



Surgical Treatment of Extracranial Internal Carotid Artery Aneurysm: A Case Report

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Abstract

A sixty four year-old female patient was admitted to the hospital with complaints of pulsatile mass in her left cervical area for one year, which had abruptly augmented one month earlier. No cervical trauma or infection appeared to be present. There was a 3x4cm pulsatile mass in the left cervical angle of the mandible, which could be observed with vascular murmur. Tomographic angiography showed a saccular aneurysm of 32x30x25mm in diameter in the left ICA. Aneurysmal dilatation was resected and primarily repaired by end-to-end anastomosis. The postoperative recovery was uneventful. Histopathologic examination showed hyperplasia in artery wall, mucous degeneration, hyalinization, chronic inflammatory cell infiltration, and local calcification. The patient was doing well during the early follow-up period without complications.

Key Words: Internal Carotid Artery; Aneurysm; Anastomosis; Surgical.

Ekstrakranial İnternal Karotis Arter Anevrizmasında Cerrahi Tedavi: Bir Olgu Sunumu

Özet

Atmış dört yaşında bayan hasta, sol servikal bölgede bir yıldır var olan pulsatil kitle nedeniyle hastaneye başvurdu. Şikayetleri son bir aydır artan hastanın, servikal travma ya da enfeksiyon öyküsü yoktu. Mandibulanın sol servikal bölgesinde 3x4 cm' lik vasküler üfürüm alınan bir kitle gözlemlendi. Tomografik anjiyografide, sol internal karotis arterde 32x30x25 mm' lik sakküler bir anevrizma olduğu görüldü. Anevrizma rezeke edilerek çıkartıldı ve internal karotis arterin proksimal ve distali uç uca anastomoz edildi. Postoperatif erken takiplerinde tam bir iyileşme gözlemlendi. Patolojik incelemede arter duvarında, fibropilazi, mukus dejenerasyonu, hiyalinizasyon, kronik inflamatuvar hücre infiltrasyonu ve yerel kalsifikasyon gözlemlendi. İyileşme komplikasyon olmadan gerçekleşti.

Anahtar Kelimeler: İnternal Karotid Arter; Anevrizma; Anastomoz; Cerrahi.

INTRODUCTION

Extracranial internal carotid artery aneurysms are a rare disease group. Aneurysm is defined by localised increase by more than 50% in the vessel calibration reference values. This increase has been identified at the level of internal carotid artery by 0:55±0:06cm in males and 0.49±0.07cm in females (1, 2).

The most common reason for this is atherosclerosis, which creates a true aneurysm (3). When untreated, carotid artery aneurysms may have adverse effects on the quality of life and may even lead to death. Extracranial internal carotid artery aneurysms can be treated with carotid ligation or surgical reconstruction (4). In the last decade, with advances in technology, treatment approaches have gained diversity. Stent graft procedures, embolisation, and detachable coils are some of these options (5,6).

In this paper, we are going to focus on the treatment procedure of an extracranial internal carotid artery saccular aneurysm patient in the light of the literature.

CASE REPORT

A sixty-four-year-old female patient was admitted to our clinic with swelling on the left side of her neck. The medical history of the patient revealed that the swelling had begun a year ago and grown bigger in the last month. She was being followed for hypertension but she did not have record of neck surgery, trauma, or infection. On the physical examination, we discovered a 3x4cm painless mass in the cervical region of the left mandible with pulsation and murmur. Other systemic examination findings were normal. Her arterial blood pressure was 160/80mmHg; the pulse rate was the normal sinus rhythm with 96/min. The patients laboratory values were also normal. Cervical Doppler ultrasonography with staining showed saccular aneurysm in the middle segment of the left internal carotid artery. The subsequent three-dimensional computed tomographic angiography disclosed the right, external, and internal carotid arteries to be in normal calibration, no vertebrobasilar failure or aneurysmal expansion in the intracranial artery, but a 32x30x25mm saccular aneurysm in the left extracranial internal carotid artery, normal in its distal and proximal and with standard calibration (Figure 1). As a part of the preoperative preparation, we

also checked for coronary artery and peripheral artery diseases and searched for other artery aneurysms with simultaneous coronary and peripheral angiography but we did not come across any concomitant or additional pathologies. The patient was also evaluated for other systemic diseases. Eventually we decided to commence the operation.



Figure 1. The 3D CTA image of the extracranial internal carotid artery aneurysm

Surgical Method

On his approval, the patient was scheduled for an elective operation. As the patient under general anaesthesia, the treatment area was appropriately prepared. Following the vertical incision from the front side of the sternocleidomastoid muscle, we reached the main, external, and internal carotid arteries. We could see the saccular aneurysm sac on the internal carotid artery. After the intravenous administration of 5000 units of heparin and by putting clamps on the internal carotid artery from the distal and proximal of the aneurysm sac, the sac was totally removed.

The internal carotid artery was anastomosed end to end from the proximal and to the distal with 7/0 prolene suture; we did not use any saphenous or synthetic grafts. To avoid causing deterioration by cerebral perfusion during the operation, the patient's head was cooled locally. The retrograde flow was good and so we did not use shunts and completed the anastomosis by removing the clamps in 22 minutes. Having seen strong arterial flow in the distal and proximal of the anastomosis area, we closed the layers duly. The pathological evaluation of the aneurysmal arterial wall, we observed fibroplasia, hyperplasia, and mucous degeneration along with hyalinisation, chronic inflammatory cell infiltration, and local calcification. The patient did not show any signs of postoperative complications. The early stage follow-ups were performed with coloured Doppler ultrasound and

we could not detect any pathologies. The patients was instructed to use low-dose antiagregants for lifetime accompanied by a three-month anticoagulant treatment. No additional complaints were observed in the long-term follow-ups.

DISCUSSION

Extracranial internal carotid artery aneurysms are quite rare. The most common cause for the disease is atherosclerosis. It is mostly encountered in the carotid artery, especially in the bifurcation region. This is followed by the internal carotid artery (7). Two different researches, that had been carried out ten years after one another and took 25 years to complete, suggest that 1.9% of carotid reconstruction cases were due to carotid artery aneurysms (8,9). The most important cause of the internal carotid artery occlusion is atherosclerosis; there are various etiologic factors for aneurysms. These are atherosclerosis, dysplasia, traumas, and infections (4). The surgical treatment of extracranial carotid artery aneurysms should be determined by evaluating the shape, size, and location of the aneurysm, an assessment of its etiology and symptoms along with the presence of comorbidities (2). Even though the carotid ligation may be sufficient due to extensive collaterals in trauma related aneurysms in young patients (small aneurysms require monitoring), emergency surgery or reoperative carotid surgery comes with high mortality and neurological complication rates because of expected rupture and rapidly evolving neurological deficit (10).

Atherosclerotic saccular extracranial carotid artery aneurysms are usually with coronary artery diseases and hypertension and their male-female ratio is 2 to 1 (11). Atherosclerotic saccular and fusiform aneurysms are more frequent in 60's and 70's (12). Considering patient's quality of life and risk of death, this type of aneurysms require surgical intervention. Because they could not be treated with surgery at the time, extracranial carotid artery aneurysm patients in the 1950s would die due to complications related to the aneurysm. The mortality rate in that period was 71% (13). For the surgical treatment of aneurysms, practitioners can use dacron, polytetrafluoroethylene (PTFE), and vein grafts while they may also apply end to end anastomosis without any grafts (14). If there the aneurysm sac is hard to reach or adjacent to vital organs, coil or stent grafting can be used as an alternative method to reduce the high surgical risk (15). Anastomoses have been applied between the extracranial carotid artery and intracranial carotid artery in the past years but this method is not preferred anymore for it gives way to new aneurysm formations, frequent bleeding, infection, and distal embolization (16). Damaging the atherosclerotic vessel wall, intra-arterial percutaneous approaches may cause intracranial neurological issues. The conservative approach may be applied to newer, spontaneous, and dissected aneurysms. However, if the anticoagulation therapy is insufficient and if there is expansion, surgical approaches, with stent grafting as the first option, may be administered (2,15). In a study conducted on 84

extracranial carotid artery aneurysm patients between 1994 and 2011, Radak et al. report that surgical treatment depending on the type and anatomical structure of the aneurysm may bear very good results. The 5-year survival rate of the saccular aneurysm patients who underwent surgical operations was 96.3% (17). Hence, the most appropriate method of treatment should be selected by taking the etiology, location, and size of the aneurysm into account. We believe that the aneurysm resection and the end to end arterial reconstruction we have preferred in our extracranial internal carotid artery aneurysm case is one of the most appropriate methods.

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