Letter to editor. Longitudinal and transverse access for carotid endarterectomy. Commentary and invitation to discussion

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Dear Editor, we were very interested to read the results of the study by Mikhailov et al. [1] on oblique-transverse access (OTA) to the carotid artery bifurcation for carotid endarterectomy (CEA). The results of the study are undoubtedly of practical importance, especially cosmetically and because of the frequency of cranial nerve injuries (CNI).

CEA is the gold standard for surgical treatment of patients with atherosclerotic lesions of the carotid arteries. CEA is currently the most frequently performed vascular arterial operation and is accompanied by a low incidence of strokes and lethal outcomes [2—4]. At present, two main accesses are used in CEA: the classic longitudinal access and the transverse/oblique transverse access (OTA). The indications for transverse access are ambiguous.

In this paper, the outcomes were evaluated after oblique transverse access to carotid bifurcation for CEA (164 patients between 2010 and 2015) [1]. The authors describe the technique of performing the operation from the oblique transverse access and its advantages. However, it is unfortunate that the article does not compare classic longitudinal access (LA) to transverse access, which in our opinion reduces the practical significance of the results.

CEA is only possible if the carotid arteries are adequately exposed. This applies particularly to the internal carotid (ICA) and its distal portion (which is especially vital for the distal progressive atherosclerotic plaque). This is why most surgeons use LA. OTA will not always ensure that the common and internal carotid artery are well exposed, making it difficult to surgically manipulate these vessels. This is largely due to specific anatomical features, in particular, the «high» or «low» localization of the bifurcation of the CA, the presence of a «short» neck, level of subcutaneous fat, as well as the tortuosity of the ICA. According to the chapter on carotid endarterectomy in the book «Haimovici’s Vascular Surgery», «if the incision is made in a suboptimal location, it is more difficult to obtain more cephalad and caudal exposure in the wound» [5]. In addition, in their atlas on vascular surgery, K. K. Zarins and B.L. Gewerts conclude that this access does not assure that the distal part of the internal carotid artery is adequately exposed [6]. In a number of major atlases on vascular surgery and surgical accesses, this type of access is not mentioned as an alternative to longitudinal access. If the more distal segment of the ICA must be exposed, one way of addressing this situation has been described in the book «Rutherford Vascular Surgery» 9th ed. This is to extend the skin access — «if the incision is made too low, more cephalad exposure can be obtained by extending the skin crease incision posteriorly» [7]. Another possible variant is to change the access passage using retractors. With proper subplatysmal dissection and retractor placement, the oblique or «transverse» incision can essentially be converted into a longitudinal incision. A Gelpi retractor that has been vertically expanded under retractor placement, the oblique or «transverse» incision can essentially be converted into a longitudinal incision.

In addition, it must be emphasized that access to the carotid artery bifurcation with OTA can only be recommended to surgeons who have extensive experience in carotid surgery [5]. The use of classical LA and OTA in carotid artery surgery was also discussed in the 2017 document of the European Society of Vascular Surgery [9]. Thus, surgeons can use whichever incision they prefer. If diagnostic ultrasound indicates that bifurcation is not too high and there is focal stenosis, a transverse skin crease incision will probably give
The best cosmetic results. If, however, there is any question about the bifurcation being high, or if the lesion is extensive, a longitudinal incision is still preferable.

The authors of the article [1] reasonably point out that injury to the cranial nerves is one of the most frequent and serious complications that arise during CEA and current published data indicate that damage is quite frequent. Damage to the cranial nerves is often a severe complication; bilateral damage can be life-threatening. However, it should be emphasized that CNI is usually not permanent. J.D. Kakisis et al. [10] have presented a systematic review and meta-analysis of the frequency of CNI in CEA, based on English language studies in the period between 1970 and 2015 (20,860 CEA. They showed that damage to the n. vagus is most frequent, corresponding to 3.99% of cases — including 0.57% permanent nerve injury (PNI). Damage to the hypoglossal nerve was found in 3.79% of cases, out of which 0.15% was PNI. Damage to n. glossopharyngeal nerve was found in 0.22% of cases, out of which 4.35% was PNI. Damage to the facial nerve was found in 1.97% of cases, out of which 11.68% was PNI. The authors pointed out, that over the past 35 years, the frequency of hypoglossal nerve injuries had decreased from 8% to 2%, whereas no statistically significant association was found between CNI and the type of anesthesia, the use of a patch, revision operation, or the use of a shunt.

In reference to their own data, the authors [1] noted that damage to the sublingual nerve was observed in 1 (0.6%) case after OTA, so that the incidence of CNI was low with this access.

The guidelines of the European Society of Vascular Surgery [9] discuss how often the classical LA procedure damages cranial nerves. Several other articles have addressed this issue. G. Marcucci et al. [11] demonstrated that a transverse access did not increase the rates of nerve damage in comparison to a short longitudinal incision. G.A. Mendes et al. [12] demonstrated that the transverse skin incision for CEAs is not associated with an increased risk of CNI (p=0.42). In their study, the incidence of CNI associated with the transverse incision was 3% (n=5) vs 5% (n=3) for longitudinal incision. All CNI were temporary.

However, it should be noted that, as a rule, a transverse access is applied in patients with low carotid bifurcation and local plaque. Thus, transverse access will be performed a priori under more favorable conditions. LA will be preferred in patients with high bifurcation and progressive atherosclerotic plaque.

The frequency of damage to the cranial nerves is affected by anatomical factors [13]. In particular, the vagal nerve may not lie behind the common carotid artery, but in front of it and the hypoglossal nerve can also cross the internal carotid artery/bifurcation at different levels. In addition, the glossopharyngeal nerve is located between the internal carotid artery and the internal jugular vein, and poses a danger when resection of the styloid process is required, with extensive mobilization of the ICA. The next factor is a short neck and extensive development of subcutaneous fatty tissue. Thus, damage to the nerves is always probable. However, a damage to the cranial nerves is minimized if the patients are selected for the transverse access.

An important aspect is the possibility of using a temporary shunt during endarterectomy. In particular, Marcucci G et al. [11], noted difficulties in implantation of a temporary shunt with a transverse access. However, there are few data on the application of this access, so it is impossible to draw definitive conclusions on the application of temporary shunting in CEE in comparison to classical LA.

The major issue considered by Mikhailov et al. [1] was the assessment of the quality of life after applying this access. Unfortunately, the authors do not compare the QL of the classical LA and TOA using comparative statistics. The comparison was more descriptive in nature, which does not allow us to draw reliable conclusions on the feasibility of applying a classical LA. However, some authors note that the transverse access gives better cosmetic outcomes [1, 9, 14]. Furthermore, as we have understood it, there were only 15% of the patients seen at follow up of 6 months. This drastically reduces the validity of the report.

The choice of the access affects postoperative outcomes, particularly cosmetic outcome and QL. However, is it possible at all to improve the QL of patients with cerebral hemodynamic disorders by using specific accesses? What is the risk of developing intra and postoperative complications with transverse access? The answer to these questions can only be provided by a prospective randomized trial comparing two accesses and with identical anatomical and clinical conditions. Such a study must also cover the cosmetic component after completing the precision intracutaneous suture.

REFERENCES


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