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Clinical Portrait of The Patient before the Planned Percutral Coronary Intervention in Conditions of Real Practice

Aim	To evaluate quality of treatment of patients with stable ischemic heart disease (IHD) prior to an elective percutaneous coronary intervention (PCI).
Material and methods	The study included 250 patients with stable IHD admitted for an elective PCI. Blood pressure, heart rate, total cholesterol, and blood glucose were measured for patients upon admission.
Results	Only 50% of patients admitted to the clinic for elective PCI received optimal medical therapy (OMT); only 5.2% of all patients achieved goal values of studied risk factors.
Conclusion	The study detected low compliance of stable IHD patients scheduled for PCI with OMT and achievement of goal values for several risk factors.

Keywords	Ischemic heart disease; diabetes mellitus; risk factors; optimal medical therapy; percutaneous coronary intervention
For citation	Leonova V.O., Kochergina A.M., Barbarash O.L. Clinical Portrait of The Patient before the Planned Percutral Coronary Intervention in Conditions of Real Practice. Kardiologiia. 2020;60(4):31–35. [Russian: Леонова В.О., Кочергина А.М., Барбараш О.Л. Клинический портрет пациента перед плановым чрескожным коронарным вмешательством в условиях реальной практики. Кардиология. 2020;60(4):31–35.]

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Coronary artery disease (CAD) rates highest among causes of global morbidity and mortality [1]. Several studies have shown that myocardial revascularization has several advantages over best drug therapy (BDT) in terms of the severity of angina symptoms, the need for antianginal drugs, increased tolerance to exercises, and improved quality of life [2]. The quality of the patient's preoperative preparation is known to make a significant contribution to a favorable prognosis of the intervention. Therefore, it is necessary to assess the quality of treatment of patients with stable CAD before routine percutaneous coronary intervention (PCI). Thus, the objective of this study was to assess the quality of treatment of patients with stable CAD before routine PCI with regard to the rate of administration of BDT and the achievement of specific risk factor (RF) targets.

Material and Methods

The study included 250 patients with stable CAD who were admitted for routine PCI procedure at Research Institute for Complex Issues of Cardiovascular Diseases from January to March, 2019. All patients had undergone coronary angiography, which was used in combination with clinical manifestations and stress test results to make decisions concerning endovascular revascularization. At admission of all patients, history was collected, including current treatment. Blood pressure (BP) and heart rate (heart rate) were measured and total cholesterol and blood glucose were determined. Target levels of BP (systolic BP (SBP) <140 mmHg, diastolic BP (DBP) <90mmHg), HR (<60 bpm at rest), total cholesterol (4 mmol/L) and current therapy were evaluated in line with current clinical guidelines [1, 2].

The mean age of patients was 64.6±10.1 years. The majority were male patients (n=148, 59.2%). Coronary angiography detected single-vessel disease in 74 (29.6%) patients, two-vessel disease in 57 (22.8%), and three-vessel disease in 119 (47.6%) patients. 125 (50%) patients had history of myocardial infarction (MI) and 91 (36.4%) had had myocardial revascularization or coronary bypass surgery At the time of admission, functional class (FC) I angina (CCS) was observed in 56 (22.4%) patients, FC II in 174 (69.6%) patients, and FC III in 20 (8%) patients. Peripheral atherosclerosis was detected in 53 (21.1%) patients and a history of cerebrovascular accident in 23 (9.2%) patients. Almost all patients (n=240, 96%) had hypertension. 52 (20,8%) patients were active smokers at the time of admission. Type 2 diabetes mellitus (DM) was present in 58 (22.8%) patients. Rhythm disorders, such as atrial fibrillation/flutter (AF/AFL), were detected in 32 patients. Paroxysmal AF/AFL was present in 21 (8.4%) patients, with the persistent form in 5 (2%) patients and the permanent form in 6 (2.4%) patients.

Statistical analysis was performed with Statistica v. 8.0.360.0. The primary database was created using Microsoft Office Excel 2003 v. 11.6355.6360. The normality of the sample distribution was verified with the Kolmogorov-Smirnov test. The significance of differences between observations was determined by the Mann – Whitney U-test. Qualitative data are expressed as absolute and relative rates (n, %), quantitative data with normal distribution are presented as mean values and standard deviations (M±SD). The critical significance level was set at p=0.05.

Results

At admission for routine PCI, antiplatelet monotherapy was used in 112 (44.8%) patients and dual antiplatelet therapy (DAPT) for the recent pre-revascularization stage in 92 (36.8%) patients. 16 (6.4%) of patients were treated with only anticoagulants. 4 (1.6%) patients were treated with a combination of antiplatelet drugs and anticoagulants. All patients taking anticoagulants had AF/AFL. 26 (10.4%) patients were not treated with antiplatelet or anticoagulant drugs, although no contraindications were identified.

Beta-blockers (BBs) were administered in 200 (80%) patients. HR at rest ≤ 60 bpm was reported in 49 patients, 24.5% of which used BBs. Among 50 patients not taking BBs, only 11 (22%) had contraindications to BBs.

The mean blood cholesterol of the 250 patients was 4.45±1.32 mmol/L. Low-density lipoproteins were not measured in this study. Statins were used by 196 (78.4%) patients; only 112 (57.14%) of them had total blood cholesterol <4 mmol/L. No contraindications to statins were identified in this sample.

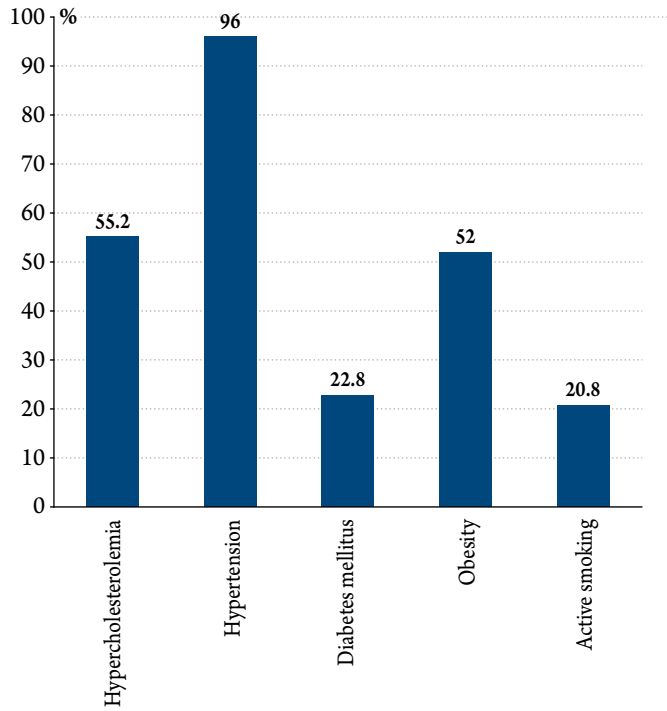
Angiotensin-converting enzyme (ACE) inhibitors or sartans were taken by 174 (69.6%) patients, of whom 108 (88.7%) had BP at rest <140/90 mmHg at admission. There were no contraindications to ACE inhibitors/sartans in this sample.

Among patients with type 2 DM (n=57), glucose self-control was performed more than once a week by only 33 (57.9%) patients, once a week by 9 (15.8%) patients, and less than once a week by 15 (26.3%) patients. The mean fasting blood sugar level was 7.97±2.48 mmol/L in this subgroup. Impaired glucose tolerance was identified in 55 (28.6%) patients and DM in 15 (7.8%) patients without having previously diagnosed disorders of carbohydrate metabolism.

Body mass index (BMI) <30 kg/m 2 was identified in 120 (48%) patients, grade III obesity (BMI > 40 kg/m^2) was established in 12 (4.8%) patients. The prevalence of RFs is shown in Figure 1.

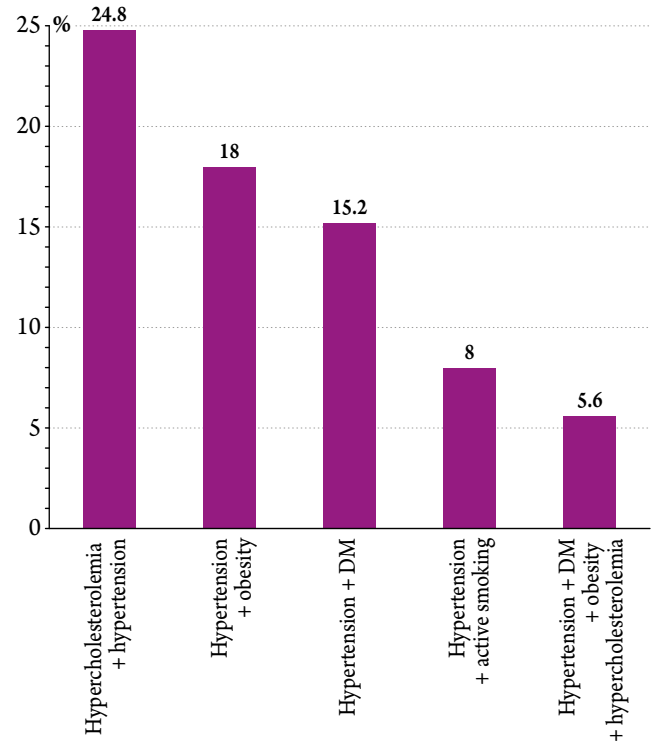
In addition to the high prevalence of RFs, many patients had a combination of two or more RFs (Figure 2).

Figure 1. Prevalence of cardiovascular risk factors in the treatment group



Combined DM and BMI >30 kg/m^2 was identified in 27 (10.8%) patients, and DM and total cholesterol >4 mmol/L in 34 (13.6%) patients. Combined BMI >30 kg/m^2 and total cholesterol > 4 mmol/L was

Figure 2. The rate of detection of risk factor combinations in patients before routine percutaneous coronary intervention



ISSN 0022-9040. Kardiologiia. 2020;60(4). DOI: 10.18087/cardio.2020.4.n937

Table 1. Clinical characteristics of patients receiving BDT (Group 1) and patients without BDT (Group 2)

Parameter	Group 1 (BDT), n=120	Group 2 (no BDT), n=130	p
Female	56 (46.7)	46 (35.4)	0.0694
Age, years (M±SD)	64.32±9.36	64.98±10.7	0.6054
DM	27 (22.5)	30 (23.1)	0.9101
History of MI	62 (52.7)	62 (47.7)	0.4296
History of myocardial revascularization	49 (40.8)	41 (31.5)	0.1258
History of cerebrovascular accident	13 (10.8)	10 (7.7)	0.3966
Peripheral atherosclerosis	26 (21.7)	26 (20)	0.7408
Hypertension	115 (95.8)	124 (95.4)	0.8777
HR <60 bpm	27 (22.5)	24 (18.4)	0.4213
Total cholesterol <4 mmol/L	56 (46.7)	58 (44.6)	0.7391
BP <140/90 mmHg	70 (58.3)	80 (61.5)	0.6093
Active smoking	23 (19.2)	29 (22.3)	0.5464
Angina pectoris FC			
• I	31 (25.8)	25 (19.2)	0.2109
• II	78 (65)	96 (73.8)	0.1308
• III	10 (8.3)	9 (6.9)	0.6759

Data are expressed as the absolute number of patients (%) unless otherwise specified. BDT, best drug treatment; DM, diabetes mellitus; MI, myocardial infarction; HR, heart rate; BP, blood pressure; FC, functional class.

Table 2. Clinical and anamnestic data of patients living in cities with/without RCVC

Parameter	With RCVC (n=99)	Without RCVC (n=151)	p
Female	36 (36.4)	66 (43.7)	0.2518
Age, years (M±SD)	65.18±9.75	64.2±10.33	0.4540
Obesity	31 (31.3)	54 (35.8)	0.4633
DM	24 (24.2)	33 (21.9)	0.6720
History of MI	55 (55.6)	70 (46.4)	0.1560
History of myocardial revascularization	47 (47.5)	44 (29.1)	0.0034
History of cerebrovascular accident	6 (6.1)	17 (11.3)	0.1662
Peripheral atherosclerosis	14 (14.1)	39 (25.8)	0.0277
Hypertension	92 (92.9)	148 (98)	0.0457
Active smoking	23 (23.2)	29 (19.2)	0.4466

Data are expressed as the absolute number of patients (%) unless otherwise specified. RCVC, regional cardiovascular centers; DM, diabetes mellitus; MI – myocardial infarction.

identified in 49 (19.6%) patients. Three risk factors, total cholesterol > 4 mmol/L, DM, and BMI >30 kg/m^2, were identified in 16 (6.4%) patients. Combined BP >140/90 mmHg and DM was observed in 38 (15.2%) patients, BP > 140/90 mmHg and BMI >30 kg/m^2 in 45 (18%) patients, and BP > 140/90 mmHg and active smoking in 20 (8%) patients. Hypertension, elevated total cholesterol, DM, and smoking simultaneously were reported in 14 (5.6%) patients.

Patients were divided into two groups depending on whether BDT was used in stable CAD: Group 1 (n=120, 48% of the entire sample) was comprised of patients taking all drugs in full, Group 2 (n=130, 52% of the entire sample) included those patients who did not take drugs of all types regularly. The two groups were compared by clinical and anamnestic characteristics and by achievement of RF targets (Table 1).

Groups 1 and 2 had the same age and sex distribution, and these patients did not differ in the rate of previous MI or coronary revascularization. Equally common accompanying diseases were hypertension, DM, peripheral atherosclerosis; there were equal numbers of active smokers.

Among patients taking BDT (Group 1), 41.7% lived in cities with regional cardiovascular centers (RCVC). The percentage of patients living in cities with RCVC was slightly higher in the subgroup of patients who reached the targets (53.8%). At the same time, 49 (37.7%) patients of Group 2, without BDT, lived in cities with RCVC. Patients living in cities with RCVC had significantly more often a history of revascularization and less often suffered from hypertension and peripheral atherosclerosis (Table 2).

Discussion

Poor adherence to BDT among patients referred for routine PCI was an important finding of this study. Only 50% of patients took the required drugs in full before routine PCI. At the same time, only 5% of the entire sample achieved the targets of cardiovascular RFs, such as total blood cholesterol, HR, and BP. Patients with DM did not check blood glucose levels often enough. Moreover, a large percentage (28%) of patients with previously unestablished disorders of carbohydrate metabolism was identified. The percentage of smokers (20.8%) and obese patients (52%) among patients referred for routine PCI was high.

The results were consistent with national and global data. Thus, according to the WHO, 50% of patients with chronic diseases do not follow their physician's advice [3]. According to the EUROASPIRE V study, 42% of patients with established CAD and with previous MI

or revascularization do not reach the target BP levels (BP > 140/90 mmHg), and 38% have BMI > 30 kg/m^2, and at least 19% smoke. 93% of patients regularly take acetylsalicylic acid, 81% BBs, and 80% statins [4]. The findings of the RECORD-3 register are equally representative. Twelve months after acute coronary syndrome, only 58% of patients used DAPT, 74% BBs, 63% ACE inhibitors or sartans, and 67% statins [5].

The effects of revascularization interventions, both clinical and prognostic, depend directly on the full implementation of lifestyle modifications and adherence to drug therapy. Patients for whom routine PCI is indicated should use drug therapy according to current guidelines, as this has proven benefits by reducing symptoms and improving prognosis [2]. Such treatments include several drugs with a positive effect on the prognosis, including antiplatelet drugs, statins, ACE inhibitors/sartans, and BBs. For example, the ORBITA study showed that PCI is not superior to conservative management of patients in correcting CAD symptoms when intensive BDT is used [6]. A Japanese study demonstrated the relevance of BDT during long-term follow-up of patients who underwent revascularization, i.e., coronary bypass surgery or PCI. For example, after 8 years of follow-up, the rate of all-cause deaths was significantly lower among patients using BDT [7].

Indeed, lifestyle changes and achievement of secondary prevention targets, i.e., control of BP, lipid and glucose levels, smoking cessation, normalization of body mass, should start well before revascularization and continued actively afterward [4]. Moreover, the effects of pre-intervention treatment on the reduction of the risk of periprocedural complications has been also reported. Wang et al. showed that the use of rosuvastatin 40 mg 12 hours before a PCI procedure was associated with a significantly less pronounced increase in serum creatinine and cystatin C on the first day after the intervention [8]. Several papers reported that strict control of BP, including pulse pressure, before routine PCI procedures results in better long-term outcomes. Also, pulse pressure could be used as a predictor for assessing prognosis [9, 10].

Factors adversely affecting patient compliance include social and economic factors, such as, mean income of the population, social status, level of education, factors pertaining to the healthcare organization, including accessibility to medical care, proximity to a large specialized clinic, plus factors related directly to the treatment, including concomitant administration of several drugs and treatment side effects [11]. Financial and organizational efforts aimed at developing high-tech care for patients with cardiovascular diseases in Russia have resulted in significant progress and in increased accessibility to endovascular coronary interventions. At the same time, the continuity from outpatient care, to selecting and preparing patients for PCI, and then to inpatient care is not sufficient. This results in poor patient adherence to BDT and poor achievement of cardiovascular RF targets.

This study has limitations because it was carried out on a case-by-case basis under normal practice conditions and did not require additional evaluation of several prognostic factors. These factors included a detailed lipidogram and active diagnosis of carbohydrate disorders by glucose tolerance test and estimation of glycosylated hemoglobin.

Conclusion

Only half of the patients submitted for routine percutaneous coronary intervention received best drug therapy, with only 5.2% reaching the target levels of blood pressure, heart rate, and total blood cholesterol. Moreover, among these patients there was a large percentage of active smokers, obese patients, and patients with previously undetected disorders of carbohydrate metabolism.

No conflict of interest is reported.

The article was received on 30/11/19

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