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АНГИОГРАФИЧЕСКИЕ И ПРОЦЕДУРНЫЕ ОСОБЕННОСТИ У ПАЦИЕНТОВ С ИНФАРКТОМ МИОКАРДА С ПОДЪЕМОМ СЕГМЕНТА ST, РАЗВИВШИМСЯ НА ФОНЕ COVID-19

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Аннотация

Введение. Коронавирусная инфекция связана со значительным сердечно-сосудистым риском и может сопровождаться острым инфарктом миокарда с подъемом сегмента ST (ИМпST). **Цель исследования** - выявить ангиографические и процедурные особенности у пациентов с ИМпST на фоне COVID-19, которым была проведена коронарная ангиография (КАГ). **Материалы и методы.** В исследование "случай-контроль" было включено 114 пациентов: 57 пар, скорректированных по полу, возрасту и диагнозу ИМпST, которым была проведена КАГ для выполнения первичного чрескожного коронарного вмешательства. В каждой паре пациент был госпитализирован из-за ИМпST и COVID-19 (группа 1) и ИМпST без COVID-19 (группа 2). Согласно правилам маршрутизации, пациенты из исследуемой и контрольной группы были госпитализированы в две разные больницы города Екатеринбург. Был выбран уровень статистической значимости $p<0,05$. **Результаты.** Не было выявлено статистически значимых различий в ангиографической оценке коронарных артерий и процедурных особенностях у пациентов с ИМпST и COVID-19 по сравнению с ИМпST у неинфицированных пациентов. **Обсуждение.** Результаты КАГ показывают противоречивые данные, есть исследования, доказывающие высокую тромботическую нагрузку независимо от атеросклеротического поражения, другие исследования не обнаруживают различий между пациентами с ИМпST с COVID-19 и без него. **Выводы.** ИМпST у пациентов с COVID-19 ассоциируется с тромботическим и атеросклеротическим поражением. Первичное ЧКВ должно быть приоритетным методом лечения ИМпST даже во время пандемии COVID-19.

Ключевые слова: COVID-19, коронарная ангиография, первичное ЧКВ.

ANGIOGRAPHIC AND PROCEDURAL FEATURES OF PATIENTS WITH ACUTE MYOCARDIAL INFARCTION WITH ST-SEGMENT ELEVATION, WHICH DEVELOPED AGAINST THE BACKGROUND OF COVID-19

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Abstract

Introduction. Coronavirus infection is associated with a significant cardiovascular risk and may be accompanied by acute myocardial infarction with ST-segment elevation (STEMI). **The aim of the study -** to identify angiographic and procedural features in patients with STEMI undergoing coronary angiography (CAG), which developed against the background of COVID-19 and STEMI in uninfected patients. **Methods.** 114 patients were enrolled in a case-control study. There were 57 pairs adjusted by gender, age and diagnosis of acute myocardial infarction with ST-segment elevation who underwent CAG to perform primary percutaneous coronary intervention (PCI). In each pair, the case patient was hospitalized due to STEMI and COVID-19 (Group 1), and the control one had STEMI without COVID-19 (Group 2). According to routing regulations, cases and control were hospitalized to two different hospitals in Yekaterinburg. Statistical significance level $p<0.05$ was selected. **Results.** There were no significant statistically significant in the angiographic assessment of coronary arteries and procedural features in patients with STEMI and COVID-19 compared to STEMI in uninfected patients. **Discussion.** The results of CAG show contradictory data, there are studies proving a high thrombus burden regardless of atherosclerotic lesion, other studies do not find differences between patients with STEMI with and without COVID-19. **Conclusions.** STEMI in patients with COVID-19 is associated with thrombotic and with atherosclerotic lesions. Primary PCI should be a priority method of STEMI treatment even during the COVID-19 pandemic.
Key words: COVID-19, STEMI, coronary angiogram, primary PCI.

INRODUCTION

A coronavirus infection that causes acute respiratory distress syndrome can affect not only the lungs, but also other organs and systems, including the cardiovascular system. A myocardial infarction can be one of the most serious diseases which developed against the background of COVID-19.

STEMI requires rapid diagnosis and timely treatment. Despite suggestions to use thrombolytic therapy as the preferred initial reperfusion modality to protect healthcare providers [1], primary PCI is associated with better outcomes in STEMI patients compared to thrombolysis and should be the preferred reperfusion strategy even during the ongoing pandemic [2].

The aim of the study - to identify angiographic and procedural features in patients with STEMI undergoing CAG, which developed against the background of COVID-19 and STEMI in uninfected patients.

METHODS

114 patients were enrolled in a case-control study. There were 57 pairs adjusted by gender, age and diagnosis of acute myocardial infarction with ST-segment elevation who underwent CAG to perform primary percutaneous coronary intervention (PCI). In each pair, the case patient was hospitalized due to STEMI and COVID-19 (Group 1), and the control one had STEMI without COVID-19 (Group 2). According to routing regulations, cases and control were hospitalized to two different hospitals in Yekaterinburg. July to December 2020 medical records data were used.

The inclusion criteria were: male and female patients aged ≥18 years with primary STEMI and with or without COVID-19 and CAG results available.

The exclusion criteria were: age <18 years, no CAG performed, history of previous myocardial infarction.

Statistica 13.0, license No. JPZ904I805602ARCN25ACD-6, software data analysis package was used for statistical processing. Mann-Whitney U test, Pearson`s chi-squared test, two-tailed Fisher's exact test, and Spearman's correlation coefficient were used. Results are presented as median (interquartile range). The level of statistical significance $p<0.05$ was chosen. The study was approved by the Local Ethical Committee of the Ural State Medical University.

RESULTS

Each group included 42 men and 15 women. The median age of Group 1 was 63 years, of Group 2 was 62 years and the interquartile intervals (58÷69) and (57÷68) years, respectively, p=0.788.

The left type of coronary blood supply was observed in 12 patients in Group 1 and in 5 patients of Group 2, the right type in 44 and 50 patients, the mixed type in 1 and 2, p=0.165, respectively.

Hemodynamically significant stenosis of one vessel was detected in 24 patients in Group 1 and in 21 patients in Group 2, two vessels stenosis was registered in 15 and 24 persons, three vessels stenosis was found in 17 and 11 subjects, respectively, one patient in each group did not have significant stenosis, p=0.312.

CAG revealed LM stenosis in 6 persons in Group 1 and 5 persons in Group 2, p=0.751; LAD stenosis was found in 41 and 48 patients, p=0.113, respectively. LCX stenosis was detected in 28 persons in group 1 and 25 in group 2, p=0.513; RCA stenosis occurred in 40 and 32 patients respectively, p=0.091. LM stenosis diameter was 40 (30÷60)% in Group 1 and 20 (10÷20)% in Group 2, p<0.001. LAD stenosis was 90 (75÷100)% for Group 1 and 95 (75÷100)% for Group 2, p=0.652. LCX stenosis diameter was 75 (60÷87,5)% in Group 1 and 70 (20÷100)% in Group 2, p=0.407; RCA stenosis – 82,5 (70÷100)% and 70 (50÷95)%, p=0.033.

Acute occlusive thrombosis was detected in 33 patients in Group 1 and in 32 patients in Group 2, atherosclerotic lesion without thrombosis was diagnosed in 24 and 25 cases, respectively, p=0.849.

Angioplasty and stenting were performed in 51 persons of Group 1 and in 55 people of Group 2, p=0.232, a success of PCI was achieved in 48 and 54 cases, respectively, p=0.067.

DISCUSSION

Coronavirus infection may have many pathogenetic ways of the cardiovascular system lesion, while myocardial infarction can develop both against the background of an infectious disease and independently. In this study, we tried to reveal only angiographic and procedural features in these conditions' comorbidity.

The patterns of coronary blood flow and the number of affected vessels were statistically similar in both groups. There was a greater percentage of the diameter of stenosis in RCA and LM in the first group, but it did not statistically affect the results of PCI, and unsuccessful PCI attempts were mainly associated with multi-vascular lesion and surgical anatomy of LM and LAD.

Occlusive thrombosis was observed with the same frequency in both groups, although early studies reported severe thrombosis regardless of atherosclerotic lesion and multivessel thrombotic lesion in patients with COVID-19 and STEMI[3]. It should be noted that atherothrombotic lesion without pronounced thrombosis was detected in a total of 49 cases in both groups, which once again indicates the superiority of PCI over thrombolysis, since in these cases thrombolysis would not be effective and could lead to complications.

CONCLUSIONS

1. STEMI in patients with COVID-19 is associated not only with thrombotic, but also with atherosclerotic lesions.

2. Primary PCI should be a priority method of STEMI treatment even during a pandemic.

3. In SARS-Cov2 positive patients as well as in SARS-Cov2-negative ones, STEMI management procedures should be performed according to clinical guidelines.

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ХАРАКТЕРИСТИКА ТРОМБОЦИТАРНОГО ЗВЕНА СИСТЕМЫ ГЕМОСТАЗА У ПАЦИЕНТОВ С ИНФАРКТОМ МИОКАРДА И НОВОЙ КОРОНАВИРУСНОЙ ИНФЕКЦИЕЙ

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Аннотация