Influence of ulinastatin on myocardial enzyme spectrum, inflammatory state and reperfusion injury of patients with extracorporeal circulation heart operation

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ABSTRACT

Objective: To study the influence of ulinastatin on the myocardial enzymes, the inflammatory state and the reperfusion injury of patients with cardiopulmonary bypass. Methods: A total of 60 patients with extracorporeal circulation heart operation in our hospital from September 2012 to August 2015 were taken as research objects. 60 patients were randomly divided into two groups: observation group (conventional surgery group with ulinastatin, 30 cases) and control group (conventional surgery group, 30 cases), and then detected and compared the related indicators of serum cardiac enzymes, inflammatory state and ischemia-reperfusion injury of two test groups at 12 h, 24 h, 72 h after operation. Results: The serum myocardial zymogram of the observation group at 12 h, 24 h and 72 h after the operation were all lower than those of the control group. Meanwhile, the inflammatory indexes and the reperfusion injury indexes of the observation group were also better than those of the control group. The test result of two groups had significant differences. Conclusions: Ulinastatin can effectively improve the myocardial enzyme spectrum and the inflammatory state of patients with extracorporeal circulation heart operation. Besides, ulinastatin is also plays active role in the prevention of reperfusion injury.

1. Introduction

The extracorporeal circulation heart operation is one of the most applied surgical options in recent years, and there are more and more relevant studies about it. Most of the studies focuses on the organ functions, especially the heart function and reperfusion injury, in the perioperative period. Therefore, intervention is very significant for these patients. It is not only concerns to the therapeutic effect of operation, but also have great influence on the condition of heart function[1,2]. So, it is of important significance to find an preferable preventive intervention measure.

In this paper, the influence of ulinastatin on the myocardial enzymes, the inflammatory state and the reperfusion injury of patients with cardiopulmonary bypass was observed, and the observation results as follows.

2. Materials and methods

2.1. Clinical materials

A total of 60 patients with extracorporeal circulation heart operation in our hospital from September 2012 to August 2015 were taken as research objects. 60 patients were randomly divided into two groups: the observation group (conventional surgery group with ulinastatin, 30 cases) and the control group (conventional surgery group, 30 cases). In 30 cases of the control group, there are 18 males and 12 females, aged 31 to 61 years old (the mean age is (36.2±5.8). The NYHA classification of the control group is that 10 persons get I grade and 20 persons get II grade including 13 mitral valve replacements, 10 atrial septal defects and 7 others. The gender, age, NYHA classification and operation type of two groups is comparable (P>0.05).
2.2. Methods

2.2.1. Treatment methods
The patients of two groups all received the surgical treatment under general anesthesia extracorporeal circulation. Meanwhile, the medicine in the operation and the operation steps of two groups has no significant differences. The patients of observation group accepted some extra ulinastatin including 300 thousand unit ulinastatin which been given after anesthesia induction and 600 thousand unit ulinastatin which been added into the priming, and then detected and compared the related indicators of serum cardiac enzymes, inflammatory state and ischemia-reperfusion injury of two test groups at 12 h, 24 h, 72 h after operation.

2.2.2. Detection methods
The detection indexes of myocardial enzymes are HDBH, CK and CK-MB. The detection indexes of inflammatory state are TNF-α, IL-8 and IL-10. The detection indexes of reperfusion injury are MMP-9, MDA and HSP70. The above-mentioned indexes all been detected by the method of Enzyme-Linked Immunosorbent Assay (ELISA). Serum samples were gotten by centrifuging the peripheral venous blood, and the blood sample was gotten at 12 h, 24 h, 72 h before and after operation.

2.3. Statistics process
The software SPSS 15.0 was used to process the data of this paper. The Measurement data, including age, myocardial enzyme, inflammatory state and reperfusion injury related indexes, were subjected to t-test. The enumeration data, including gender, NYHA classification and operation type, were subjected Chi-square test. There are has significant differences when \( P < 0.05 \).

3. Results

3.1. The comparison of serum myocardial enzymes indexes
The serum myocardial enzymes indexes of two groups, such as HDBH, CK and CK-MB, all have no significant differences \((P>0.05)\) before operation, but the serum myocardial enzymes indexes of the observation group all lower than those of the control group at 12 h, 24 h, 72 h after operation, and there is a remarkable difference \((P<0.05)\). The detailed data is presented in table 1.

3.2. The comparison of serum inflammatory state indexes
The serum inflammatory state indexes of two groups, such as TNF-α, IL-8 and IL-10, all have no significant differences \((P>0.05)\) before operation. The value of TNF-α and IL-8 of the observation group all lower than those of the control group at 12 h, 24 h, 72 h after operation except IL-10, and there is a remarkable difference \((P<0.05)\). The detailed data is presented in table 2.

3.3. The comparison of serum reperfusion injury indexes
The serum reperfusion injury indexes of two groups, such as MMP-9, MDA and HSP70, all have no significant differences \((P>0.05)\) before operation, but the serum reperfusion injury indexes of the observation group all lower than those of the control group at 12 h, 24 h, 72 h after operation, and there is a remarkable difference \((P<0.05)\). The detailed data is presented in table 3.

| Table 1 | The comparison of serum myocardial enzymes indexes of two groups (U/L). |
| --- | --- | --- |
| Groups | HDBH | CK | CK-MB |
| Control (n=30) Before operation | 148.98±15.96 | 221.37±18.49 | 30.52±3.24 |
| 12 h after operation | 190.24±20.75 | 328.56±28.54 | 57.59±5.48 |
| 24 h after operation | 191.33±21.08 | 332.78±29.29 | 58.10±5.52 |
| 72 h after operation | 172.35±16.89 | 283.64±20.50 | 52.61±5.18 |
| Observation (n=30) Before operation | 148.99±15.93 | 221.39±18.45 | 30.55±3.22 |
| 12 h after operation | 171.43±17.25* | 290.46±24.85* | 45.22±4.75* |
| 24 h after operation | 171.58±17.48* | 289.71±22.73* | 42.07±4.39* |
| 72 h after operation | 154.61±16.16* | 240.76±20.57* | 38.26±3.79* |

The test results of two groups after operation have significant differences \((P<0.05)\).

| Table 2 | The comparison of serum inflammatory state indexes of two groups. |
| --- | --- | --- |
| Groups | TNF-α (ng/mL) | IL-8 (pg/mL) | IL-10 (pg/mL) |
| Control (n=30) Before operation | 178.24±16.39 | 10.97±1.85 | 33.59±2.76 |
| 12 h after operation | 218.74±20.85 | 21.34±2.45 | 20.56±2.22 |
| 24 h after operation | 220.69±21.76 | 22.79±2.78 | 19.48±2.05 |
| 72 h after operation | 205.15±19.83 | 18.40±2.24 | 22.79±2.42 |
| Observation (n=30) Before operation | 178.28±16.37 | 10.98±1.83 | 33.61±2.73 |
| 12 h after operation | 190.21±19.23* | 17.36±2.19* | 25.38±2.63* |
| 24 h after operation | 187.46±19.18* | 16.88±2.10* | 25.16±2.60* |
| 72 h after operation | 180.56±18.21* | 13.72±1.94* | 28.81±2.69* |

The test results of two groups after operation have significant differences \((P<0.05)\).
4. Discussion

The extracorporeal circulation heart operation has a large proportion in clinical application for it can effectively guarantee sufficient operative view during heart operation. So the extracorporeal circulation heart operation has good clinical effect, and there are many related studies. The influence on organism made by the operation was deeply researched as well as the effect of the extracorporeal circulation heart operation in recent years[3]. In the studies, the study about myocardial injury and inflammatory state is one of the most popular and prominent aspects[4]. Besides, how to reduce the reperfusion injury is a research hotspot of clinical treatment. There is a large amount of the study about the influence of ulinastatin on intervening the reperfusion injury of system and organ including the study on the application of ulinastatin in cardiac surgery. However, the study on the comprehensive intervention effects of ulinastatin is insufficient[5,6].

In this paper, the influence of ulinastatin on myocardial enzymes, inflammatory state and reperfusion injury of patients with cardiopulmonary bypass was observed by clinical test. The test result show that the patients of using ulinastatin treated have lower myocardial enzymes indexes, and this indicates that ulinastatin can reduce the degree of myocardial injury. At the same time, the patients of using ulinastatin treated also has smaller fluctuation of inflammatory state indexes, such as TNF-α, IL-8 and IL-10. This indicates that ulinastatin can also reduce the degree of the organism stress response, which can let ulinastatin widely used in the application of reducing surgical trauma. Besides, the patients of using ulinastatin treated also have lower reperfusion injury related indexes, such as MMP-9, MDA and HSP70. Actually, ulinastatin can control the reperfusion related injury by regulating the oxidative stress and the active state[7]. So, the comprehensive protection of ulinastatin to patients has been widely recognized. In the application of ulinastatin, it can effectively regulate the oxygen radicals of patients and the inhibitors of myocardium, and play an active role in the releases of inflammatory factors[8-10].

In summary, ulinastatin can effectively improve the myocardial enzyme spectrum and the inflammatory state of patients with extracorporeal circulation heart operation. Besides, ulinastatin is also plays active role in the prevention of reperfusion injury. In a word, ulinastatin has some unique comprehensive advantages in extracorporeal circulation heart operation.

### References


