Minimally Invasive Coronary Artery Bypass Or Percutaneous Intervention For Chronic Left Anterior Descending Artery Occlusion?

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Objective

The final target is to discover benefits of both revascularization methods, including economical parameters, and choose the most preferable way in similar clinical cases.

Background

We have analyzed the studies about revascularization methods for chronic total occlusion (CTO) of left anterior descending coronary artery (LAD) which included percutaneous coronary intervention (PCI) and minimally invasive direct coronary artery bypass (MIDCAB) together in one study or separately in a few studies over the last 10 years period. The results of the research have demonstrated ambivalent data and we haven't found any study which compares PCI with MIDCAB in a surgical treatment of LAD CTO, just only for LAD stenosis.

Methods

From January 2018 to December 2019 we operated 134 patients with LAD CTO. Patients were divided in to two groups: the first group underwent on MIDCAB and the second on PCI. Preoperative characteristics of both groups are presented in the **table 1**.

Parameter	MIDCAB n = 48 n (%)	PCI n = 86 n (%)
Male	36 (75%)	52 (60,5%)
Female	12 (25%)	34 (39,5%)
Age(y) (mean ±SD)	58,7 ±8.7	64.8 ±8.3
Previous diabetes ID NIDD	7 (14,6%) 6 (12,%) 1 (2,1%)	23 (26,7%) 4 (4,6%) 19 (22,1%)
Atrial fibrillation	3 (6,2%)	4 (4,6%)
Chronic kidney disease	14 (29,2%)	29 (33,7%)
Previous LAD PCI (DES)	10 (20,8%)	No
EuroSCORE II (mean)	2,74 ±4,0 from 0,5 to 23,3	1,25 ±0,7 from 0,6 to 2,4

Table 1 ID, insulin dependent; NIDD, noninsulin dependent; EuroSCORE II, European System for Cardiac Operative Risk Evaluation

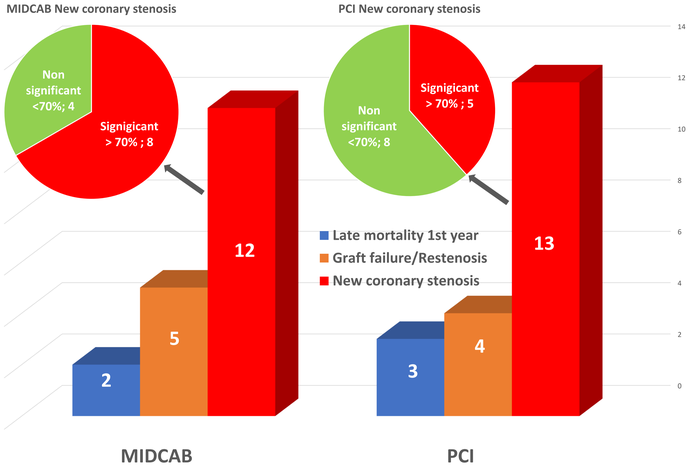
Results

In hospital:

Parameter	MIDCAB n = 48 n (%)	PCI n = 86 n (%)
Hospital mortality	0 (0%)	1 (1,2%)
Myocardial infarction	0 (0%)	0 (0%)
Conversions	0 (0%)	0 (0%)
Pleuritis with pleural puncture	6 (12,5%)	0 (0%)
Hospitalization period (days)	10.7±2.9	9.9 ±3.9
Number of drug-eluting stents	0 (0%)	2.0 ±1.0
Treatment's cost (for 2019)	3258 ±562,3 €	3809 ±2201,6 €

Table 2. In hospital results

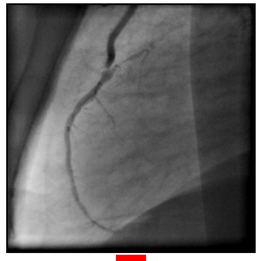
The cause of patient's death in PCI group was coronary dissection and acute myocardial infarction.



The 1st year of research:

BUT!

Pandemic of COVID-19 has changed our plans. **Only 48 patients** were checked by angiography and general clinical examination: 25 after MIDCAB and 23 after PCI. Thus, the statistical analysis was carried out only for the examined patients.



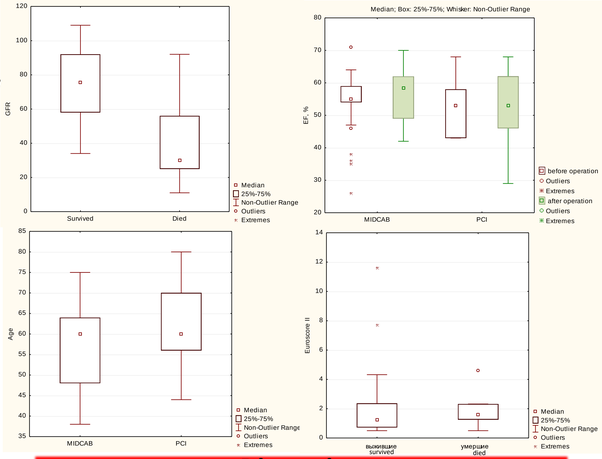
5 patients have a graft failure, caused by surgical mistakes



4 patients have stents restenosis and **1 has LAD's reocclusion**

Potential risk-factor	Common mortality	MIDCAB (p-value) n = 25		PCI (p-value) n= 23	
		Graft failure	New coronary stenosis	Restenosis	New coronary stenosis
Age	0,2223	0,0568	0,3230	0,19	0,3746
BMI	0,1906	0,3078	0,0706	0,2204	0,9725
EuroSCORE II	0,0083	0,5281	0,2482	0,5678	0,8095
GFR	0,0041	0,9121	0,6940	0,5729	0,2201
Dyslipidemia	---	---	---	0,0200	0,6159

Table 3. Statistical analysis of risk factors. BMI, body mass index ; GFR, glomerular filtration rate



Discussion

Causes of late mortality were different between both groups. In the surgical group there weren't cardiac deaths: one patient died from stroke and the second died from lung's infection. In PCI group all deaths happened from cardiac diseases. Concerning graft failure in MIDCAB group, we found out that all patients were operated in the beginning of new surgical approach usage in our clinic. Thus it's demonstrated that a learning curve for MIDCAB surgery exists. But all compromised grafts were still working and patients weren't complain about heart ischemia.

Conclusions

Both methods of revascularization for LAD CTO are demonstrated similar results. EuroSCORE II and GFR are significant potential risk factors for mortality in both groups, age is potential risk factor for graft failure. Dyslipidemia is significant factor for LAD restenosis in PCI group. MIDCAB is associated with lower incidence of revascularization repeat and in-hospital mortality in the literature data and it costs lower than PCI for LAD CTO as our study has shown. COVID-19 is decreasing now and we hope that our research will continue and we'll follow up all patient's cohort soon.