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## Original research article

# Barriers in the implementation of guidelines for acute coronary syndromes. Focus on antiplatelet therapy

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## ARTICLE INFO

## Article history:

Received 27 October 2016

Received in revised form

8 December 2016

Accepted 12 December 2016

Available online xxx

## Keywords:

Acute coronary syndromes

Antiplatelet treatment

Guidelines

Myocardial infarction

Percutaneous Coronary intervention

Clopidogrel

Ticagrelor

Prasugrel

## ABSTRACT

**Aim:** Modern treatment of acute coronary syndromes significantly improved outcomes of patients with this life-threatening disease. Especially the combination of timely interventional treatment with potent novel antiplatelet agents was proven to be effective in several randomized trials and is now recommended by guidelines worldwide. The aim of this study was to analyze how the guidelines are implemented in real life practice.

**Methods and patients:** Between 2013 and 2015 two complementary acute coronary syndrome registries were organized in the Czech Republic and included a total of 1967 patients. The ATHRO-II registry was done in 29 outpatient cardiology practices, focused on the prescription of antithrombotic drugs and enrolled 687 patients discharged home after percutaneous coronary intervention (PCI) for acute coronary syndrome (with or without ST elevation). These patients were followed for 12 months. The CZECH-3 registry was done in 43 hospitals of all types (13 PCI capable and 30 non-PCI) and enrolled 1280 consecutive patients admitted for proven acute coronary syndrome during a period of 2 months, irrespective of treatment strategy and in-hospital outcome. These patients were followed for 30 days. Weighted average values were calculated for both cohorts combined. The mean age of all enrolled patients was 66 years, females presented 32% of study population, 21% had prior MI, 19% prior PCI and 7% prior CABG.

**Results:** Prehospital aspirin was used in 51% of patients (i.e. majority of those arriving via emergency medical services), prehospital ticagrelor in 13% and clopidogrel in 16% of patients. Coronary angiography was performed in 94% of patients, PCI in 80% and coronary artery bypass graft (CABG) in 13%. Among stented patients the use of drug-eluting stents was

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<http://dx.doi.org/10.1016/j.crvasa.2016.12.002>

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only 69%, and 31% of stent were bare metal stents. There were major differences between PCI centres in DES proportion (36–78%). Discharge medication included aspirin in 93%, clopidogrel in 73%, ticagrelor in 14%, prasugrel in 4% and warfarin in 6%. Surprisingly, clopidogrel preference (over ticagrelor or prasugrel) was caused by economic reasons (patients refused to pay the price difference) only in 4% of those, who were put on aspirin + clopidogrel treatment. Contraindication of prasugrel or ticagrelor was present in 17% (including 5% of patients with an indication for oral anticoagulation). Among remaining 79% of patients who were treated by clopidogrel + aspirin (instead of more potent novel antiplatelet agents) the attending physicians were unable to explain the reason for not using the guidelines-recommended treatment.

**Conclusions:** The use of modern guidelines-recommended treatment (DES or novel antiplatelet agents) is surprisingly poor and is not limited by economic restrictions but rather by lack of guidelines knowledge or lack of physicians' activity to quickly implement the new guidelines.

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## Introduction

Modern treatment of acute coronary syndromes significantly improved outcomes of patients with this life-threatening disease. Especially the combination of timely interventional treatment with potent novel antiplatelet agents was proven to be effective in several randomized trials and is now recommended by guidelines worldwide [1–3]. However, not all aspects of the guidelines are implemented in all countries, regions and institutions. A recent literature review [4] found large variations between 39 studies, ranging from less than 5.0% to more than 95.0% for recommendations on acute and discharge pharmacological treatment, 34.3–92.0% for risk stratification, and 16.0–83.2% for performing coronary angiography. Seven studies indicated that higher adherence rates were associated with lower mortality. Several patient-related (e.g. age, gender, comorbidities) and organization-related (e.g. teaching hospital) factors influencing adherence were identified. A large US dataset (119,398 patients) demonstrated, that a shorter length of hospital stay (<4 days) did not appear to adversely affect adherence to discharge quality of care measures [5]. The Portuguese Registry on Acute Coronary Syndromes analyzed Compliance with Guidelines for the management of NSTEMI-ACS, comprising the treatment with: aspirin, clopidogrel, heparin, beta-blocker, angiotensin-converting enzyme inhibitor and statin. Centres with PCI capacity had a statistically significant higher adherence to guidelines. In-hospital mortality was 2.4%. Age, peripheral artery disease, Killip class >I, electrocardiogram (ECG) with ST-segment depression and positive troponin were independent predictors of in-hospital mortality [6].

The aim of this study was to analyze how the guidelines are implemented in real life practice in a central European country with advanced state-guaranteed health care insurance system. The focus was put especially on antithrombotic therapy.

## Methods and patients

Between 2013 and 2015 two complementary acute coronary syndrome registries were organized in the Czech Republic and

included a total of 1967 patients. The ATHRO-II registry [7] was done in 29 outpatient cardiology practices, focused on the prescription of antithrombotic drugs and enrolled 687 patients discharged home after percutaneous coronary intervention (PCI) for acute coronary syndrome (with or without ST elevation). These patients were followed 12 months. The CZECH-3 registry was done in 43 hospitals of all types (13 PCI capable and 30 non-PCI) and enrolled 1280 consecutive patients admitted for proven acute coronary syndrome during a period of 2 months, irrespective of treatment strategy and in-hospital outcome. These patients were followed for 30 days. The CZECH-3 registry better reflects the in-hospital treatment, while the ATHRO-II registry reflects outpatient 12-month treatment in those patients, who are discharged home after an acute coronary syndrome.

Weighted average values were calculated for both cohorts combined. The mean age of all enrolled patients was 66 years (proportion of patients >75 years was 23.7%), females presented 32% of study population, 21% had prior MI, 19% prior PCI and 7% prior CABG. Detailed baseline characteristics are in Table 1.

## Results

Overall, prehospital aspirin was used in 51% of patients (i.e. majority of those arriving via emergency medical services), prehospital ticagrelor in 13% and clopidogrel in 16% of patients. Coronary angiography was performed in 94% of patients, PCI in 80% and coronary artery bypass graft (CABG) in 13%. Among stented patients the use of drug-eluting stents was 69%, while 31% of stents were bare metal stents. There were major differences (36–78%) between PCI centres in DES proportion. Discharge medication included aspirin in 93%, clopidogrel in 73%, ticagrelor in 14%, prasugrel in 4% and warfarin in 6%. Surprisingly, based on investigators reporting, clopidogrel preference (over ticagrelor or prasugrel) was caused by economic reasons (patients refused to pay the price difference) only in 4% of those, who were put on aspirin + clopidogrel treatment. Contraindication of prasugrel or ticagrelor was present in 17% (including 5%

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