



Endovascular treatment of the subclavian arteries steno-occlusive disease

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Strokes are diagnosed in 6.5 mln people annually,
20% among them are developed in the vertebrobasilar system.

Gulli G, Marquardt L, Rothwell PM, Markus HS. *Stroke* (2013) 44(3):598–604

Labropoulos N, Nandivada P, Bekelis K. *Int Angiol* (2011) 30(2):105–114

According to most researchers, conservative treatment is recommended for asymptomatic patients and the surgical interventions (bypass or PTA and stenting) for patients suffering from vertebrobasilar insufficiency or upper extremity ischemia are performed.

Linni K, Ugurluoglu A, Mader N et al. *Ann VascSurg*, 2008; 22(6): 769–67

Markus HS, van der Worp HB, Rothwell PM. *Lancet Neurol* 2013; 12(10):89–98



Objective: to assess safety and efficacy of endovascular interventions for the treatment of steno-occlusive disease of subclavian artery (SA)

Materials

The endovascular treatment for **205** patients with steno-occlusive disease of SA was performed

There were 145 men, 60 women. The average age of the patients was $64,7 \pm 7,8$.

Inclusion criteria:

Occlusion and stenosis (atherosclerosis) of SA $\geq 70\%$ in the presence of chronic upper limb ischemia (arm claudication (arm fatigue) or rest pain)

and/or steal syndrome with vertebrobasilar insufficiency symptoms (vertigo, diplopia, optometry and others)

Unequal arm pressures (difference >20 mm Hg)



Materials / methods



The patients (**n=205**) were divided into 2 groups:

Group 1 - the patients (**n=126; 61%**) with stenosis (70-99%)

Group 2 - the patients (**n=79; 39%**) with occlusion

In the 1st group we used retrograde technique in **43 (34%)** cases (lesion of right SA) and antergrade technique in **83 (66%)** cases

In the 2nd group we used retrograde technique in **68 (86%)** cases and antergrade technique in **11 (14%)** cases

Vertebrobasilar insufficiency symptoms were determined in all patients of both groups

Chronic upper limb ischemia was observed in **99 (78%)** cases of the 1st group and in **64 (81%)** cases of the 2nd group.

Angioplasty with stenting of SA disease segment was conducted with usage of self-expandable and balloon-expandable stents for all the patients



Results



Clinical profiles for two groups

		Group 1 (n=126)	Group 2 (n=79)	p
Male / Female		99/27	60/19	0.66
Age, years		65±6.6	61,8±6.8	0.8
Disease segment	Left	79 (62,7%)	70 (88,6%)	0,112
	Right	47 (37,3%)	9 (11,4%)	0,002
UE ischemia		38 (30,1%)	37 (46,8%)	0,069
Co-morbidity	Coronary heart disease	109 (86,5%)	68 (86,1%)	0,533
	Idiopathic hypertension	104 (82,5%)	67 (84,8%)	0,491
	Diabetes mellitus	13 (10,3%)	10 (12,6%)	0,402
	Carotid arteries disease	57 (45,2%)	37 (46,8%)	0,495
Operations anamnesis	in PTCA	30 (23,2%)	17 (21,5%)	0,450
	CABG/MCBG	16 (12,4%)	11 (13,9%)	0,490

Significant difference in gender, symptoms of ischemia, cardiac insufficiency rate, arterial hypertension and operations in anamnesis in groups wasn't detected ($p>0.05$).



Results

In the early stage



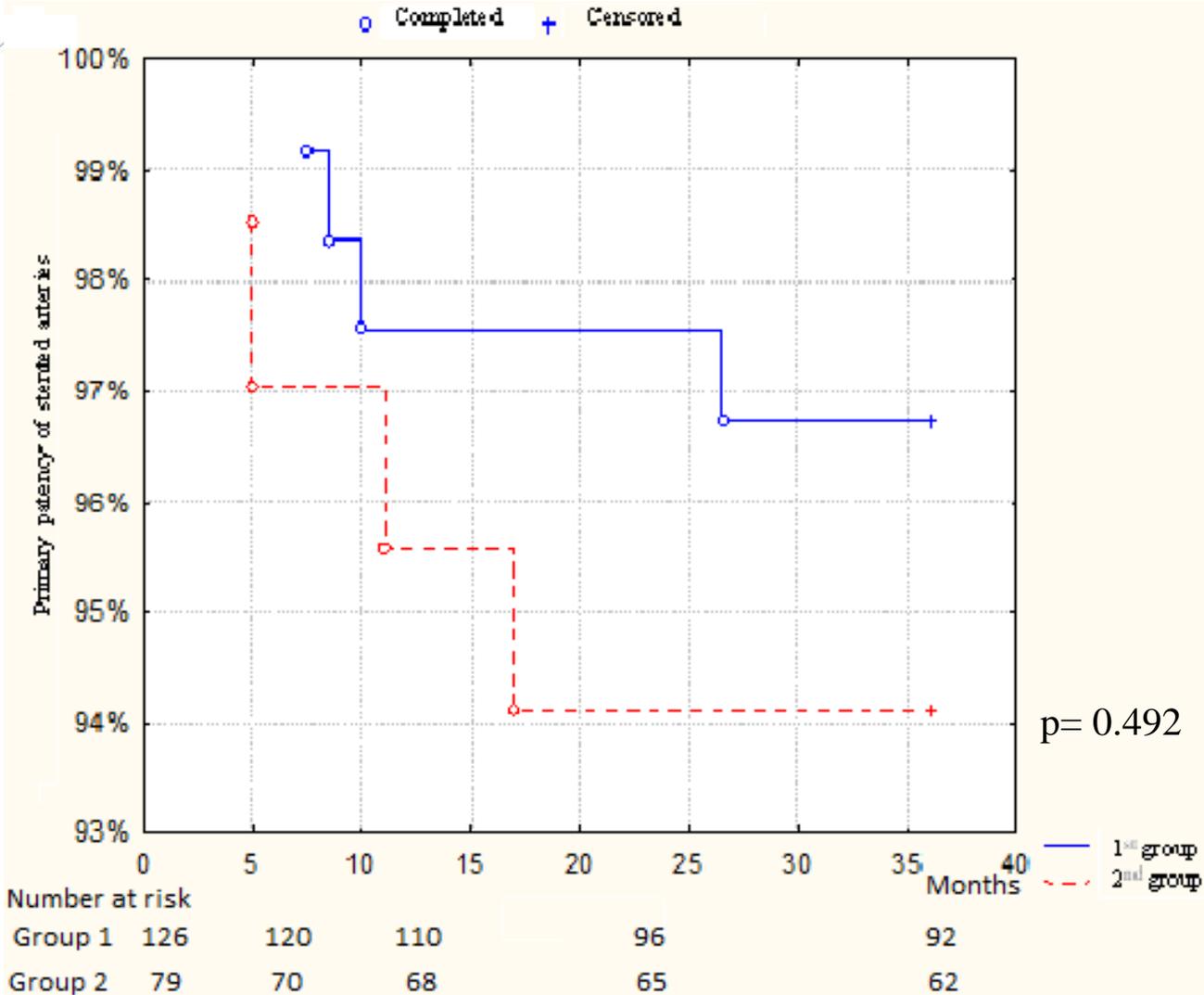
1 (0,8%) patient in the 1st group and **1 (1.2%)** patient in the 2nd group had transitory ischaemic attack in the vertebrobasilar system

Reinterventions because of residual stenosis were performed in **2 cases (1,6%)** in the 2nd group

SA occlusion recanalization failure occurred in **5 cases (6,3%)** in the 2nd group (p=0.07)

In these **5 cases** carotid-subclavian bypasses were successfully carried out

Results



The primary patency rates at 3 years was **96,7%** in the 1st group and **94,1 %** in the 2nd group, respectively (p=0.492).



Results



Follow up 3 years:

secondary acute cerebrovascular accidents or transitory ischaemic attacks weren't determined in both groups.

Reinterventions into operated segments were conducted for **4 (3.1%)** patients in the 1st group (at average in 13 months) and **4 (5%)** patients in the 2nd group (at average in 12.6 months)

p=0.419



Results



Restenosis or reocclusion development variables (the regression analysis)

Variable	Odds ratio	P	Hazard ratio	P
Age	0.972[0.931; 1.014]	.19	0.965 [0.867; 1.075]	.525
Gender (female/male)	0.505[0.232; 1.102]	.085	0.327 [0.082; 1.310]	.115
Subclavian artery occlusion*	0.562[0.134; 2.354]	.428	1.759 [0.441; 6.994]	.424
Upper extremity ischemia rate	0.968[0.783; 1.196]	.75	0.507 [0.195; 1.326]	.166
Coronary heart disease	0.671[0.264; 1.704]	.399	0.929 [0.115; 7.499]	.945
Idiopathic hypertension	1.396[0.541; 3.604]	.488	2.493[0.607; 0.164]	.205
Diabetes mellitus	0.771[0.215; 2.769]	.689	1.142 [0.141; 9.218]	.901
Stent type (self-expandable)**	1.321[0.487; 3.583]	.582	1.013 [0.254; 4.032]	.98

*in comparison with stenosis **in comparison with balloon-expandable stents

Initial artery conditions (stenosis or occlusion) don't influence significantly on stent patency in the late postoperative period



Results



The resolution of chronic upper extremity ischemia was determined in both groups

Vertebrobasilar insufficiency symptoms elimination was clinically estimated and indicated by **116 patients (92%)** in the 1st group and **72 patients (91%)** in the 2nd group ($p=0.82$)

The reduction of vertebrobasilar insufficiency symptoms in the remaining patients was found out.



Conclusions

Occlusion of SA is expedient to carry out as the first stage of endovascular recanalization followed by stenting

Endovascular treatment of lesions is an effective and safe method of prevention of stroke in the vertebrobasilar system



Thank you for your attention



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