American Journal of Medicine and Medical Sciences 2020, 10(11): 911-913
DOI: 10.5923/j.ajmms.20201011.17

Method of Improving Vasopressor Therapy for Acute Myocardic Infarction Complied with Cardiogenic Shock

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Abstract This article is devoted to the improvement of vasopressor therapy used in the treatment of patients with acute myocardial infarction complicated by cardiogenic shock. Today, despite the development of the medical field and the rapid growth of the pharmaceutical industry, one of the most serious complications of acute myocardial infarction is mortality after cardiogenic shock. Moderate acute myocardial infarction (OMI) is complicated by cardiogenic shock (CS) in 20-30% of cases. It is known from scientific sources that the death rate from KS has reached 30-40%. This is now one of the global challenges of the health care system.

Keywords Cardiogenic shock, Vasopressor, Thrombolytic therapy (TLT), Antiaggregants

1. Introduction

It is known that acute myocardial infarction is one of the most serious pathologies in coronary heart disease, which in turn leads to a sharp decrease in work capacity and many fatal consequences. In most cases, lethal consequences are caused by myocardial infarction with cardiogenic shock.

It is known that shock is the death of these cells. Numerous literatures show that in recent years the incidence of CK has decreased and accounts for 5-9% of OMI.

Numerous studies have shown that achieving these results is not surprising given the widespread use of thrombolytic therapy (TLT) in medicine, surgical procedures, and the correct implementation of treatment tactics in this group of patients.

However, the lethal consequences from the US remain high, having been found to be 40-90% today. Effective treatment of these patients still remains one of the major and challenging problems of the health care system.

Le Dran first coined the term "shock" and its clinical significance in 1743, describing shock as a "post-addictive steady state." can develop.

Throughout the history of the study of shock, with its descriptions and classifications in many literatures, Moore described it as follows: "The greater the cause of death, the more types of shock there are."

Therefore, shock treatment should focus on the choice of vasopressor, infusion therapies, and organ preservation. Therefore, the correct choice of vasopressor therapy in the treatment of shock dramatically reduces mortality.

Initiation of dopamine (equivalent to norepinephrine) in the treatment of shock affects dopamine receptors, α and breceptors, improving blood flow to internal organs and preventing cell death.

The presented data show the importance of vasopressor therapy in the treatment of CK, its clinical and dermographic changes and its impact on mortality. OMI is intended to improve the treatment of CKD.

The aim of this study was to improve the treatment of cardiogenic shock from vasopressor therapy by comparative diagnosis of norepinephrine and dopamine.

2. Materials and Methods of Research

In order to achieve this goal, 78 patients treated with the diagnosis of "acute myocardial infarction complicated by cardiogenic shock" in the Bukhara branch of the RCST in 2018-2020 were involved in research.

All patients were prescribed additional vasopressor therapy in addition to standard therapy (anticoagulants, antiaggregants, nitrates, glucocorticosteroids, diuretics, and thrombolytics as directed).

In order to evaluate the effectiveness of norepinephrine and dopamine, patients were divided into 2 groups: 30 patients in group 1 were prescribed norepinephrine (Norepin 0.2% -8mg 4.0 ml) intravenously in a 3-5 mcg / kg / min infusion for 24 hours); In 48 patients in group 2, dopamine (dopamine 40mg / ml- 4% -5.0ml) was administered intravenously at a dose of 2–10 μg / kg / min for 24 h, starting with arterial pressure (A / B), ventricular systole (SVS), under pulse control.

The dose of medication is selected according to the instructions of the treating physician. Hemodynamics were not compared when doses were selected.

All patients were asked to complete a general clinical

Received: Sep. 29, 2020; Accepted: Nov. 4, 2020; Published: Nov. 28, 2020
Published online at http://journal.sapub.org/ajmms

analysis, i.e., general condition at the time of admission and post-infusion status in all patients, in which symptoms of acute heart failure were assessed on a H7 score system, i.e., +3 very good, +2 relatively good, + 1 is partially good, 0 is completely unchanged, -1 is worse, -2 is significantly worse, - 1 is very bad.

Biochemical analysis of blood showed lipid spectrum (LPNP, LPVP, triglycerides, total cholesterol), glucose, urea, creatinine in all patients. and renal pelvic filtration rate in all patients was calculated based on the MDRD formula in ml / min / 1.73m2:

- for men 186 x (amount [mg / dl] 1,154) x (age);
- for women 186 x (creatinine in the blood [mg / dl]) x (age) x 0.742.

Renal insufficiency Kidney ball filtration rate <90ml / min / 1.73m2 was calculated.

Ultrasound examination of the heart (EXOKG), Doppler examination in M- and V-mode. The fraction of the left ventricle of the heart is FV LJ, and its final systolic measurement (KSR) and final diastolic measurement (KDR).

Myocardial contractility (norm, hypokinesia, akinesia, dyskinesia) was observed. In evaluating the effectiveness of therapy, EXOKG was performed on day 1 of therapy and on the day therapy was discontinued.

Electrocardiography was performed in 12 standard networks.

To assess the arrhythmogenic effects of the drugs, Holter monitoring was performed 1 and after infusion cessation.

QT interval dispersion was considered the norm to be up to 60 ms in standard 12 networks between maximum and minimum QT intervals. The monitor calculated supraventricular paraxysmal extrasystoles, the maximum frequency of ventricular extrasystoles, the maximum frequency of ventricular tachycardia.

The diagnosis was based on the Killip scale, based on clinical and ECG signs.

3. Results and Discussion

The mean age of the 78 patients involved in the study was 66 ± 4.5 years. Of these, 52 are male and 26 are female.

Of these, 64 (82%) cases had a history of arterial hypertension, type 2 diabetes mellitus 43 (55%), harmful habits - smoking 40 (51%), hypercholesterolemia 58 (74%) cases (Table 1). All patients were monitored during treatment. The mean day spent in the hospital was 10 ± 3.4 days.

Table 1. Indicators of comorbidities and harmful habits of the studied patients, n = 78

Indicators	Absolutely	%
Arterial hypertension	64	82%
Type 2 diabetes	43	55%
Smoking	40	51%
Hypercholesterolemia	58	74%

The patient reported a decrease in the rate of renal glomerular filtration and an increase in creatinine in the blood. 35% of patients in the group presented with a 3-day OMI, 28% with a 2-day OMI, and 37% with a 1-day OMI. In left ventricular FV analysis, FV <35% was reported in 26% of cases, FV from 35% to 50% in 16% of cases, and FV> 51% in 6% of cases.

Patients in the group were not given b-blockers and APF-inhibitors because they further reduced renal function in a state of shock. In all other patients, nitrates, diuretics, a group of inotropic drugs, anticoagulants, antiaggregants, statins, hormones, and vasopressors were recommended as directed. TLT was performed in 17% of cases.

Lower renal glomerular filtration rate (<48 ml / min / 1.73m2) led to higher creatinine in the blood, which made the clinical course more severe. Lethality was also reported in 17% of cases below renal glomerular filtration rate <48 ml / min / 1.73m2.

No differences in clinical-dermographic age, sex, harmful habits, and obesity were identified among the groups undergoing vasopressor therapy. General blood analysis, biochemical analysis, blood clotting time, blood coagulation system, and general urine analysis were performed.

Proarrhythmic feature: 6 patients had nocturnal left ventricular potential before norepinephrine administration, no condition was observed after infusion.

Prior to infusion, QT interval variance was among the normal values (91 ± 15 ms) in 12 patients, while in the remaining patients they were 60 cm (48 ± 10 ms). After infusion, they were 42 ± 10ms in 18 patients and 82 ± 18 ms in 12 patients. The QT length remained almost unchanged after norepinephrine infusion, but the QT interval variance decreased from 73.8 ± 8.5 ms to 65.7 ± 5.05 ms (Table 2).

Table 2. Analysis of cardiac parameters before and after infusion

Indicator	Infusion	Before
TotQRS,Mc	109,7±5,7	107,8±3,9
LAS40,MC	28,0±6,1	31,7±2,4
RMS40,MKB	35,8±8,3	37,3±6,1
QT, мс	361,3±16,7	383,7±11,2*
QTc, мс	469,3±15,3	391,7±9,4*
Dispersion;QT, мс	73,8±8,5	65,7±5,05

Note: * - reliability mark.

Signs of ectopic activity remained virtually unchanged before and after infusion. No arrhythmias were recorded before and after the infusion according to statistically significant character and severity. QT interval variance exceeded 100ms. No deepening of ischemia in the myocardium was observed during and after the infusion.

4. Conclusions

1. In acute myocardial infarction complicated by cardiogenic shock, maximum vasopressor therapy

should be selected for immediate relief of shock. This, in turn, prevents the recording of deaths and the increase in disability among patients.

2. Complications of acute myocardial infarction with cardiogenic shock are more common in the elderly due to organic changes, in patients with low heart rate, in patients with a sharp decrease in renal function.
3. The importance of vasopressor therapy in acute myocardial infarction is important because it provides the necessary hypoperfusion in the tissues. Dopamine can cause high blood pressure as well as tachycardia, which further increases the myocardium's need for oxygen, deepening the ischemia. Norepinephrine does not affect IUDs and in turn raises blood pressure, making it superior to dopamine.

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