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Review article

Carotid endarterectomy during the acute period of ischemic stroke

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ABSTRACT

Objective/background: High risk of recurrent ischemic stroke within the first 14 days after index event in patients with atherosclerotic stenosis of the carotid arteries gave the impetus for the revision of the term of performing carotid endarterectomy (CEA) in symptomatic patients. Nowadays the advisability of performing urgent CEA within 72 h after stroke onset in neurologically unstable patients is discussed frequently. The paper presents the evaluation of carotid endarterectomy during the acute period of ischemic stroke.

Methods: The results of CEA in 462 patients with symptomatic ICA stenosis performed in two independent Vascular Centers were analyzed. Indication for CEA was stenosis of ICA 50%. In Group I 28.5% of patients underwent CEA within 14 days after stroke onset, and in 71.5% of patients was performed 6 weeks after stroke onset. In Group II 39.5% of patients with unstable neurological symptoms underwent within 3–6 h after stroke onset, and in 60.5% of patients with unstable atherosclerotic plaque, CEA was performed within 24–48 h after stroke onset.

Results: In Group I (239 people) 7 (2.9%) patients developed stroke. Three (1.3%) patients died. In Group II (223 people) 5 (2.2%) patients developed stroke. One (0.4%) patient died. When comparing complications in the early postoperative period no statistical significance was found.

Conclusions: Urgent CEA is indicated in patients with unstable neurological symptoms as well as for those with unstable atherosclerotic plaques. Considering a high risk of stroke recurrence within the first 14 days urgent CEA is effective in the prevention of recurrent stroke. Only 2.2% patients developed postoperatively stroke.

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Introduction

Prevention and treatment of acute ischemic stroke is one of the most relevant problems in modern medicine. Ischemic stroke is a principal cause of mortality and disability [1]. In addition, the annual risk of recurrent stroke is approximately 37% and the risk of recurrent ischemic stroke within 14 days is 20% [2,3]. According to randomized clinical trials, carotid endarterectomy (CEA) is an effective surgical method stroke prevention when the rate of postoperative complications in patients with symptomatic ICA stenosis is <6% [4]. However, the timing of carotid endarterectomy in patients with symptomatic ICA stenosis after acute stroke is still a matter of debate. Due to a higher risk of intracerebral hemorrhage after ischemic stroke, it has been recommended to delay CEA 4–6 weeks after stroke [5]. However, new data show no increased stroke risk after CEA performed within 14 days after stroke onset, compared to CEA performed 4–6 weeks after stroke [3,6]. In recent years, data on the advisability and efficacy of CEA within 3 days and even within the first 6–8 h after suggesting stroke onset in symptomatic patients have appeared frequently [2,6], suggesting that currently, many specialists and leading Vascular Centers adhere to the advisability of performing urgent CEA (within 72 h) after stroke onset high risk patients [7,8].

However, some questions remain unanswered:

What are the criteria for selecting patients for urgent CEA?
What is the main risk factor for recurrent ischemic stroke?

In our study we have analyzed the results of CEA depending on time interval between the onset of ACD and surgery performed in patients with symptomatic ICA stenosis.

The objective of our research was to study the results of CEA during the acute period of ischemic stroke.

Materials and methods

Results of CEA performed in 462 patients with symptomatic ICA stenosis over a 6-year period were analyzed. The study included the results of CEA performed in two independent Vascular Centers with different principles and approaches to the selection of time interval between stroke onset and the

date of performing CEA in patients with symptomatic ICA stenosis > 50%.

Patients' age ranged from 32 to 83 years, the average age was 63.5 ± 2.7 years. There were 286 (61.9%) males and 176 (38.1%) females.

Patients were divided into two groups:

Group I included 239 patients with symptomatic ICA stenosis who had CEA at the Clinic of Vascular Surgery at the East Slovak Institute of Cardiovascular Diseases (VÚSCH, a.s.), Košice, Slovak Republic.

Group II consisted of 223 patients with symptomatic ICA stenosis who has urgent CEA at the Department of Cardiovascular and Thoracic Surgery at the Central Military Hospital, Budapest, Hungary.

There were no age or gender differences between the two groups.

Clinical characteristics of patients that had typical atherosclerotic carotid disease with symptoms of insufficient blood supply to the brain. Neurological status of patients is shown in Table 1. Comorbidities of patients is shown in Table 2.

In Group I there were 37 patients (15.5%) with a stenosis ICA of 50–60%, 92 patients (38.5%) with a stenosis ICA of 60–80% and 110 (46%) patients with a stenosis ICA of 80–98% (Table 3).

The selection of the interval between stroke onset and the date of performing CEA was formed using the following algorithm: all patients with symptomatic ICA stenosis underwent brain CT to detect new ischemic lesions.

A better method to detect ischemic brain lesion after a stroke is MRI. In our group, due to better availability and shorter duration of examination, CT was used. For those patients that continue to neurological deficit and no brain lesion detected by CT, MRI was used.

If the size of the ischemic lesion was not more than one third of the territory of the middle cerebral artery (MCA) (approximately $2 \text{ cm} \times 3 \text{ cm}$) and minimal neurologic symptoms were present, CEA was performed within the first 14 days after stroke onset. If the size of ischemic lesion was more than $2 \text{ cm} \times 3 \text{ cm}$ or there were more ischemic lesions (multiple lesions), CEA was performed 5–6 weeks after stroke onset. In Group I (239 people) 5 (2.1%) patients had CEA within 72 h after stroke onset; 63 (26.4%) patients had CEA within 3–14 days after stroke onset; 171 (71.5%) patients had CEA 6 weeks after the onset of ACD (Table 4).

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