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CAROTID ENDARTERECTOMY WITH PRIMARY CLOSURE: IS IT SAFE?

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Objective:

The choice of optimal closure technique after carotid endarterectomy has long been a matter of debate and primary closure was offen considered inferior to patch closure. The purpose of our work was to study the results of carotid endarterectomy whith primary closure and to identify the predective factors of both survival and short and long term complications.

Methods:

We conducted a retrospective descriptive study including patients operated for atheromatous carotid stenosis by carotid endarterectomy with primary closure. The primary end points were immediate and delayed postoperative complications (Specific neurological complications + Acute thrombosis + Early death (≤ 30 days) / Rate of carotid restenosis + Late specific neurological complications).

The stroke and death rate: The sum of deaths and disabling strokes occurring within 30 postoperative days.

Clinical and other surgey-related criteria were studied to identify predictive factors for those complications.

Results:

128 patients were included (operated from January 1, 2009 to December 31, 2019), the mean age was 68 years (50 – 84 years), whith a sex-ratio of 2.6. Hypertension was the principal cardiovascular risk factor and 82% of patients cumulated more than 2 risk factors.

Clinical study:

	symptomatology		exploration			lesions	
	symptomatic	asymptomatic	Doppler us	CT angiography	MRI angiography	unilateral	bilateral
n	73	55	128	110	16	78	50
%	57	43	100	86	12.5	61	39

Peroperative data:

General anesthesia, Brain monitoring (NIRS).

Optimization of MBP ≥ 20%, intraoperative heparin therapy.

Surgical technique: Open carotid endarteriectomy with direct closure

carotid cross-clamping times: Average time: 26 min, carotid shunt: 2 patients, Average opérative time: 72 min

Postoperative complications: mean follow up:

Early complications

the stroke and death rate: 1.6% & 2.3 (asymptomatic & symptomatic)

	death	Acute thrombosis	Dissection	Acute coronary syndrome	stroke
n	2	1	2	13	3
%	1.6	0.8	1.6	10.2	2.3

Late complications

	restenosis	occlusion	stroke
n	5 (over 18 months)	1	1 (over 4 years, restenosis)
%	3.6	0.8	0.8

Predictive factors

Factors that influence death: operative time (p=0.012), coronary disease (p=0.07), male sex & dyslipidemia (p=0.09)

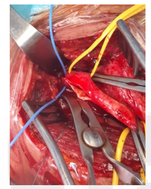
Factors that influence coronary syndrome: coronary disease (p=0.042), dyslipidemia (p=0.047)

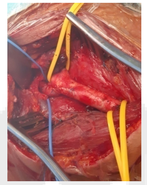
Factors that influence stroke: optimization of MBP ≥ 20% (p=0.039)

Factors that influence restenosis: adherance to treatment (p=0.034)

Discussion:

Technical considerations: short arteriotomy, ideally confined within the bulb, running fine monofilament suture





Perioperative death & morbidity:

	n	Death (%)	Stroke (%)	Acute coronary syndrome (%)
chung	377	0	1.1	3.2
Avgerinos	412	0.5	2.2	0.5
Al-Rawi	175	2.9	2.3	1.1
zenonos	111	0	2.7	-
Our study	128	1.6	2.3	10.2

Late morbidity:

	n	restenosis	stroke
Avgerinos	412	5.5	6.3
Al-Rawi	175	4.8	2.1
Lamba	192	6.2	2.7
Our study	128	3.6	0.8

Various systematic reviews and meta-analyses have studied the effect of the type of closure in CEA outcomes. The first Cochrane review published in 2004 showed a clear benefit for patch over primary closure in perioperative stroke and death, long-term ipsilateral stroke, and restenosis. An updated Cochrane review published in 2009 showed no difference in perioperative events, although patch closure was still beneficial in the longer term in terms of stroke and restenosis. Based on these, both U.S. and European guidelines currently recommend patch over primary closure.

The NSQIP data analysis of 3845 patients showed that the variables independently associated with postoperative stroke and death were: age >80 years, active smoking, contralateral ICA stenosis of 80% to 99%, emergency procedure, preoperative stroke, presence of one or more NSQIP-defined high-risk characteristics (class III/IV congestive heart failure, left ventricular ejection fraction <30%, recent unstable angina, operative time >150 minutes, but not the technical features of CEA.

Conclusions:

Primary closure after carotid endarterectomy is equivalent to patch closure. It allows for a reduction in clamping time and thus in the procedure, offers a low rate of mortality and postoperative complications while preventing the specific complications of the vascular patch.

References:

1 . Efthymios D. Avgerinos, MD. Primary Closure After Carotid Endarterectomy Is Not Inferior To Other Closure Techniques. JOURNAL OF VASCULAR SURGERY Volume 64, Number 3

2. Sung-Pil Joo,* Yong-Hwan Cho, Modified Suturing Techniques in Carotid Endarterectomy for Reducing the Cerebral Ischemic Time