Therapeutics evaluation on whole range dynamic management for infection control in cardiac surgery patients during rehabilitation.

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Abstract

Objective: To explore the effect of whole range dynamic management on infection control in cardiac surgery patients during rehabilitation.

Methods: The study involved 160 patients, who were admitted in cardiac surgery of our hospital from January 2014 to 2017, and assigned them into study group and control group by a random number table. Patients in study group were supervised with a whole range dynamic management, while others were administrated with a conventional method, counting and analyzing their baseline diseases, rate of infection during hospital-stay, infection sites, and length of hospital-stay.

Results: For composition of baseline diseases, there was no statistic difference between two groups (P<0.05). In terms of postoperative infection, there were 10 cases in study group (12.5%), which were lower than 24 cases in control group (30%), so there was statistical significance (P<0.05). The main infection sites were respiratory tract and digestive tract in study group while incision and respiratory tract in control group, compared their constituent ratio, the difference was significant (P<0.05). The average length of stay was 17.25 ± 3.22 d in study group but 27.43 ± 5.17 d in control group, so there was statistical significance (P<0.05).

Conclusion: Using whole range dynamic management benefits to reduce the incidence of postoperative infection in cardiac surgery patients, especially to better prevent incision infection and quicken their recovery.

Introduction

Because of the specificity of heart disease, cardiac surgery patients have worse physical state and hypoimmunity, and cardiac surgery is complicated with slower recovery after operation, which causes longer postoperative length stay, thereby making patients stay in a circumstance with a variety of bacteria over a long time [1,2]. On the basis of two points mentioned above, it is known that cardiac surgery patients are easier to suffer nosocomial infection during recovery process. As a complication, infection during recovery in cardiac surgery patients involves incision but also multiple systems and has varying degrees of influence on the curative effect of cardiac surgery, what's more, of which treatment results in heavy burden for patients and their family [3,4]. How to prevent postcardiac surgery infection during recovery has been an issue that mass medical workers hot investigate. Whole range dynamic management, a method for patient's management emerging in recent years, focus on the supervision starting from admission and ending at post-discharge and makes adjustments according to patient's specific condition [5]. This study is to explore the effect of whole range dynamic management on infection control in cardiac surgery patients during recovery, and details are as follow.

General data

160 patients, who were admitted in cardiac surgery of our hospital from January 2014 to 2017, were assigned into study group and control group by a random number table. There were 80 patients in study group, 46 males, 34 females, aged from 2~78 y, 41 ± 2 in average, and 80 in control group, 44

males, 36 females, aged from 1.5~76 y, 38 ± 2 in average. Comparison on general data of both groups is in Table 1.

Table 1. Statistical list on general data of both groups.

		Sex (n)		Age (y)	
Group	Amount of patients (n)	Male	Female	Range of age	Mean age
Study group	80	46	34	2~78	41.19 ± 4.37
Control group	80	44	36	1.5~76	38.67 ± 5.16
χ^2 value		1.748		2.635	
P value		0.075		0.062	

This study selected patients according to the following standards: All patients were those with heart diseases which require cardiac surgery; All patients do not have severe other systems disorder such as kidney and liver diseases; All of them had good compliance but no infectious diseases; the therapeutic scheme was carried out under the agreement of all patients and their families.

Methods

Management methods for control group

Management methods for control group were following: Patients at admission received conventional guidance about medication, diet, sports and rest. The medication was schemed strictly based on medication guide for cardiac surgery patients. Patients under immune status or critical ones would be given antibiotics to prevent infection. If patients had any signs of infection or a definite infection site, it should be reported to the supervisor and treated in proper.

Management methods for study group

Study group underwent whole range dynamic management, the detail methods were as follow: Carefully obtaining patient's data before surgery: The supervisor got full knowledge about patient's diseases before operation and assessed their status. For selective surgical patients, in order to stagger their special periods like seasonal allergic period and menstrual period, the supervisor should decide operation time on the basis of their detail conditions. Executing canonically under strict sterile conditions: Health-care workers should rigidly carry out aseptic techniques during the surgery and at the moment of dressing changes. Instruments like endoscope, that would enter patient's body, must be sterilized before surgery. The workers should wash their hands and wear a mask and a hat according to standards before and after they exposed to the patient, and they should gently manipulate when intubated, to avoid injuring patients. Strengthening management on operation room and patient's room: Infecting external bacteria during surgery was a main factor resulting in infections that occurred during postoperative recovery, so the operation room should be strictly sterilized before surgery to

prevent the patients from intraoperative infection. Furthermore, the patient's room also should keep in relative aseptic condition after surgery and at the early stage of patient recovery, visits should reduce, aiming to avert foreign infections. Postoperative observation in time: Incision condition should be observed timely after surgery and 6 h a time in the first 71 h. If the wound was red, swelling, and painful, it should be immediately reported to the supervisor for timely and proper treatment. Giving antibiotics based on patient's condition: The patients should be given moderate antibiotics before surgery to prevent intraoperative and postoperative infections. If the operation time was long, antibiotics should be added one more time during surgery and maintained at base dose after operation. If infection symptoms appeared, appropriate anti-infective medications should be used in time. Recommending patients to move early after surgery: The patients should walk more when they could get out of bed, for proper movement could benefit the recovery of lung function, effectively decrease the incidence of lung infection, and strengthen their immunity.

Assessment indexes

Patient's baseline diseases, amount of patients with infection during hospital-stay, infection sites, and length of stay were counted and analyzed.

Statistical Analysis

All data was analyzed by software SPSS19.0, t-test was used for measurement data, chi-square test for group comparison, $\alpha=0.05$ and the statistical difference was defined as P<0.05.

Comparison on baseline diseases of patients in two groups

There were 15 cases with congenital atrial septal defect, 30 myocardial infarction, 15 rheumatic mitral stenosis, 7 aortic aneurysm, 8 tetralogy of Fallot, and 5 congenital patent ductus artereriosus in study group, and 13 congenital atrial septal defect, 32 myocardial infarction, 16 rheumatic mitral stenosis, 6 aortic aneurysm, 6 tetralogy of fallot, and 7 congenital patent ductus artereriosus in control group. There was no statistical

difference for baseline diseases of the patients in two groups, but they were comparable, P>0.05 (Table 2).

Table 2. *Comparison on baseline diseases of patients in two groups (n, %).*

Group	Amount of patients (n)	Congenital atrial septal defect (n)	Myocardial infarction (n)	Rheumatic mitral stenosis (n)	Aortic aneurysm (n)	Tetralogy of fallot (n)	Congenital patent ductus artereriosus (n)
Study group	80	15 (18.75)	30 (37.5)	15 (18.75)	7 (8.75)	8 (10.0)	5 (6.25)
Control group	80	13 (16.25)	32 (80.0)	16 (20.0)	6 (7.50)	6 (7.50)	7 (8.75)
χ^2 value		1.748	2.635	1.273	3.748	2.493	4.304
P value		0.075	0.062	0.087	0.058	0.067	0.051

According to Table 2, it is known that there was no difference in baseline diseases typing of two groups (P<0.05).

Infection sites and their constituent ratio of patients in two groups

There were 10 cases with infection in study group, including 4 respiratory tract infections, 3 digestive tract infections, 1 wound infection, and 2 other infections. 24 cases with infection in control group, including 8 respiratory tract infection, 4 digestive tract infection, 9 wound infection, and 3 other infections. The proportion of the infection of digestive canal in the study group was higher than in the control group, but the infection rate of wound was lower than that of the control group. So, there was no statistical difference, P<0.05 (Table 3).

Table 3. *Statistical table on infection sites and their constituent ratio of patients in two groups.*

Group	Amount of patients (n)	Amount of infections (n)	Infection site	Number of infected person (n)	Constituent ratio
Study group			Respiratory tract infection	4	0.4
			Digestive tract infection	3	30%*
	80	10	Wound infection	1	10%*
			Other infections	2	0.2
Control group			Respiratory tract infection	8	0.3333
	80	24	Digestive tract infection	4	0.1667
			Wound infection	9	0.375
			Other infection	3	0.125

Note: *Indicates the comparison of study group with control group, P<0.05.

Comparison on length of stay and infection rate of patients in two groups

There were 10 cases with postoperative infection in study group (12.5%) but 24 in control group (30.0%). The mean length of stay was 17.25 ± 3.22 d in study group but 27.43 ± 5.17 d in control group. It can be seen from the above that the post-operation infection rate of the patients in the study group was lower than that in the control group and the hospital stay of the former was shorter than that of the latter, which was of statistical difference, P<0.05 (Table 4).

Table 4. *Statistical table on length of stay and infection rate of patients in two groups.*

Groups	Amount of patients (n)	Amount of infected person (n)	Infection rate (%)	Length of stay (d)
Study group	80	10	12.5	17.25 ± 3.22
Control group	80	24	30	27.43 ± 5.17
χ^2/t value		9.395		8.271
P value		0.028		0.034

Discussion

According to statistical data, it is known that infection rate at recovery stage after cardiac surgery is between 25% and 44% [6]. Postoperative infections in cardiac surgery patients prolong their recovery time, impact therapeutic effect to some extent, but also add financial burden for patients and their families. Therefore, preventing infections after cardiac surgery has been a hot spot that health-care workers investigate.

Commonly, the critical point of infection after cardiac surgery is at three stages such as preoperation, intraoperation, and postoperation, especially intraoperative performances, which are related to the complex of cardiac surgery and high standard in asepsis [7,8]. The research about high-risk factors of infection that occur after cardiac surgery is more explicit. After analyzing and comparing many studies, it is known that the study supervised by Saiying is especially better [9]. He claims that in terms of single factor, there are six main high-risk factors causing infections after cardiac surgery as follow: (1) Age is over 65 y or less than 5 y; (2) The patient himself has moderate or severe anemia; (3) The incision is over 10 cm; (4) The patient suffers baseline diseases like hypertension, diabetes, and COPD; (5) The patient meets visitors more than 10 times after surgery, hence, preventing postoperative infection should focus on them. Whole range dynamic management refers to a method for supervising patients which emerges in recent years, of which core is make doctors gain more comprehensive and dynamic understanding about disease progress of the patient and adjust therapies and nursing according to realities [10]. In this research, study group adopts whole range dynamic management, while control group use conventional one. Its outcomes show that there isn't difference in baseline diseases between two group (P<0.05); 10 patients suffer postoperative infection in study group with infection rate of 12.5%, but 24 in control group with infection rate of 30%, compared two groups, study group is better (P<0.05). The main infection sites include respiratory tract and digestive tract in study group but wound and respiratory tract in control group, there is statistical difference in the constituent ratio (P<0.05). The mean length of stay is 17.25 ± 3.22 d in study group but 27.43 ± 5.17 d in control group, and the post-operative infection rate and hospital stay of the patients in the study group were obviously superior to those of the control group (P<0.05). It means that close, detailed and comprehensive observation of the patient's diseases and their post-operative recovery conditions and timely reasonable and effective recovery guides for them are more beneficial to recovery of the patient's diseases.

To sum up, using whole range dynamic management is of help to cut down the incidence of infections after cardiac surgery, particularly, to better preventing wound infection, and quickens the postoperative recovery of patients.

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