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Study on application of GRACE scoring system on nursing of ACS patients

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Abstract. – OBJECTIVE: The aim of this study is to analyze application effects of specialized emergency nursing mode based on Global Registry Acute Coronary Events (GRACE) scoring system on Acute Coronary System (ACS) patients.

PATIENTS AND METHODS: 135 ACS cases in this hospital of the same period were selected and they were divided into control group (65 cases) and observation group (70 cases) according to random number method and their order of hospitalization. The standard specialized nursing mode was applied in the control group while specialized nursing mode based on GRACE scoring system was applied in observation group to compare treatment effects.

RESULTS: We found that average time of Door-to-Balloon, surgery time and length of stay in observation group were shortened and the occurrence rate of complications during and after surgery was significantly lowered. The remedy achievement ratio and satisfaction scores on nursing are increased and differences were of statistical significance ($p<0.05$).

CONCLUSIONS: The stratified nursing was used to ACS patients based on GRACE scoring system, which was able to significantly increase remedy achievement ratio and decrease complications and, therefore, nursing quality is improved.

Key Words:
GRACE scoring system, Specialized nursing mode, ACS, Remedy achievement ratio.

Introduction

It was pointed out in International Treatment Guidelines on CPR/Cardiovascular Emergency in 2005 published by AHA and ACC that remedy achievement ratio and prognosis of ACS patients will be improved in condition that effective initial risk assessment and triage are performed in time and then patients are treated in Cardiology Department[1]. Taking it as a base, the series of effective scoring prediction systems were concluded through lots of clinical practice such as GRACE, TIMI and SIRS scoring, etc. (2). Risk stratification in GRACE scoring system was firstly recommended in latest guidelines of ACS administration and treatment published by ACC/AHA and ESC in 2007[3]. With treatment procedures "emergency triage" and "green channel" for coronary heart disease patients are emphasized in China and programmed clinical and nursing paths are established, treatment efficiency and achievement ratio of ACS patients are significantly improved[4]. This study provides a reference for improving nursing quality by analyzing the application of GRACE scoring system and specialized emergency nursing mode.

Patients and Methods

Patients

135 ACS patients in this hospital from October 2014 to October 2015 were selected and they were suffering from chest distress, chest pain and dizziness, with (or without) basic heart diseases. It was shown in conventional 18 lead electrocardiogram that at least two successive leads were with obvious ST segment elevation or depression while with (or without) positive myocardial injure marker (including creatine kinase-MB and troponin). Patients with severe anxious or depressive symptoms, acute gastrointestinal tract hemorrhage, acute pancreatitis, ectopic pregnancy, acute aortic dissection, acute thoracic trauma, poor compliance or incomplete clinical materials were excluded. After approval from patients and their families through Ethics Committee in this hospital, patients in this study were divided into control group (65 cases) and observation group (70 cases) by random number method and their order of hospitalization. In the control group, 4

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cases are changed to another hospital, 3 cases give up treatment, and 2 cases are lack of clinical materials, as last, there were 56 cases in this group, among which there were 30 males and 26 females. Their ages were between 30 and 72 years old and average age was (50.4±14.6) years old; 24 cases of STEMI, 21 cases of NSTEMI and 11 cases of UA; the time period from disease outbreak to admission was 10 min to 6h and the average value is (1.3±0.6) h; 12 cases with past coronary heart disease, 15 cases of hypertension, 7 cases of diabetes mellitus and 16 cases of hyperlipidaemia; 17 smoking cases. For observation group, 6 cases were changed to another hospital, 2 cases give up treatment and 3 cases were lack of clinical materials. At last, there were 59 cases in this group, among which there were 34 males and 25 females with ages between 41 and 75 years old, and average age of (53.6±15.2) years old. In addition, 26 cases of STEMI, 20 cases of NSTEMI and 13 cases of UA; the period from disease outbreak to admission was 15 min to 6.5h and the average value was (1.7±0.5) h; 13 cases with past coronary heart disease, 16 cases of hypertension, 5 cases of diabetes and 13 cases of hyperlipidaemia; 19 smoking cases. The differences between the two groups concerning age, gender, ACS type, time of disease outbreak, basic disease type and smoking ratio showed no statistical significance (p>0.05).

Nursing Method

The standard specialized nursing mode was used in the control group. The emergency triage and first diagnosis responsibility were carried out[5] and nurses informed doctors in related departments based on clinical symptoms of patients and perform measurement of life signs and electrocardiographic examination. Nurses contacted the Cardiovascular Department for referral after making a definite diagnosis as ACS, patients with stable conditions were transferred to cardiovascular ward directly and intervened with medicines and treated with myocardial revascularization. For patients with unstable conditions and that needs for emergency revascularization, the nurses contacted the Cardiovascular Catheters Department in time and performed an emergency coronary angiography through green channel. Correct revascularization method (PCI or CABG) was selected after being clear about pathological changes and, then, patients shall be sent to CCU for intensive care.

The specialized nursing mode based on GRACE scoring system was applied in the observation group. The nurses received specialized training, including GRACE scoring system[6] (including age, diabetes mellitus history, history of hypertension, heart rate, systolic pressure, Killip classification, cardiac arrest history, initial cardiac markers, initial creatinine level, ST segment elevation or depression degree, myocardial infarction history, etc.) and risk stratification was performed. If the scores were no less than 108 points, then it was divided into low risk group and low level nurses shall take care of patients in this group and be in charge of admission procedures, bed management, introduction on environment of ward and regulations, active communication with patients and getting to know patients' needs in time. The patients in emergency ward went through medical history collection, physical examination, related biochemical, ultrasound and imageological examinations and standard medical treatment process; and then they received GRACE scoring after 3-6h and for patients with condition changes, they were transferred to specialized treatment. For scores between 109 and 140 points, it was an intermediate risk group and the patients were taken care of by intermediate level nurses (with nurse practitioner qualification and work experience more than 5 years). They contacted the Angiocardiopathy Department in time for transfer treatment, collection of patients' EEG, myocardial biochemical markers, for evaluation and treatment of possible complications such as hypotension, emesis and arrhythmia. Meanwhile, they informed doctors at Emergency Department to prepare fluid infusion, anti-emesis and electrocardiograph monitoring. In addition, cardio-pulmonary resuscitation and electric defibrillation were performed when necessary. For scores more than 140 points, it was a high risk group and the patients were taken case of by head nurses or high level nurses (with nurse-in-charge qualification and working experience more than 10 years). They informed specialized medical staff from Angiocardiopathy Department to get ready and prepare Catheter Room, setting up peripheral venous access actively, performing fluid infusion, anticoagulation, antiplatelet, analgesia, blood pressure maintaining, heart rate control and myocardial nutrition. They performed electrocardiograph monitoring and cardiac markers examination continuously, prepared for possible malignant arrhythmia and recorded dynamic changes rules of cardiac

Table I. Comparisons of D-to-B average time, surgery time and length of stay.

Group	D-to-B average time (min)	Surgery time (min)	Length of stay (d)
Control	45.6±16.4	58.7±16.9	10.5±2.3
Observation	27.8±13.2	42.6±15.5	7.8±2.4
t	5.937	6.402	6.768
p	0.039	0.036	0.034

markers. Moreover, they prepared preoperative preparation and explained condition changes, risks of surgery to patients and their families, propose possible treatment plans and alleviate their anxieties.

Observation Indexes

The differences between the two groups in terms of door-to-Balloon (D-to-B) average time, surgery time, length of stay, prevalence rate of complications with surgery, remedy achievement ratio and scoring on nursing satisfaction were compared. Scoring scale prepared by this hospital was used for nursing satisfaction scoring, including clinical reception, transfer treatment, nursing attitude and operating skills. The clinical reception including inquiring symptoms, conditions judgment and assisting doctors, transfer treatment includes contact in time, adequate preparation and correct transfer, nursing attitude including immediate words, behavior and nursing, operating skills including specialized knowledge, invasive manipulation and relative examination. There were three grades for each item, "satisfied", "ok" and "bad", which were 2 points, 1 point and -1 point. A high score means better nursing satisfaction. Validity index of scale was 0.869 and Cronbach's α was 0.794.

Statistical Analysis

SPSS 19.0 statistical software (SPSS Inc., Chicago, IL, USA) was used and measurement data was represented by mean value ± standard deviation and through t-testing. Enumeration data was shown by cases or (%) and χ^2 testing is used for enumeration data and $p<0.05$ means the difference is of statistical significance.

Results

Comparisons of D-to-B Average time, Surgery time and Length of Stay

D-to-B average time, surgery time and length of stay in observation group were shortened significantly ($p<0.05$) as shown in Table I.

Comparison of occurrence Rate of Complications and Remedy Achievement Ratio During and after Surgery

The occurrence rate of complications in the observation group during and after surgery was significantly lowered and remedy achievement ratio was significantly increased ($p<0.05$) as shown in Table II.

Comparison of Nursing Satisfaction Scoring

Nursing satisfaction scoring in observation group was increased significantly ($p<0.05$) (Table III).

Discussion

It can be known by GRACE scoring that death risk of low risk patients in the hospital is less than 1%[6], while for intermediate and high risk patients,

Table III. Comparison of nursing satisfaction scoring (points).

Group	Clinical reception	Transfer treatment	Nursing attitude	Operating skills	Total points
Control	3.5±1.3	3.1±1.2	3.2±1.4	3.3±1.1	12.6±1.8
Observation	4.6±1.2	4.3±1.3	4.5±1.3	4.7±1.5	17.2±1.7
t	4.927	4.685	5.102	5.324	6.302
p	0.038	0.041	0.036	0.034	0.027

Table II. Comparison of occurence rate of complications and remedy achievement ratio during and after surgery [cases (%)].

Group	Cases	Acute thrombosis	Shock	Malignant arrhythmia	Others	Complications during surgery	Acute stent thrombosis	Wound bleeding and hematoma	Pain	Others	Complications after surgery
Control	56	5	2	3	2	12 (21.4)	3	3	6	2	14 (25.0)
Observation	59	2	1	1	1	5 (8.5)	1	1	3	1	6 (10.2)
χ^2						3.827					4.398
p						0.050					0.036

the death risk is 1-3% and more than 3%, separately. It was suggested that two conditions can be regarded as the basis of urgent (<2h), early (<24h) and delayed (within 72h) invasive strategy, one is if the scoring is more than 140 points and the other was the amount of high risk factors. Currently, GRACE study was the first scoring system that performs prospective observation on ACS of all countries in the world. The risk scoring must be applied to initial risk evaluation procedures after admission in order to predict death rate and incidence rate of myocardial infarction[7]. GRACE scoring further refines risk factors and quantification, which was more scientific and reasonable than TIMI system[8].

In emergency treatment of ACS, the combination of clinical and nursing path was able to increase treatment efficiency and achievement rate[9]. First of all, GRACE scoring can specify the risk degrees. Nurses with less working experience took care of low risk patients and follow up their condition changes in time. During observation in the Emergency Department, GRACE scoring was evaluated regularly, patients with stable conditions received correct treatment based on standard medical treatment procedures and avoided delaying optimal window for treatment because of transferring to Cardiopathy Department. For patients with unstable conditions, the changes were discovered in time and treated correctly, which saved more treatment time for transfer treatment in next step[10].

Less experienced nurse can look after 2 or 3 patients. As for intermediate risk patients, intermediate or more experienced nurses were recommended to predict early the risk of the diseases and assist doctors to clinic data collection, referral and the performance of doctor's advice timely. Generally, one senior nurse practitioner can take care of 3 or 4 low level nurses' daily nurse operation training, supervision and correction, the check and implementation of doctors' advice, reduce the medical and nursing errors[11]. As for high-risk patients, head nurse and nurse-in-charge should be responsible for them so as to implement multidisciplinary close cooperation practically and effectively[12]. Be responsible for implementation, feedback and improvement of wards' daily nursing regulation; facing dealing with great care accidents timely; providing the doctor-in-charge with the feedback of patients' disease changes and the adjustment of the treatment plan. Aged patients always have basic heart disease complicated with many other diseases, generally with heavier ACS

lesion, poor heart function and high severe concurrence incidence. On the one hand, their family should be explained correctly the disease risk and operation plan. On the other hand, plans should be prepared to response various complications[13]. The bleeding risk caused by antiplatelet and anticoagulant therapy during ACS treatment is always the clinic difficulty. According to GRACE scoring system, ESC predicted that independent factors causing bleeding are advanced age, female, history bleeding, PIC or history of renal insufficiency, using GPIIb/IIIa antagonist, excessive anticoagulant and antithrombotic drugs, etc.[14]. Closely monitoring blood coagulation indexes, personalized medicine plan can not only avoid the incidence of postoperative acute stent thrombosis, but also reduce the post-operation bleeding risk[15].

The study indicates that D-to-B of observation group's average time, operation time and length of stay decreased significantly (Table I), occurrence of complications during and after operation decreased significantly (Table II), remedy achievement ratio increased significantly, nursing satisfaction score increased significantly (Table III). The study involved nursing operation on ACS patients from hospitalization to treatment period and study on nursing guide for ACS patients after operation and post-discharge so that GRACE scoring system was of great significance for improving cardiac rehabilitation and living quality[16].

Conclusions

The stratified nursing is used to ACS patients based on GRACE scoring system, which was able to significantly increase remedy achievement ratio and decrease complications and, therefore, nursing quality was improved.

Conflicts of interest

The authors declare no conflicts of interest.

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