



COMPARATIVE ANALYSIS OF THE RESULTS OF CORONARY ARTERY BYPASS GRAFTING BY ORSAV IN PATIENTS WITH CORONARY ARTERY DISEASE WITH MULTIPLE LESIONS OF THE CORONARY BED, DEPENDING ON THE PRESENCE / ABSENCE OF OBESITY.

Teshaev Ulugbek Shukhratovich

Bukhara State Medical Institute; Bukhara, Uzbekistan

Annotation. Coronary artery bypass grafting (CABG) – as a method of treating patients with coronary heart disease (CHD) today retains the position of the gold standard. Surgical treatment by CABG is generally based on optimizing the results of treatment of patients with coronary heart disease, which in the modern world can be achieved by minimizing the traumatism of this operation. Taking into account the increased risk of complications associated with artificial blood circulation (IC), sternotomy and aortic manipulations, CABG requires the development of new and new maximally low-traumatic surgical techniques. 279 patients with coronary artery disease with complex multivessel lesions of the coronary bed were examined, who underwent elective CABG according to the OPCAB method. Depending on the BMI level, two groups were identified: 1gr. – 143 patients with a BMI < 30 kg/m² and 2gr. – 136 patients with a BMI > 30 kg/m², i.e. with the presence of obesity of varying severity.

Keywords: aorta carotid bypass, coronary artery disease, heart failure, dysfunction

The anthropometric characteristics of the examined patients are presented in Table 1, from which it can be seen that patients with an increased BMI were 1.1 years younger ($p > 0.05$). A more detailed analysis by age categories (Table.1) there were no significant differences in the analyzed groups. In general, 60+ persons prevailed in both groups compared ($\approx 56\%$).

In the gender aspect in 2gr. the number of women prevailed by more than 2 times ($p < 0.0001$). The average age of men in 1gr. was 61.0 ± 8.1 years and in 2gr. – 59.6 ± 7.6 years ($p = 0.200$); the average age of women in 1gr. = 64.2 ± 7.1 years and in 2gr. – 62.1 ± 7.1 years ($p = 0.269$).

Table 1 shows that, in general, from the entire sample, the number of persons with a BMI level of ≥ 25 kg/m² amounted to 242 people, i.e. 86.7% of the surveyed were overweight or obese of varying severity. This once again underlines that the problem of obesity is currently "gaining momentum", especially among people of young working age. The above was confirmed by the results of the correlation analysis, which established an inverse relationship between the age of the subjects and the BMI level ($p > 0.05$), i.e. the increase in BMI values was associated with young age (Fig.1), however, the revealed trends did not reach the level of reliability.

Anthropometric data of patients depending on the level of BMI

Sign of Sr.age, years	Group 1	Group 1	p	χ^2
	61,5±8,0	60,4±7,5	0,235	
≤ 40 years, n (%)	1 (0,7)	2 (1,5)	0,965	0,002
41-50 years, n (%)	14 (9,8)	13 (9,6)	0,891	0,019
51-60 years, n (%)	48 (33,6)	45 (33,0)	0,966	0,002
category 60+, n (%)	80 (55,9)	76 (55,9)	0,912	0,012
M/W, n (%)	122 / 21	92 / 44	0,000	11,207
Sr. height, m	1,7±0,1	1,6±0,1	0,000	
Sr.weight, kg	73,6±9,2	91,3±11,4	0,000	
Sr.BMI, kg/m ²	26,7±2,3	33,9±4,0	0,000	
Normal weight:	37 (25,9)	-		
BMI < 25 kg/m ² , n (%)	106 (74,1)	-		
Overweight:	-	136 (100)		
BMI =25 - 30 kg/m ² ,	-	100 (73,6)		
n (%)	-	24 (17,6)		
Obese, BMI > 30 kg/m ² , n (%)	-	12 (8,8)		

Notes: n – number of patients; BMI – body mass index; p – reliability of differences between groups.

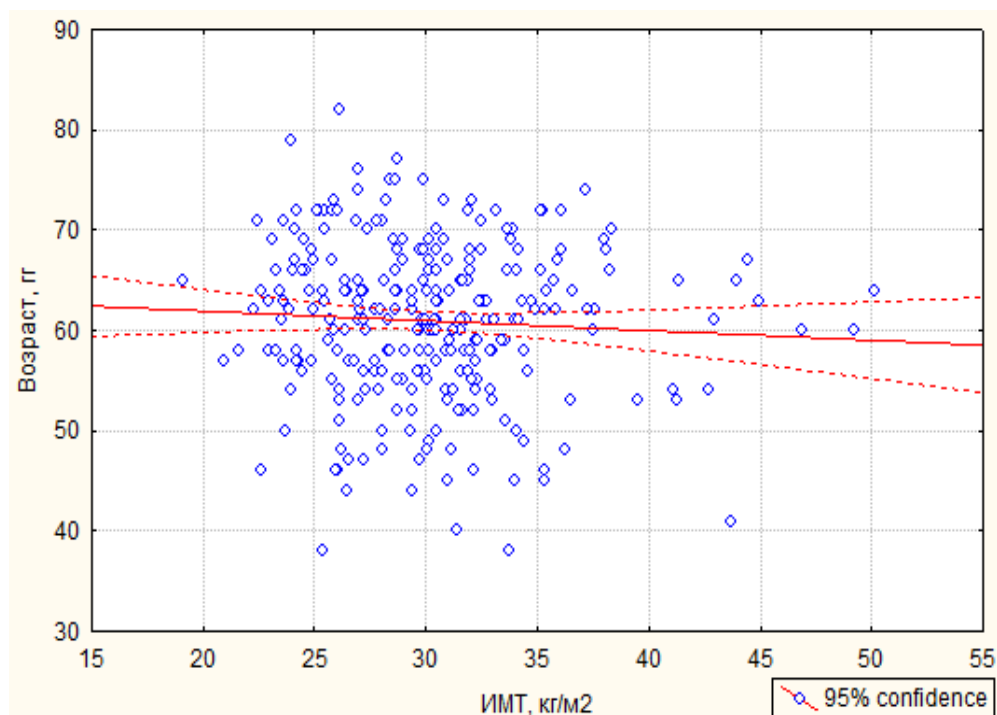


Figure 1. A graph of the correlation between the age of patients and BMI values.

$$p=0.314; p=-0.060; t=-1.008$$

Notes: on the X-axis - BMI values in kg/m²;
on the Y axis – the age of patients in years.

As mentioned earlier, in the group with an increased BMI, the number of women was higher. In this regard, a correlation analysis was carried out between the patients' gender and BMI values, which established a positive, highly reliable relationship with the female sex (Fig.2). That is, women were characterized by higher BMI values than men.

Analysis of the data on the performed CABG-ORSAV showed the following: 2 shunts were applied in 18.3% of the total sample of subjects; 3 shunts – in 61.3% and 4 shunts – in 20.4% of patients. A detailed analysis depending on the BMI level is presented in Table 2, from which it can be seen that in the group with an increased BMI, cases of anastomosis with 4 conduits were 7.5% more frequent than in the control group ($p>0.05$). This, in turn, was reflected in such an

indicator as the average number of shunts per 1 patient, which also turned out to be more in people with an increased BMI (Table 2).

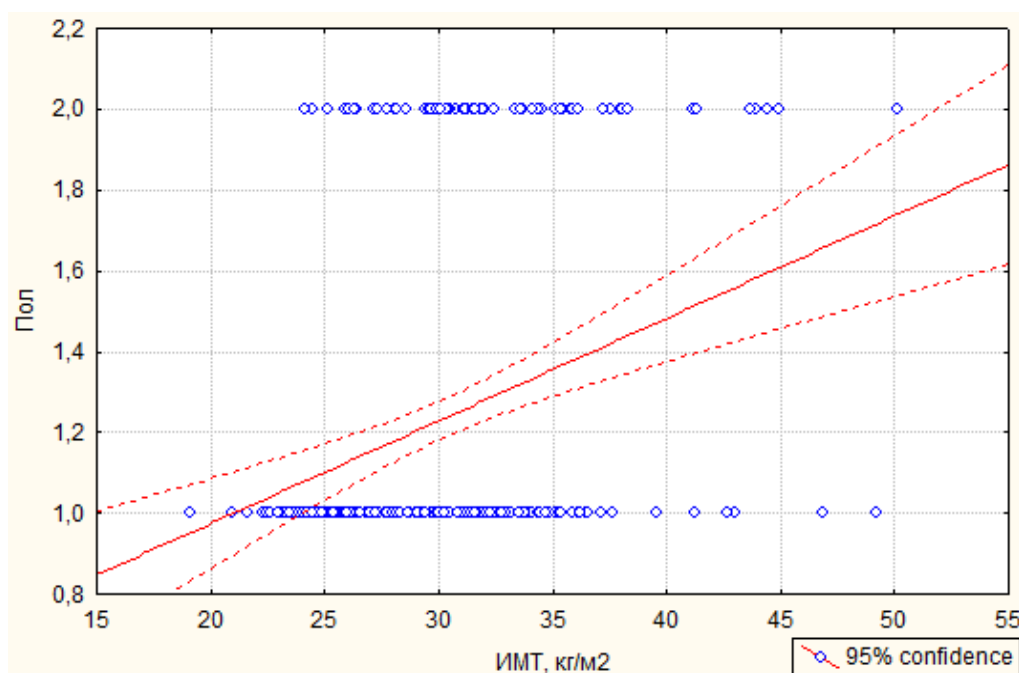


Figure 2. A graph of the correlation between the gender identity of patients and the values of BMI.

$$p=0,0000; r=0,291; t=5,066$$

Notes: on the X axis – BMI values in kg / m²; on the Y axis – under the number "1" - men and under the number "2" - women.

The incidence of stem lesions in 1gr. was 42.7% and in 2gr. – 47.0% (Table 2). The frequency of nonfatal intraoperative complications was 8.4% and 11.8%, respectively, in groups 1 and 2. I.e., in persons with increased BMI, intraoperative complications were observed more often than in the control group, while they were mainly represented by various cardiac arrhythmias (LDC) and a decrease in hemodynamic parameters. Namely, ventricular extrasystoles (VE) were registered in 2.8% of respondents from 1g and 3.7% from 2g; atrial fibrillation (AF) - in 3.5% and 4.4%; a decrease in hemodynamic parameters that required vasopressors was observed in 2.1% and 3.7% of patients, respectively, in groups 1 and 2 (Table 2). Intraoperative conversion to IC occurred in 2.1% of cases among control group individuals and in 5.1% of cases among patients with increased BMI ($p>0.05$). The

analysis of the relationship of conversion cases with gender identity revealed a direct positive correlation with the female sex (Fig.3).

Table 2.

Characteristics of the performed CABG-ORSAV depending on the BMI level

Attribute 1 group	Attribute 1 group	Attribute 1 group	Attribute 1 group	Attribute 1 group
Number of shunts 2, n (%)	25 (17,5%)	26 (19,1%)	0,842	0,029
Number of shunts 3, n (%)	94 (65,7%)	77 (56,6%)	0,150	2,073
Number of shunts 4, n (%)	24 (16,8%)	33 (24,3%)	0,161	1,962
Sr. number of shunts per 1 patient	3,0±0,6	3,1±0,7	0,201	
Successful operation	140 (97,9%)	129 (94,9%)	0,295	1,097
Intraoperative complications	12 (8,4%)	16 (11,8%)	0,461	0,545
The presence of lesions of the trunk of the LCA	61 (42,7%)	64 (47,0%)	0,536	0,282
Conversion to IR	3 (2,1%)	7 (5,1%)	0,295	1,097
Time spent in the ICU, hh	47,1±11,7	52,5±14,8	0,000	
Hospital stay time, days	8,2±0,9	8,6±1,1	0,000	
Mediastinal drainage volume, ml	±	±		
Total blood loss, ml	290,7±113,9	317,5±117,4	0,054 [#]	
Mortality in hospital, n (%)	0	0		
Subjective assessment of the patient:				
Improvement	131 (91,6%)	122 (89,7%)	0,734	0,116
Without effect	12 (8,4%)	14 (10,3%)		
<i>Notes: Qty – quantity; LKA – left coronary artery; IC – artificial circulation; ICU – intensive care unit; p – reliability of differences between groups; # - tendency to reliability of differences between groups.</i>				

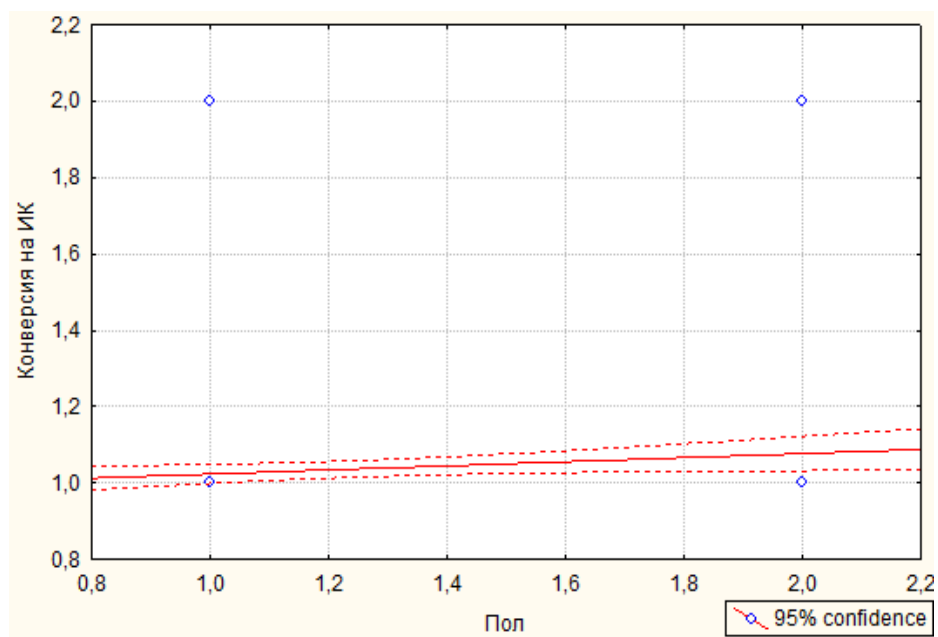


Figure 3. A graph of the correlation between the gender identity of patients and cases of intraoperative conversion to IC.

$p=0,042$; $r=0,121$; $t=2,042$

*Notes: on the X-axis - under the number "1" - men and under the number "2" - women;
on the Y axis – cases of intraoperative transition to IR*

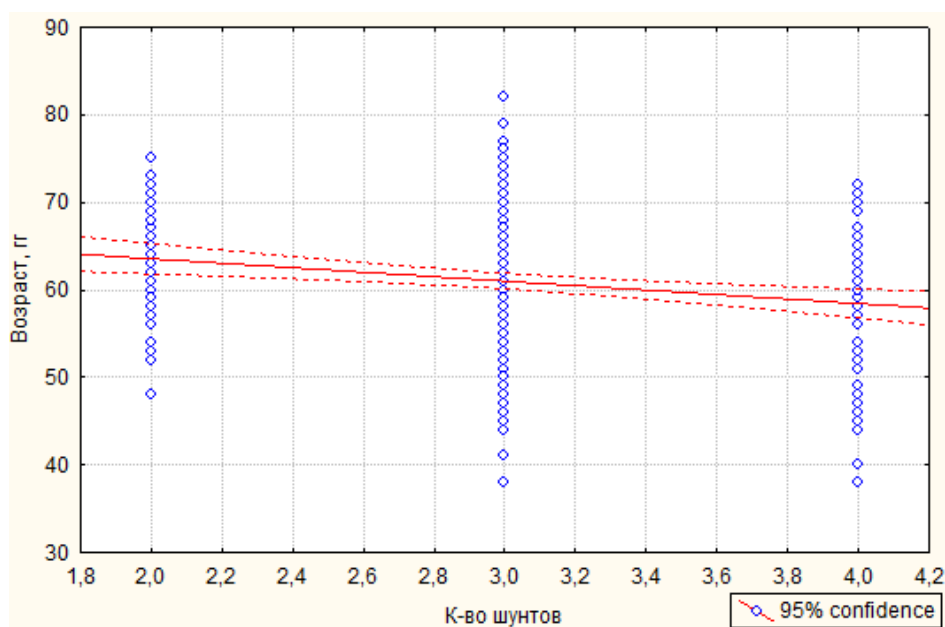


Figure 4. A graph of the correlation between the age of respondents and the number of imposed conduits.

$p=0,0005$; $r= -0,204$; $t= -3,477$

Analysis of the relationship between the age of respondents and the number of imposed conduits established an inverse relationship ($p < 0.005$). This once again confirms the fact that in modern society there is a tendency to rejuvenation of coronary heart disease and an increase in obesity (Fig.4).

It is noteworthy that in patients with increased BMI, the volume of total blood loss was greater than in the comparison group, and this difference tended to be reliable (Table 2).

In the postoperative period, patients with a BMI > 30 kg/m² had a relatively long duration of stay both in the ICU and in the hospital (both $p < 0.0001$), however, according to other postoperative data, the groups did not differ from each other. There were no deaths in hospital in either the 1st or 2nd groups.

Among 2-year-old patients, we conducted a more detailed intra-group analysis of data depending on the degree of obesity by BMI gradations (Table.3):

- A-subgroup with BMI=30.1-35.0 kg/m² – 100 patients;
- B-subgroup with BMI=35.1-40.0 kg/m² – 24 patients and
- C-subgroup with BMI ≥ 40.1 kg/m² – 12 patients.

From these positions, it was found that three shunts were most often filed in all three subgroups, but in the largest number of cases – in patients of the C-subgroup (75% - in the C-subgroup versus 56% and 50%, respectively, in the A and B subgroups). Nevertheless, the average number of shunts in patients of the B-subgroup was the smallest (Table 3).

Characteristics of performed CABG-ORSAV depending on the degree of obesity (i.e. with a BMI > 30 kg/m²)

Sign	A-subgroup	A-subgroup	A-subgroup
of Number of shunts 2, n (%)	20 (20,0%)	4 (16,7%)	2 (16,7%)
Number of shunts 3, n (%)	56 (56,0%)	12 (50,0%)	9 (75,0%)
Number of shunts 4, n (%)	24 (24,0%)	8 (33,3%)	1 (8,3%)
Sr. number of shunts per 1 patient	3,04 \pm 0,66	3,17 \pm 0,70	2,92 \pm 0,51
Successful operation	97 (97,0%)	22 (91,7%)	10 (83,3%)
Intraoperative complications	11 (13,0%)	3 (12,5%)	2 (16,7%)
The presence of lesions of the trunk of	44 (44,0%)	13 (54,2%)	7 (58,3%)

the LCA			
Conversion to IR	3 (3,0%)	2 (8,3%)	2 (16,7%)
Time spent in the ICU, hh	49,2±17,4	52,3±14,8	54,8±13,9
Hospital stay time, days	8,4±1,1	8,5±1,1	8,7±1,2
Mediastinal drainage volume, ml	±	±	±
Total blood loss, ml	305,6±111,7	318,7±114,4	327,2±121,4
Mortality in hospital, n (%)	0	0	0
Subjective assessment of the patient:			
Improvement of well-being 122	92 (92,0%)	20 (83,3%)	10 (83,3%)
Without effect 14	8 (8,0%)	4 (16,7%)	2 (16,7%)
<i>Notes: Qty – quantity; LCA – left coronary artery; IC – artificial circulation; ICU – intensive care unit.</i>			

Also, among the patients of the C-subgroup, there was a greater number of intraoperative complications (the difference with the A-subgroup was 3.7% and with the B-subgroup – 4.2%), conversions to IC (13.7% and 8.4%, compared with A- and B-subgroups) and stem lesions of the coronary bed (by 14.3% - compared with the A-subgroup and 4.1% - with the B-subgroup). In the comparative aspect, the total volume of blood loss in patients of the C-subgroup was the largest: the difference with the A-subgroup was 21.6 ml and with the B-subgroup – 8.5 ml. This, in turn, contributed to a decrease in the success of the operations performed and a deterioration in the chronological picture of rehabilitation. Namely, the successful intervention in the A-subgroup was 13.7% and in the B-subgroup – 8.4% better than in the C-subgroup. The time spent in the ICU in patients of the A-subgroup was 5.6 hours and in patients of the B-subgroup – 2.5 hours shorter than in patients of the C-subgroup. The total time of inpatient treatment in the C-subgroup averaged 8.7 days, which was 0.3 and 0.2 units less than in the A- and B-subgroups, respectively (Table 3).

Thus, this fragment of the study found that the presence of elevated BMI values was associated with relatively young age and female sex ($p>0.05$). In patients with a BMI level $> 30 \text{ kg/m}^2$, 4-conduit anastomoses were applied 7.5% more often (at the same time, an inverse relationship was observed between the age of the respondents and the number of shunts applied ($p<0.05$)); intraoperative

complications were observed more often, which were mainly represented by various LDC and a decrease in hemodynamic parameters. Intraoperative conversion to IR was registered in 5.1% of cases among patients with increased BMI, while it had a direct positive correlation with the female sex ($p < 0.05$).

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