Assessment of carotid endarterectomy in iran

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Abstracts

Introduction: Carotid Endarterectomy (CEA) is recommended in patients with symptomatic and some times asymptomatic carotid stenosis in vascular surgery centers with low perioperative complication rate.

Methods: A retrospecticve study was carried out in patients who underwent CEA in 3 vascular surgery centers in Tehran and 2 centers in Mashhad. Patients selection criteria, methods of detection of carotid stenosis, method of anesthesia, surgical techniques and perioperative complications were evaluated.

Results: 388 CEA in 345 patients (65% males) with mean age of 66.8 years ranged 46-84 years were evaluated. Detection of carotid stenosis was made by one carotid duplex ultrasound in 90% of CEA candidates. The whole perioperative stroke and death rate in reported Iranian vascular surgery centers is 6.4%. Perioperative stroke and death rate in Emam Reza, Razavi, Shohada Tajrish, Taleghani and Iranmehr hospitals was 2.4%, 0%, 4.8%, 10.2% and 10.2% respectively.

Conclusion: In Iran, CEA is recommended only in patients with symptomatic ≥70% ICA stenosis and preferably in patients with symptomatic ≥90% ICA stenosis. Method of detection of carotid stenosis in Iranian vascular surgery centers should be corrected.

Key Words: Carotid, Endarterectomy, Iran,

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Introduction

Carotid Endarterectomy (CEA) has been performed in Iran since 1991 by vascular surgeons. The benefits of CEA will not be realized if prioperative morbidity and mortality is excessive. Stroke, hyperperfusion syndrome including cerebral edema and intracerebral hemorrhage, lower cranial nerve palsy, wound hematoma, myocardial infarction, arrhythmia and death are CEA complications.[1] The results derived from North American Symptomatic Carotid Endarterectomy Trial (NASCET)[2] and European Carotid Surgery Trial (ESCT)[3] revealed that the patients with symptomtic Internal Carotid Artery Stenosis (ICA) should be referred to a surgical center with perioperative stroke and death less than 6%.[2,3] If the combined perioperative stroke and death approched to 10%, the benefit of CEA is negated.[4] The Asymptomatic Carotid Artery Surgery (ACAS) trial confirmed that patients with asymptomatic carotid stenosis should only be operated by surgeons with perioperative stroke and death rate of less than 3%.[5] Review of diagnostic method of ICA stenosis, criteria of patient selection, surgical technique and perioperative complications in Iran demonstrates significant differences than standard protocols of CEA.[2,3,5] This retrospective observational study compares the above characteristics of CEA in various Iranian vascular surgery centers.

Methods

A retrospective observational study was performed by review of patients demographics, patients' selection criteria and methods of detection of carotid stenosis. Methods of anesthesia, surgical techniques and perioperative complications were evaluated. Perioperative complications evaluated during 30 days after operation. All of the patients were operated by vascular surgeons and patients operated by neurosurgeons were excluded. The computerized archives of Emam Reza and Razavi hospitals served for data extraction of Mashhad vascular surgery centers during 2003-2008. A single surgical team performs CEA operation in these hospitals. The results and data of CEA in Shohada Tajrish,[6] Taleghani[7] and Iranmehr[8] hospitals in Tehran during 1991-2006 derived of published articles. CEA operations in Taleghani and Iranmehr hospitals is performed by a single surgical team.[7,8] The research was approved by ethics committee of Emam Reza hospital, Mashhad. Guidelines for performance of CEA in Iranian vascular surgery centers was designed in assessment of total data of reported CEA in Iranian medical literature.[6,7,8]

Results

388 CEA in 365 patients (65% males) with mean age of 66.8 years ranged 46-84 years were evaluated. These candidates of CEA were referred from neurology, cardiac surgery and vascular surgery centers in 62%, 23% and15 % respectively.

Method of detection of ICA stenosis

In Emam Reza and Razavi hospitals, detection of ICA stenosis in symptomatic and asymptomatic patients was made by one carotid duplex sonography in 95% of candidates. Magnetic Resonance Angiography (MRA) had been requested for confirmation of occluded ICA in report of duplex sonography. Conventional angiography was performed in 5% of symptomatic and asymptomatic candidates of CEA. In Shohada Tajrish hospital, detection of symptomatic ICA stenosis was made by one carotid dulex sonography in 94% of CEA candidates and asymptomatic candidates had their carotid stenosis detected in 90% by conventional angiography. This team doesn't trust the results of MRA for detection of carotid stenosis even as an adjunctive vascular imaging. In Taleghani and Iranmehr hospitals symptomatic ICA stenosis was detected by one carotid duplex exam in 95% and both hospitals have one team of vascular surgery. This surgical team did not use MRA for detection of carotid stenosis or occlusion. None of the above vascular surgery teams pay attention to the presence of tandem stenosis in ipsilateral middle cerebral artery or carotid siphon by transcranial doppler, MRA or conventional angiography.

Patients selection criteria for CEA

Patients with symptomatic ≥60 ICA stenosis or asymptomatic ≥75% ICA stenosis were candidated for CEA in Emam Reza and Razavi hospitals. Patients with symptomatic ≥70% ICA stenosis were candidated for CEA in Shohada Tajrish hospital, however 24% of CEA in this center was performed in patients with asymptomatic ≥70% ICA stenosis. 98% of CEA in Taleghani and Iranmehr hospitals were carried out in patients with symptomatic ≥70% ICA stenosis.

Method of anesthesia

All of the CEA operations were done under general anesthesia in Shohada Tajrish, Taleghani, Iranmehr and Razavi hospitals. Cervical sympathetic ganglionic block served for all of CEA operations in Emam Reza hospital until 2007 and thereafter general anesthesia has been used for 90% of CEA in this center.

The main reason of cervical block anesthesia in Emam Reza hospital during 2003-2007 has been placement of arterial clamps without intra-arterial shunting which needs monitoring of the patient.

Surgical Technique

Intra-operative arterial shunting was used in all of CEA operations in Shohada Tajrish, Taleghani, Iranmehr and Razavi hospitals. In Emam Reza hospital, all of the CEA operations were done without intra-arterial shunting up to 2007 and thereafter intra-arterial shunting served for CEA. Despite Emam Reza and Razavi hospitals, arterial patch in site of CEA was used in all of Tehran vasular surgery centers.

Perioperative complications

Perioperative stroke and death rate in Emam Reza, Razavi, Shohada Tajrish, Taleghani and Iranmehr hospitals was 2.4%, 0%, 4.8%, 10.2% and 10.2% respectively. Table 1 demonstrates the perioperative complications of CEA in each center . The whole perioperative stroke and death rate in reported Iranian vascular surgery centers is 6.4%.

Table 1: Perioperative complications of CEA in each surgical center .

Perioperative complication	Emam Reza 86 CEA	Razavi 14 CEA	Shohada 42 CEA	Taleghani 49 CEA	Iranmehr 197 CEA
Stroke	1-1.2%	_	1-2.4%	2-4.1%	12-6.1%
Death	1**-1.2%	_	1*-2.4%	3-6.1%	4-2%
Hperperfusion cerebral edema	_	1-7.1%	_	_	_
Wound hematoma	7-8.1%	_	3-7.1%	_	3-1.5%
Lower cranial nerve paresis	1-1.2%	_	_	_	1-0.5%
Total	14-16.3%	1-7.1%	5-11.9%	5-10.2%	20-10.2%

*Death due to intracerebral hemorrhage secondary to hyperperfusion syndrome
**Death due to extensive brain infarction

Discussion

In Iranian vascular surgery centers ICA stenosis is usually detected by one carotid duplex sonography. Because vascular surgeons trust the skill and experience of their sonographer in determination of ICA stenosis. However, there is no published validation study of their sonographer. At the other side, Iranian vascular surgeons prefer to refuse the acceptance of risk and complications of conventional angiography in candidates of CEA. This diagnostic strategy is out of the standard protocols of CEA operation.[1,4,5] Conventional angiography is the gold standard for diagnosis of ICA stenosis[1,4,5] and is indicated when carotid duplex and MRA show disparate results or are indeterminate.[1,4,5] In centers with validated vascular imaging, if the results of carotid duplex is corresponding with MRA or CT angiography is a patient, combination of duplex with one of these vascular imagings could substitute conventional

angiography.[1,4] Although presence of tandem stenosis reduces the probability of hyperperfusion syndrome after CEA, however it has negative influence in effectiveness of CEA in restoring cerebral blood supply.[4] Thus Iranian vascular surgeons should pay attention to tandem stenosis in these candidates. Results of reported clinical trials of CEA have shown that groups of patients with symptomatic ≥70%, ≥90% and 50-69% ICA stenosis require 6, 4 and 24 CEA operations for prevention of 1 stroke in the next 2 years respectively.[2,3] Based on the ACAS trial, 67 asymptomatic patients with ≥60% ICA stenosis should be operated for prevention of 1 stroke in the next 2 years.[5] The risk of medical therapy alone increases with the degree of stenosis.[1,4] There is no difference in adverse outcomes among those with different degrees of ICA stenosis.[10] The benefit of surgery is greater for patients in high vascular risk profile category.[11] These vascular risk factors do not add to the hazard of CEA.[10,12] Selection strategy of CEA candidates in each center depends on their perioperative stroke and death rate. Review of data from 3644 patients undergoing CEA in the united states has shown overall in-hospital stroke and death rate of 1.8%.[13] Perioperative stroke and death of 1.5% was reported in patients with symptomatic ≥70% ICA stenosis in Cologne, Germany.[14] The first published Iranian CEA data belong to Dr Fazel et al team who works in both Taleghani university hospital and Iranmehr private hospital.[7,8] They had a perioperative stroke and death rate of 10.2%.[7,8] Dr Fazel's team have been the pioneer of CEA in Iran, these complication rate belong to their learning cure period and probably after 2001 they have lower perioperative stroke and death rate[7.8]. However the overall reported perioperative stroke and death rate of CEA in Iranian centers is more than 3%. Based on the NASCET, ESCT and ACAS trials[2,3,5] and our Iranian CEA data, CEA is recommended in Iranian vascular surgery centers only in patients with symptomatic ≥70% ICA stenosis and preferably in patients with symptomatic ≥90% ICA stenosis.[9,15] At the other words, performance of CEA in asymptomatic patients with carotid stenosis is contraindicated in Iranian hospitals, due to superiority of its hazards than its benefits in asymptomatic candidates[16]. Patients undergoing CEA by vascular surgeons had lower adverse outcomes compared to neurosurgeons in the united states.[17] Data of CEA performed by neurosurgeons in Iranian hospitals is limited. A dozen of CEA has been performed by neurosurgeons in the mentioned hospitals with two postoperative death. However, these patients were not included in our study.

We recommend that CEA should be performed in Iran only by vascular surgeons who have considerasble skill and experience of this operation.

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ارزیابی اندآرترکتومی کاروتید در ایران

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چکیده

زمینه و هدف: اندآرترکتومی کاروتید در بیمارانی که تنگی علامت دار و بعضا بدون علامت کاروتید دارند در مراکزی که عوارض حین عمل اندکی دارند توصیه می شود.

روش کار: مطالعه گذشته نگر در بیمارانی که در سه مرکز جراحی عروق در تهران و دو مرکز در مشهد تحت جراحی اندآرترکتومی کاروتید قرار گرفته اند انجام شد. انتخاب بیماران و روش تعیین تنگی کاروتید و روش بیحسی و تکنیک جراحی و عوارض حین جراحی در بیماران مورد ارزیابی قرار گرفت.

یافته ها: ۳۸۸ جراحی اندآرترکتومی در ۳۴۵ بیمار که ۶۵٪ آنان را مردان شامل شده بود انجام شد. میانگین سنی بیماران ۶۶/۸ سال و محدوده آن از ۴۶ تا ۸۴ سال بود.در ۹۰٪ افراد متقاضی جراحی اندآرترکتومی تعیین تنگی کاروتید توسط یک دوپلکس سونوگرافی کاروتید صورت گرفت. احتمال مرگ و سکته مغزی ناشی از جراحی در مراکز جراحی عروق فوق بطور کلی ۶/۴٪ است. عوارض مرگ و سکته مغزی ناشی از جراحی در بیمارستان امام رضا و رضوی و شهدای تجریش و طالقانی و ایران مهر بترتیب ۲/۴٪و ۰٪ و ۴/۸٪ و ۱۰/۲٪ و ۱۰/۲٪ گزارش شد.

نتیجه گیری: در ایران جراحی اندآرترکتومی کاروتید فقط در بیماران با تنگی علامت دار بیشتر از ۷۰٪ شریان کاروتید داخلی توصیه می شود. روش تعیین تنگی کاروتید در مراکز جراحی عروق ایران باید اصلاح شود

واژگان کلیدی: کاروتید- اندآرترکتومی- ایران