterilization was 100.0%[5-6].

The evaluation of the effect of continuous quality improvement management was compared with the increase of disinfectant quantity, circulation time, loss rate of disinfectant and nosocomial infection caused by equipment problems in one year before and after the introduction of continuous quality improvement system.

Statistical analysis using SPSS17.0 software for data processing, measurement data to express, counting data to express the percentage, compared with the application of t test and_2 test, $P < 0.05$ was statistically significant.

RESULTS AND DISCUSSION

As shown in Table1, in 2017, there were 22465 sterilized items, which was higher than that in 2016. In 2017, the loss rate of sterilized items was 0.26%, significantly less than 1.8% in 2016. The difference was statistically significant (χ^2=221.18, P<0.05). The cycle time of sterilized items in 2017 was (3.46+0.8) days, which was shorter than (6.52+1.8) days in 2016. The difference was significant (χ^2=267.43, P<0.05). In 2017, the incidence of nosocomial infection caused by equipment problems was 3.8%, which was significantly lower than that in 2016, which was 13.7%. The difference was statistically significant (χ^2=9.34, P<0.05).

Table1 The quality management mentions the entrance sterile supply department before and after the continuity quality improvement

	2016	2017	Test value	P value
Number(n)	14589	22465		
The loss rate of sterilized items (%)	1.8%	0.26%	221.18	<0.05
Circulation time (d)	6.52±1.8	3.46±0.8	267.43	<0.05
Infection rate due to equipment problems (%)	13.7%	3.8%	9.34	<0.05

Discussion

Hospital nosocomial infections are responsible for the cleaning, disinfection and sterilization of invasive medical items in the whole hospital. It is an important part of the prevention and treatment of nosocomial infection. Once there is insufficient supervision, the sterilization of generators is not strict, and the validity of the packages exceeds the validity period, it will easily lead to the occurrence of nosocomial infection, and serious cases will lead to the occurrence of medical accidents. Therefore, it is suggested that a reasonable and standardized continuous quality improvement system for nosocomial infections play an important role in controlling hospital infection.

According to the integration of the working mode of the central sterile supply department and the operating room, the central sterile supply department implements the centralized management mode for the reusable instruments in the operating room and clinical departments. After the operation room is used, the surgical instruments are pretreated, recycled directly by the staff of the central sterile supply department, and distributed to the operating room by the special elevator after cleaning and packaging sterilization, so as to reduce the risk of contamination diffusion and

facilitate the management of the instruments and instruments in the operating room. Centralized management mode is safe, professional, scientific, quality consistency and economic rationality; the whole process from recovery to distribution is completed by trained professionals; efficient, standardized and simplified (specialization); the most important thing is to reduce pollution diffusion. Traceability management of sterilized items is the core of centralized management in the central sterile supply department.

In recent years, with the continuous development of computer technology, bar code scanning technology has been gradually applied to the recovery, counting, classification, cleaning, packaging, disinfection, sterilization, check and distribution of disinfectant items. Our hospital has introduced the modern traceability system of disinfection items into the continuous quality improvement management of the nosocomial infections. On the one hand, it makes the management of disinfection items more detailed and specific, and clarifies the responsibilities; on the other hand, it strengthens the responsibility and quality of the staff of the nosocomial infections, which is conducive to ensuring the implementation of the system and the smooth progress of various operating procedures, and effectively prevents improper sterilization of instruments. The occurrence of nosocomial infection. The results showed that there were 22 655 sterilized items in 2017, which was higher than that in 2016. The loss rate of sterilized items in 2017 was 0.26%, which was significantly lower than that in 2016 (χ^2=221.18, P<0.05). The cycle time of sterilized items in 2017 was (3.46 ±0.8).d, shorter than in 2016 (6.52±1.8) d, The incidence of nosocomial infection due to equipment problems was 3.8% in 2017, which was significantly lower than 13.7% in 2016 (χ^2 = 9.34, P < 0.05).

The establishment of continuous quality improvement management in nosocomial infections can ensure the supply quality of sterile goods and is an effective means to control hospital infection.

Conflicts of interest

The authors declare that there is no conflict of interest.

Author contributions

Jiang Wei conceived the project and designed the protocol; Jiang Wei and Chen Yan wrote the manuscript. All authors read and approved the final manuscript.

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