

# Analysis of Risk Factors for Postoperative Ketoacidosis in Patients with Coronary Heart Disease Complicated with Diabetes Mellitus

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**Abstract:** Objective: To analyze the risk factors for postoperative ketoacidosis in patients with coronary heart disease complicated with diabetes mellitus. Methods: A retrospective analysis was conducted on 94 patients with coronary heart disease complicated with diabetes mellitus who underwent surgery in our hospital from March 2024 to May 2025. They were divided into two groups according to the presence of postoperative ketoacidosis: the non-ketoacidosis group (59 cases) and the ketoacidosis group (35 cases). The clinical data of the two groups were analyzed. Results: There were significant differences between the two groups in blood glucose level, postoperative stress response level, infection, and postoperative nutritional level ( $P<0.05$ ). The postoperative diuretic use rate in the ketoacidosis group was higher than that in the non-ketoacidosis group ( $P<0.05$ ). Conclusion: Blood glucose level, postoperative stress response level, infection, and postoperative nutritional level are risk factors for postoperative ketoacidosis in patients with coronary heart disease complicated with diabetes mellitus, which require attention in clinical treatment.

**Keywords:** Risk Management; Cardiac Surgery; Acute Skin Failure; Nursing

## 1. Introduction

Coronary heart disease complicated with diabetes mellitus is one of the most common clinical diseases. There is no specific radical treatment, and the disease is characterized by progressive development. Patients with coronary heart disease complicated with diabetes mellitus are at risk of developing ketoacidosis during surgical treatment, which directly affects patient recovery<sup>[1-2]</sup>. To

effectively ensure the effect of surgical treatment for coronary heart disease complicated with diabetes mellitus, it is necessary to analyze the risk factors leading to postoperative ketoacidosis in these patients and promptly formulate relevant management plans to reduce the incidence of postoperative ketoacidosis<sup>[3-4]</sup>. This study analyzed the risk factors for postoperative ketoacidosis in patients with coronary heart disease complicated with diabetes mellitus through retrospective analysis.

## 2. Materials and Methods

### 2.1 General Data

A total of 94 patients with coronary heart disease complicated with diabetes mellitus who underwent surgery in our hospital from March 2024 to May 2025 were retrospectively enrolled. They were divided into the non-ketoacidosis group (59 cases) and the ketoacidosis group (35 cases) based on the occurrence of postoperative ketoacidosis. Inclusion criteria: (1) First-time surgical treatment in our hospital. (2) Confirmed diagnosis of coronary heart disease complicated with diabetes mellitus. (3) Normal cognitive and language expression abilities. Exclusion criteria: (1) Complicated with cancer. (2) Presence of congenital diseases.

### 2.2 Methods

The clinical data of the enrolled patients were analyzed, including age, body mass index (BMI), blood glucose level, postoperative stress response level, infection, and postoperative nutritional level. Blood glucose level was evaluated by measuring fasting blood glucose and 2-hour postprandial blood glucose after surgery. Elbow venous blood was collected after surgery to measure epinephrine and norepinephrine levels using an automatic

biochemical analyzer. Meanwhile, elbow venous blood was collected to detect hemoglobin, albumin, and transferrin levels.

### 2.3 Statistical Methods

Statistical analysis was performed using SPSS 26.0 software. Spearman correlation analysis was used to assess the correlation between various indicators. Univariate and multivariate regression analyses were conducted on relevant

variables to screen for factors affecting postoperative ketoacidosis.

## 3. Results

### 3.1 Comparison of Baseline Data

There were no significant differences in baseline data such as age and gender between the non-ketoacidosis group and the ketoacidosis group ( $P>0.05$ ), as shown in Table 1.

**Table 1. Comparison of Baseline Data Between the Two Groups [n, (%)]**

Variables	Non-ketoacidosis group (59 cases)	Ketoacidosis group (35 cases)	Statistical value	P
Age (years)	65.45±2.01	64.25±2.25	0.425	0.458
Gender	-	-	-	-
Male	30(50.85)	18(51.43)	0.003	0.957
Female	29(49.15)	17(48.57)		
Body mass index (kg/m <sup>2</sup> )	22.45±1.35	22.58±1.45	0.234	0.815
Course of disease (years)	5.36±1.02	5.41±1.11	0.425	0.4152

### 3.2 Statistics of Blood Glucose Level, Postoperative Stress Response Level, Infection, and Postoperative Nutritional Level in the Two Groups

**Table 2. Statistics of Blood Glucose Level, Postoperative Stress Response Level, Infection, and Postoperative Nutritional Level in the Two Groups (x±s)**

Groups	Number of cases	Epinephrine (ng/ml)	Norepinephrine (ng/ml)	Hemoglobin (g/L)	Albumin (g/L)	Fasting blood glucose (mmol/L)	2-hour postprandial blood glucose (mmol/L)	Infection rate (%)
Non-ketoacidosis group	59	71.85±2.11	63.56±2.67	122.45±2.25	37.45±1.68	6.35±0.15	9.05±1.12	1(1.69%)
Ketoacidosis group	35	81.45±1.67	72.45±2.77	107.45±2.11	34.74±1.85	7.65±0.22	11.45±1.25	8(22.86%)
X2/t	-	37.836	96.493	26.452	20.425	20.052	26.411	16.487
P	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

### 3.3 Analysis of Risk Factors

Blood glucose level, postoperative stress response level, infection, and postoperative

There were significant differences between the two groups in blood glucose level, postoperative stress response level, infection, and postoperative nutritional level ( $P<0.05$ ), as shown in Table 2.

nutritional level were identified as risk factors for postoperative ketoacidosis in patients with coronary heart disease complicated with diabetes mellitus, as shown in Table 3.

**Table 3. Analysis of Risk Factors**

Groups	AUC	95%CI	Sensitivity (%)	Specificity (%)
Blood glucose level	0.88	0.77~0.92	85.45	76.85
Postoperative stress response level	0.87	0.82~0.93	84.65	75.98
Infection	0.91	0.88~0.94	78.04	90.45
Postoperative nutrition	0.98	0.87~0.91	78.88	91.36

## 4. Discussion

Ketoacidosis is a common postoperative complication in patients with coronary heart disease complicated with diabetes mellitus. Its inducing factors are complex, which directly affects patient recovery, the comprehensive

effect of surgical treatment, and even increases the risk of other complications<sup>[5-6]</sup>. In the process of managing patients with coronary heart disease complicated with diabetes mellitus undergoing surgery, it is necessary to accurately analyze various risk factors and implement targeted management to reduce the incidence of

ketoacidosis.

According to this retrospective analysis, blood glucose level, postoperative stress response level, infection, and postoperative nutritional level are risk factors for postoperative ketoacidosis in patients with coronary heart disease complicated with diabetes mellitus. Poorly controlled blood glucose may lead to ketone bodies produced by fat decomposition exceeding the metabolic capacity of the liver, increasing the risk of ketoacidosis<sup>[7]</sup>. Under the influence of postoperative stress response, the levels of epinephrine and norepinephrine in patients are prone to antagonize insulin, thereby increasing blood glucose levels and the risk of ketoacidosis. Postoperative infection can increase ketone body levels in patients, making blood glucose control more difficult and also increasing the risk of ketoacidosis. Poor nutritional status can accelerate fat decomposition, thereby increasing ketone body levels and the risk of ketoacidosis. Therefore, in the postoperative management of patients with coronary heart disease complicated with diabetes mellitus, it is necessary to accurately identify various risk factors and conduct corresponding management to reduce the incidence of ketoacidosis.

In conclusion, blood glucose level, postoperative stress response level, infection, and postoperative nutritional level are risk factors for postoperative ketoacidosis in patients with coronary heart disease complicated with diabetes mellitus, which require attention in clinical treatment.

### Acknowledgments

This paper is supported by Application of ACTED Rehabilitation Nursing Model in Patients After CABG Surgery (Project Number:

2023HL-47)

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