



## Comparative outcomes in elderly patients with multivessel coronary artery disease against the background of various therapy strategies

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### Abstract

The authors carried out a comparative study of annual outcomes in patients of the older age group who underwent PCI, CABG or were exclusively on optimal drug therapy. A study was carried out, 254 patients over 65 years old with lesions of the left coronary artery in combination with lesions of two or more coronary arteries. All patients received generally accepted basic therapy, which included acetylsalicylic acid (ASA), clopidogrel, beta-blocker bisoprolol 2.5-5 mg / day, ACE inhibitor, rosuvastatin 20 mg/day. According to the chosen treatment strategy, the patients were divided into 3 groups. The first group consisted of patients who underwent stenting of the coronary arteries (from 1 to 4 stents, n = 99), the second - those who underwent coronary bypass grafting (from 2 to 4 bypass grafts, n = 86), the third - who received only drug therapy (n = 69). Results were mixed, with evidence of both harm and benefit. This suggests that: 1) invasive intervention in older patients should be carefully considered in the context of the burden of angina pectoris and background drug therapy, 2) in older patients with multivessel coronary artery disease, coronary revascularization can significantly contribute reducing symptoms and improving quality of life.

**Keywords:** multivessel coronary artery disease, elderly, coronary artery bypass grafting, stenting of coronary arteries, optimal drug therapy

### Introduction: Relevance

Multivessel coronary artery disease is a powerful factor of poor prognosis in patients with coronary artery disease associated with ischemia, the development of CHF [1]. Deaths. An increase in age for every 5 years leads to an increase in mortality per 100 thousand people by 2-2.5 times [2].

Correction of multivessel lesions involves stenting of the affected vessels and the appointment of two-component antiplatelet therapy, correction of CHF.

At present, the range of indications for percutaneous coronary interventions is expanding more and more, and therefore, many patients previously referred for coronary artery bypass grafting choose PCI, although CABG shows good intermediate survival [1, 3, 5], while the choice of PCI in elderly patients is attractive for its minimally invasive nature and low postoperative mortality [6].

Besides, in the early years of PCI, it was widely believed that opening a stenotic artery would provide a long-term prognostic benefit even in stable coronary artery disease. That is, in patients with angina pectoris who have a higher risk of cardiovascular complications and death, after PCI or CABG, this risk should be reduced by restoring blood flow through the blocked artery and preventing the development of myocardial infarction (MI) in the future. However, in the future, doubts arise about such a simple relationship, since it becomes more and more obvious that myocardial infarction often occurs in the area of blood supply to other, less stenotic arteries. Ischemic heart disease (CHD) has come to be viewed more as a systemic disease and less as a problem of local coronary stenosis. In this regard, there is a growing understanding of the importance of the positive effects of drug therapy, especially statins and acetylsalicylic acid [7].

The aim of the study was a comparative study of annual outcomes in patients of the older age group who had undergone PCI, CABG or were exclusively on optimal drug therapy (ODT).

### Materials and Methods

A study was carried out, 254 patients over 65 years old with lesions of the left coronary artery in combination with lesions of two or more coronary arteries. All patients received generally accepted basic therapy, which included acetylsalicylic acid (ASA), clopidogrel, beta-blocker bisoprolol 2.5-5 mg / day, ACE inhibitor, rosuvastatin 20 mg/day

According to the chosen treatment strategy, the patients were divided into 3 groups. The first group consisted of patients who underwent stenting of the coronary arteries (from 1 to 4 stents, n = 99), the second - those who underwent coronary bypass grafting (from 2 to 4 bypass grafts, n = 86), the third - who received only drug therapy (n = 69).

During the year, the patients were under observation. In particular, the following endpoints were recorded: death, myocardial infarction (non-fatal), progression of coronary insufficiency, development and progression of heart failure (HF) (according to SHOKS data modified by V. Mareev), repeated hospitalizations associated with an increase in coronary insufficiency, the need for surgical intervention (CABG).

### Results

The main result was the absence of differences between the three groups in the incidence of the primary endpoint, which included cardiovascular death, myocardial infarction,

progression of coronary and heart failure. There was no difference for the primary secondary endpoint: cardiovascular death. (tab. 1)

**Table 1:** Primary endpoint in groups.

Groups	Total patients	Safely	Worsening	Death
PCI	99	42	54	3
CABG	69	23	43	3
ODT	86	34	50	2
Total	254	99	147	8

\*d.f. = 4, x2 = 3,29, p > 0,90,

\*\* Differences are statistically significant if p ≤ 0, 05

The only thing in which revascularization surpassed conservative tactics was a decrease in the symptoms of coronary and heart failure requiring hospitalization (PCI - 17.6% of cases, CABG - 24.4% of cases, ODT - 33.3% of cases, p <0.025). At the same time, there were significantly

more patients requiring intervention in the form of CABG in the ODT group: 2.0% of cases in the PCI group, 10.1% in the ODT group, and 1 case of revascularization in the CABG group (1.2%), p = 0.021

**Table 2:** However, when comparing risks (OR), by groups, the following picture was noted

	PCI	ODT	OR	ARR	NTT
Death	3 (3%)	3 (4, 3%)	0,69 [0,14-3,52]	-1,32% [-7,2-4,56]	-75,76
reinfarction	0 (0%)	1 (1, 4%)	0,23 [0,01-5,73]	-1,45% [-4,27-1,37]	-68,97
acute cerebrovascular accident	0 (0%)	1 (1, 4%)	0,23 [0,01-5,73]	-1,45% [-4,27-1,37]	-68,97
bleeding	2 (2%)	0 (0%)	3,56 [0,17-75,32]	2,02% [-0,75-4,79]	49,50
hospitalization	18 (18, 2%)	23 (33, 3%)	0,44 [0,22-0,9]	-15,15% [-28,62--1,68]	-6,60
PCI-2	5 (5, 1%)	1 (1, 4%)	3,62 [0,41-31,69]	3,6% [-1,55-8,75]	27,78
CABG-2	2 (2%)	7 (10, 1%)	0,18 [0,04-0,89]	-8,12% [-15,76--0,48]	-12,32
progression of coronary insufficiency without hospitalization	22 (22, 2%)	22 (31, 9%)	0,61 [0,3-1,22]	-9,66% [-23,37-4,05]	-10,35
exercise tolerance	26 (26, 3%)	20 (29%)	0,87 [0,44-1,73]	-2,72% [-16,49-11,05]	-36,76
adherence to therapy	52 (52, 5%)	33 (47, 8%)	1,21 [0,65-2,24]	4,7% [-10,65-20,05]	21,28

The odds are measured on a relationship scale(0, ∞). Values less than one indicate that the probability of the outcome is less than 0.5 (the outcome is unlikely); values equal to 0.5 -

indicate that the probability of the outcome is “50 to 50”; if the values are greater than one, then the outcome will come rather than not.

**Table 3:** There is a higher risk of bleeding and re-PCI in the PCI group, as well as a higher adherence to therapy

	ODT	CABG	OR	ARR	NTT
death	3 (4, 3%)	10 (11, 6%)	0,35 [0,09-1,33]	-7,28% [-15,59-1,03]	-13,74
reinfarction	1 (1, 4%)	7 (8, 1%)	0,17 [0,02-1,42]	-6,69% [-13,12--0,26]	-14,95
acute cerebrovascular accident	1 (1, 4%)	17 (19, 8%)	0,06 [0,01-0,46]	-18,32% [-27,2--9,44]	-5,46
bleeding	0 (0%)	28 (32, 6%)	0,01 [0-0,17]	-32,56% [-42,46--22,66]	-3,07
hospitalization	23 (33, 3%)	31, 5 (36, 6%)	0,87 [0,45-1,69]	-3,29% [-18,37-11,79]	-30,40
PCI-2	1 (1, 4%)	37, 9 (44, 1%)	0,02 [0-0,15]	-42,62% [-53,49--31,75]	-2,35
CABG-2	7 (10, 1%)	44, 3 (51, 5%)	0,11 [0,05-0,27]	-41,37% [-54,11--28,63]	-2,42
progression of coronary insufficiency without hospitalization	22 (31, 9%)	50, 7 (59%)	0,33 [0,17-0,64]	-27,07% [-42,2--11,94]	-3,69
exercise tolerance	20 (29%)	57, 1 (66, 4%)	0,21 [0,11-0,42]	-37,41% [-52,05--22,77]	-2,67
adherence to therapy	33 (47, 8%)	63, 5 (73, 8%)	0,32 [0,16-0,63]	-26,01% [-41,02--11]	-3,84

The odds are measured on a relationship scale(0, ∞). Values less than one indicate that the probability of the outcome is less than 0.5 (the outcome is unlikely); values equal to 0.5 -

indicate that the probability of the outcome is “50 to 50”; if the values are greater than one, then the outcome will come rather than not.

**Table 4:** When comparing the ODT and CABG groups, no significant differences were found between the groups.

	CABG	PCI	OR	ARR	NTT
death	10 (11, 6%)	3 (3%)	4,21 [1,12-15,84]	8,6% [1,03-16,17]	11,63
reinfarction	7 (8, 1%)	0 (0%)	18,77 [1,06-333,67]	8,14% [2,36-13,92]	12,29
acute cerebrovascular accident	17 (19, 8%)	0 (0%)	50,11 [2,96-847,29]	19,77% [11,35-28,19]	5,06
bleeding	28 (32, 6%)	2 (2%)	23,41 [5,38-101,92]	30,54% [20,26-40,82]	3,27
hospitalization	31, 5 (36, 6%)	18 (18, 2%)	2,6 [1,33-5,1]	18,45% [5,75-31,15]	5,42
PCI-2	37, 9 (44, 1%)	5 (5, 1%)	14,81 [5,47-40,06]	39,02% [27,67-50,37]	2,56
CABG-2	44, 3 (51, 5%)	2 (2%)	51,52 [11,93-222,42]	49,49% [38,57-60,41]	2,02
progression of coronary insufficiency without hospitalization	50, 7 (59%)	22 (22, 2%)	5,03 [2,65-9,54]	36,73% [23,5-49,96]	2,72
exercise tolerance	57, 1 (66, 4%)	26 (26, 3%)	5,55 [2,95-10,45]	40,13% [26,91-53,35]	2,49
adherence to therapy	63, 5 (73, 8%)	52 (52, 5%)	2,55 [1,37-4,75]	21,31% [7,78-34,84]	4,69

The odds are measured on a relationship scale(0, ∞). Values less than one indicate that the probability of the outcome is less than 0.5 (the outcome is unlikely); values equal to 0.5 - indicate that the probability of the outcome is "50 to 50"; if the values are greater than one, then the outcome will come rather than not.

But, when comparing CABG and PCI, there is a significantly greater risk of adverse events, practically on all counts. There is also a greater adherence to therapy, in the CABG group.

### Discussion

According to the selection criteria, patients from the low-risk group with one or two coronary arteries on coronary angiography were not included in the study. Thus, the question of the expediency of revascularization in the present study is resolved only for the category of patients in which it is really relevant, i.e., those with a clinically significant risk of developing cardiac complications.

The main result was the absence of differences between the three groups in the incidence of the primary endpoint, which included cardiovascular death, myocardial infarction, progression of coronary and heart failure. There was no difference for the primary secondary endpoint: cardiovascular death. The largest multicenter international randomized study ISCHEMIA (NCT01471522), designed to answer the question of the optimal revascularization strategy in stable coronary heart disease at the present stage, has demonstrated similar data. The aim of the study was to evaluate conventional invasive treatment versus optimal drug therapy in patients with stable coronary artery disease and moderate to severe myocardial ischemia with non-invasive stress testing. The ISCHEMIA study failed to show that routine invasive intervention was associated with a reduction in serious ischemic side effects compared to optimal drug therapy in stable patients with moderate ischemia. There was also no benefit from invasive intervention in terms of overall mortality or cardiovascular mortality / myocardial infarction. However, in contrast to ISCHEMIA, our study noted a significant decrease in the symptoms of coronary and heart failure requiring hospitalization (PCI - 17.6% of cases, CABG - 24.4% of cases, OMT - 33.3% of cases,  $p < 0.025$ ).

At the same time, when comparing the risks (OR), by groups, there is a higher risk of bleeding and repeated PCI in the PCI group, as well as a higher adherence to therapy in this group. Further, when comparing the groups in pairs, it is worth noting a significantly higher risk of adverse events in almost all items in the CABG group, compared with the PCI group, despite the greater adherence to therapy, in this group.

Results were mixed, with evidence of both harm and benefit. This suggests that: 1) invasive intervention in older patients should be carefully considered in the context of the burden of angina pectoris and background drug therapy, 2) in older patients with multivessel coronary artery disease, coronary revascularization can significantly contribute reducing symptoms and improving quality of life. Indications for revascularization in patients with stable coronary artery disease - persistence of symptoms despite treatment, or improved prognosis [8] In this regard, it must be remembered that revascularization and drug therapy, regardless of the patient's age, are considered as complementary rather than competing strategies treatment.

### Conclusion

1. Invasive intervention in older patients should be carefully considered in the context of the burden of angina pectoris and background drug therapy
2. The patients of the older age group, with multivessel coronary artery disease, coronary revascularization can significantly reduce symptoms and improve the quality of life.

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