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Implementation of percutaneous coronary interventions in patients with acute coronary syndrome in Russia and clinical factors influencing decision making



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ABSTRACT

Background: Percutaneous coronary intervention (PCI) in patients with acute coronary syndrome (ACS) should be performed in presence of objective evidence of myocardial ischemia. Our study investigated the appropriateness of PCI among ACS patients in Russia and explored clinical factors associated with PCI performance.

Methods and results: Clinical information about 65,912 ACS patients (60.5% male, aged 63.2 ± 13.8 years) enrolled in the 2010–2011 Russian ACS Registry was examined. ACCF 2012 criteria were used to assess the appropriateness of PCI. PCI was performed in 13.8% of patients included in the study. Among patients with performed PCI (ACS-PCI patients), it was appropriate in 68.9%. In patients refused from PCI (ACS-nonPCI patients), it would be appropriate in 57.9% patients. Main clinical factors related to PCI were age, male sex, prior PCI, ST-segment elevation on ECG, and accordance with any of ACCF 2012 appropriate use criteria. But these factors were attributable for ACS-PCI patients only. It was a low correlation between these clinical factors and refuse from PCI.

Conclusions: It was shown that intervention was appropriate in the most patients with ACS received PCI. Among patients, refused from revascularization, PCI would be appropriate in more than half of them. We revealed that several clinical characteristics of ACS patients, including ACCF 2012 criteria, are fundamental for the decision to conduct PCI, but the negative decision was determined by other, non-clinical factors.

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Introduction

Percutaneous coronary interventions (PCI) today are available for the most of patients with acute coronary syndromes (ACS) due to

modern medical technologies. Guidelines for PCI implementation were developed to facilitate clinical decision making [1,2]. Recent guidelines on coronary revascularization promote early coronary angiography in anticipation of revascularization [3–6].

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In ACS patients, PCI should be performed with the appropriate clinical and objective evidence of myocardial ischemia [1,7]. Clear criteria for PCI implementation in ACS patients were defined by ACCF/SCAI/STS/AATS/AHA/ASNC/HFSA/SCCT in 2009 and had been updated in 2012 (hereafter referred as ACCF 2012) [8,9]. European criteria for PCI performance were developed previously [10]. These criteria cover the most clinical conditions occurring in ACS patients. The use of appropriateness criteria (ACCF 2012 especially) allows one to avoid inappropriate interventions in ACS patients. PCI appropriate use criteria potentially may be used in routine clinical practice, firstly for selecting patients who may benefit from intervention and, secondly, for evaluating the appropriateness of performed procedures. While several deficiencies are observed in PCI appropriateness criteria, their use is already clinically and economically justified now [11–13].

The aims of the present study were

- (i) to analyze the appropriateness of performed PCI with the help of ACCF 2012 criteria;
- (ii) to evaluate the potential need in PCI among ACS patients refused from the intervention, with the help of ACCF 2012 criteria;
- (iii) to explore the impact of clinical factors, influencing on PCI performance/refuse in ACS patients.

Material and methods

Data source

The Registry of Acute Coronary Syndrome of the Ministry of Health of Russian Federation (hereafter referred as Russian ACS Registry) was used as a source of data about ACS patients [14]. It is retrospective, continuous, nation-wide, Web-based registry working on-line.

Participation in the Russian ACS Registry is voluntary. The access to the registry is given to registered members. Centers participating in the Registry asked to include all patients following inclusion/exclusion criteria treated from ACS during the year prior to the year of participation. The source of patient's data is a hospital chart.

Russian ACS Registry inclusion criteria [15]:

- (i) age \geq 18 years;
- (ii) any type of ACS as a presumptive diagnosis;
- (iii) patient's hospital chart is finished;
- (iv) absence of any exclusion criteria.

Russian ACS Registry exclusion criteria [15]:

- (i) symptoms considered as consistent with acute cardiac ischemia are absent within the last 24 h prior to admission;
- (ii) patient was transferred into a registry hospital >24 h after admission to the initial hospital;
- (iii) patient was transferred out of a registry hospital <24 h after admission;
- (iv) patients who develop ACS symptoms while hospitalized for any reason;

- (v) ACS accompanied by a significant co-morbidity such as a motor vehicle accident, trauma, severe gastrointestinal bleeding, operation or procedure directly before admission.

Registry database is developed using ACCF/AHA 2011 Key Data Elements and Definitions of a Base Cardiovascular Vocabulary for Electronic Health Records [16]. Data on clinical characteristics, prior and hospital drug treatment, and reperfusion therapy are collected. Data on post-hospital treatment of ACS patients is not included in the registry database.

Patient selection

The following enrollment criteria were used for the purposes of the present study:

- (i) age between 18 and 80 years.
- (ii) acute myocardial infarction or unstable angina as a diagnosis at discharge.

The patients over 80 years were not included in the present study because of proven disparities in treatment of ACS between the older and the younger people [17–19]. It was previously reported that the high age itself is a predominant clinical factor influencing on implementation of invasive treatment among aged patients in Russia in spite of their higher risk of inhospital death [20,21]. This restriction of the present study is indicated in the Limitation section.

Patients were rejected from the study, if they had one of the following exclusion criteria:

- (i) missing of data on the time of reperfusion (time of fibrinolytic agent injection and/or time of balloon inflation during PCI),
- (ii) missing of principal data on the hospital presentation, treatment and history of the present event,
- (iii) data entry errors.

Study population

Data from 65,912 patients with ACS (aged 63.2 ± 13.8 years, 60.5% male) enrolled in the 2010/2011 Russian ACS Registry following the study inclusion/exclusion criteria were examined.

Enrolled patients were treated in 155 cardiological offices in 46 regions of Russia. 53% of patients were admitted to the invasive hospitals.

All ACS patients included in the study were divided into two groups according to the presence or absence of PCI during hospital stay. The first group was composed of patients ($n=9147$, 13.8%) with performed PCI. This group was named as ACS-PCI patients. The second group was composed of patients ($n=56,765$, 86.2%) refused from PCI. This group was named as ACS-nonPCI patients. Demographic and clinical characteristics of patients are shown in Table 1. ACS-PCI patients differed from ACS-nonPCI patients by the most of demographic and clinical parameters. ACS-PCI patients were younger, more frequently to be of male sex. They smoked more frequently. ACS-PCI patients more rarely

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