Application of HFMEA Model in ICU Delirium Risk Management of Patients after Cardiac Surgery

Xing Xiaoying, Ma Yaya, Wang Lei, Ji Cui
Shaanxi Provincial People's Hospital, Xi'an, Shaanxi, China
**Corresponding Author*

Abstract: Objective : To observe the effect of HFMEA model in ICU delirium risk management of patients after cardiac surgery. Methods : From May 2022 to May 2024,70 ICU patients after cardiac surgery in our hospital were selected as subjects. According to the random sampling grouping method, the included cases were divided into two groups. One group was given routine ICU delirium risk management (control group, 35 cases), and the other group was given risk management based on HFMEA model (observation group, 35 cases). The delirium score and the incidence of delirium in the two groups were statistically analyzed. Results : The delirium score of the observation group after management was lower than that of the control group, P<0.05. The incidence of delirium during recovery in the observation group was lower than that in the control group, P<0.05. Conclusion : Risk management based on HFMEA model for ICU patients after cardiac surgery can reduce the risk score of delirium during recovery, reduce the incidence of delirium, and help patients recover.

Keywords: Delirium; HFMEA Mode; Cardiac Surgery; Risk Management

1. Introduction

Cardiac surgery has maintained a high implementation rate in clinical practice and belongs to a type of surgery with high operational difficulty, causing significant trauma to patients during the surgical process. Under the influence of factors such as intraoperative trauma and anesthesia drugs, patients are at risk of developing delirium during the ICU recovery process, which directly affects their recovery. The Health Failure Mode and Effect Analysis (HFMEA) is a new approach for risk management in clinical practice. This study mainly analyzes the role of risk management based on the HFMEA model in the management of delirium risk in ICU patients undergoing cardiac surgery.

2. Materials and Methods

2.1 Materials

From May 2022 to May 2024, 70 ICU patients who underwent cardiac surgery in our hospital were selected as the subjects. The included cases were randomly divided into two groups: one group received routine ICU delirium risk management (control group, 35 cases), and the other group received risk management based on the HFMEA model (observation group, 35 cases). There were 18 males and 17 females in the control group, aged between 50 and 69 years old, with an average of (59.63 ± 1.25). There were 19 males and 16 females in the observation group, aged between 51 and 70 years old, with an average of (60.45 ± 1.25). Comparison of two sets of basic information, P>0.05。

2.2 Methods

During the ICU treatment of the control group patients, all aspects of management work were carried out in accordance with the conventional mode to accurately evaluate the changes in various indicators of patients during ICU treatment, and records were kept to timely analyze whether patients had abnormal symptoms. Strictly follow the doctor's advice for medication and control the administration speed reasonably. The observation group conducted risk management based on the HFMEA model during ICU treatment. (1) Failure risk assessment. After the patient is transferred to the ICU, nursing staff need to conduct a comprehensive evaluation of all aspects of the patient's condition, including

surgical plan, intraoperative bleeding, patient physical condition, and medical history. Identify the risk factors that exist during the patient's ICU treatment process and summarize high-risk failure modes. (2) Summary of high-risk failure modes. Based on the characteristics of cardiac surgery patients and comprehensive evaluation, the high-risk failure of delirium in this group of patients during ICU treatment is mainly manifested as: ① frequency of delirium risk assessment. ② The rationality of using delirium assessment scale The prevention measures for delirium need to be improved The specialized nursing skills of nursing staff need to be improved. (3) Risk management based on HFMEA model. ① Improve the risk assessment mechanism for delirium. To conduct a more comprehensive assessment of delirium risk during ICU treatment for cardiac surgery patients, nursing staff need to immediately calculate the patient's risk index and evaluate the risk of delirium failure after the patient is transferred to the ICU. Based on the changes in the patient's condition, the frequency of early risk assessment is set. Within 24 hours after surgery, delirium risk assessment should be conducted at 1-hour intervals, and after 24 hours, delirium risk assessment should be conducted at 3-hour intervals Multi modal delirium risk management. To effectively prevent postoperative delirium in patients undergoing cardiac surgery, a delirium control team should be formed by ICU nursing staff, nutrition, psychiatry, respiratory, cardiology and other nursing staff to conduct a more comprehensive evaluation of the patients Enhancement of specialized skills for ICU nursing staff. Regularly provide targeted training for ICU nursing staff to enhance their skills in preventing and managing delirium, and provide more comprehensive nursing support for cardiac surgery patients Comprehensive patient management. After the patient's consciousness is restored, nursing staff need to patiently communicate with the patient, inform them of the success and effectiveness of the surgery as soon as possible, and relieve the patient's psychological pressure. And explain the follow-up treatment plan to the patient, and share some similar cases with the patient after their life indicators stabilize to avoid excessive concern.

2.3 Outcome Measures

(1) Comparison of delirium scores. Using the Intensive Care Delirium Screening Scale (ICUDC), a statistical analysis was conducted on the delirium scores of patients during postoperative recovery. The scale evaluates patients from five dimensions: changes in consciousness, lack of concentration, disorientation, hallucinations, delusional psychiatric states, and psychomotor excitement or delay. The score range for each dimension is from 0 to 8 points, with higher scores indicating more severe delirium symptoms. (2) Statistics on the incidence of delirium. Statistical analysis was conducted on the incidence of delirium during ICU treatment for two groups.

2.4 Statistics

Through SPSS 22.0 analysis of various data in the study, mean ± standard deviation was used to represent the measurement data, and t-test showed that $P<0.05$ had statistical significance.

3. Experimental Result

3.1 Comparison of Delirium Scores between Two Groups

Compared to the control group, the observation group had lower delirium scores after management, ($P<0.05$), the specific data are shown in Table 1:

Table 1. Comparison of Delirium Scores between Two Groups($\bar{x} \pm s$)

Group	Number of cases	Change of state of consciousness	hypoprosexia	disorientation	Illusion, fantasy mental state	Psychomotor excitement or dullness
Observer group	35	3.52±0.22	3.05±0.21	2.65±0.18	3.42±0.25	2.62±0.14
Control group	35	5.35±0.35	4.75±0.25	4.17±0.25	5.01±0.17	4.25±0.18
t	-	7.142	12.135	13.447	20.045	12.045
P	-	0.001	0.001	0.001	0.001	0.001

3.2 Statistics of Te Incidence of Delirium in The Two Groups

The incidence of delirium in the observation group was lower than that in the control group ($P<0.05$), the specific data shown in Table 2.

Table 2. Statistics of The Incidence of Delirium in The Two Groups[n,(%)]

Group	Number of cases	Abnormal attention	Anomaly of directional force	Mental and behavioral disorders	Abnormal language emotion	Somnipathy dyssomnia	Incidence
Observer group	35	1(2.86)	1(2.86)	1(2.86)	0(0.00)	0(0.00)	3(2.86)
Control group	35	2(5.71)	1(2.86)	1(2.86)	2(5.71)	2(5.71)	8(22.86)
χ^2	-						18.052
P	-						0.001

4. Conclusion

Cardiac surgery has high implementation difficulty and causes significant trauma to patients during the surgical process, requiring patients to recover for a long time after surgery. During the process of transferring patients to the ICU for treatment after surgery, they are influenced by various factors, which increases the risk of delirium and directly affects their recovery. Therefore, effective risk management measures should be taken to prevent delirium in patients undergoing cardiac surgery during ICU treatment.

The risk management model of HFMEA is a new model for clinical risk management. By evaluating the risk of delirium in patients during ICU treatment, identifying the factors that cause delirium, and developing comprehensive management measures, it aims to prevent delirium. Based on the characteristics of patients undergoing cardiac surgery, increasing the frequency of delirium risk assessment appropriately in the early stages of recovery can accurately grasp the risk of delirium in patients, and establish a multidisciplinary delirium management team to provide nursing support to patients from different dimensions and meet their needs in different dimensions during the recovery period. Timely comprehensive management of patients can help them quickly adapt to the postoperative ICU treatment environment and prevent delirium. Based on this observation, under the HFMEA mode of delirium risk management, the delirium score of patients during ICU treatment can be reduced, the incidence of delirium can be lowered, and it is helpful for patients to recover.

Through comprehensive research, the HFMEA model can be applied to manage the risk of delirium in ICU patients after cardiac surgery, improving management effectiveness and reducing the incidence of delirium.

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