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Reporte de caso

Surgical treatment of a spontaneous rupture of a giant common carotid artery aneurysm

Tratamiento quirúrgico de la ruptura de un aneurisma gigante de arteria carótida común

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Abstract

Primary atherosclerotic aneurysms of the carotid artery are extremely rare. Most cases are due to atherosclerotic disease, pseudoaneurysms secondary to neck trauma or previous surgery and mycotic aneurysms. Vascular surgeons will very likely encounter only a few of these aneurysms in their professional life as surgeons. These aneurysms pose a significant risk to the patient, due to embolisation of the thrombus, neurological complications, compression of adjacent neck structures and rupture from infection and previous surgery.

The following case report describes the presentation and surgical treatment of a spontaneously ruptured gigantic common carotid artery aneurysm.

Keywords: Aneurysm, Carotid Artery, Atherosclerosis.

Resumen

Los aneurismas primarios de la carótida son extremadamente infrecuentes. La mayoría de los casos ocurren en el contexto de una enfermedad aterosclerótica, pseudoaneurismas secundarios a trauma o cirugía de cuello previa y aneurismas micóticos. Un cirujano vascular tendrá que operar un paciente con esta presentación en dos o tres ocasiones en toda su carrera. Aunque raros, estos aneurismas traen un riesgo importante para el paciente, en cuanto a embolia y sus complicaciones neurológicas, compresión de estructuras adyacentes en el cuello y más raro aún, ruptura y hemorragia.

Este reporte de caso describe la presentación y tratamiento de una paciente quien presentó una ruptura espontánea de un aneurisma gigante de carótida común.

Palabras clave: Aneurisma, Aterosclerosis, Arteria carótida.

Introduction

Atherosclerotic related cardiovascular disease is the leading cause of death in the majority of regions in the world. Vascular surgeons care for a diverse set of clinical manifestations related to this disease presentation.

Although rare, these aneurysms pose a significant risk to the patient, due to embolisation of the thrombus, neurological complications, compression of adjacent neck structures and, more rarely, rupture from infection and previous surgery.

Most cases of primary carotid artery aneurysms are due to atherosclerotic disease and secondary causes include pseudoaneurysms secondary to neck trauma or previous surgery and mycotic aneurysms (1,2).

Vascular surgeons will very likely encounter only a handful 2 of these aneurysms in their professional life. The reported incidence of this condition is approximately 0.2 cases per year (3,4). Although rare, these aneurysms pose a significant risk to the patient, due to embolisation of the thrombus, neurological complications, compression of adjacent neck structures and, more rarely, rupture from infection and previous surgery (5,6). Treatment for this rare presentation is still surgical. Prior to the publishing of this article, only 1 case of spontaneous rupture of an atherosclerotic carotid aneurysm had been reported (7).

Case report

A 57-year-old woman was admitted to the emergency department with a swollen and pulsatile neck mass, with skin abnormalities, bruising and hoarseness. At the time of admission, the patient did not manifest any neurological symptoms.

Two years earlier, the patient was diagnosed with a small common carotid artery aneurism measuring 2.5 cm in diameter; however, the patient refused surgical treatment.

Her relatives reported an associated bipolar disorder diagnosed a year earlier, for which the patient was being treated with oral lithium. Other concomitant medical conditions included hypertension, smoking and dyslipidemia.

Clinical examination revealed a large (4.6 cm in diameter) pulsatile mass on the anterior side of her neck, associated with small patches of skin necrosis and extensive bruising around the neck (figure 1). Her oxygen saturation was 90 % in room air and was declining rapidly. The patient also had severe hypertension, with a systolic blood pressure of over 190 mm Hg but with no focal neurological signs.



Figure 1. Patient's aneurysm at presentation

Dissection distal to the aneurysm was then performed and access was gained to the internal carotid artery. After full heparinization, we opened the aneurysmal sac, occluded the ostium of the external carotid artery and placed a Pruitt-Inahara shunt between the common and internal carotid arteries, thereby re-establishing blood flow to the brain in less than 3 minutes.

The patient was immediately sent to the operating room for emergency surgical exploration. Further scans were not conducted due to her life-threatening situation.

During anaesthetic induction, the patient experienced 2 cardiac arrests that subsided immediately after cardiac compression and pharmacological intervention by the anaesthetist. Surgery proceeded despite these events.

A longitudinal incision was made along the line of the sternocleidomastoid muscle, with temporal detachment of this muscle at the clavicular insertion to gain access to the proximal segment of the common carotid artery. The measured size of the aneurysm was 4.8 cm. Dissection distal to the aneurysm was then performed and access was gained to the internal carotid artery. After full heparinization, we opened the aneurysmal sac, occluded the ostium of the external carotid artery and placed a Pruitt-Inahara shunt between the common and internal carotid arteries, thereby re-establishing blood flow to the brain in less than 3 minutes. A small transverse incision was then performed on the anterior neck triangle, resecting the necrotic skin and the rest of the aneurysm.

A 8-mm Dacron interposition graft was sutured in place, the shunt was removed, and the detached sternocleidomastoid muscle was sutured ([figure 2](#)). The platysma muscle and skin were then sutured.

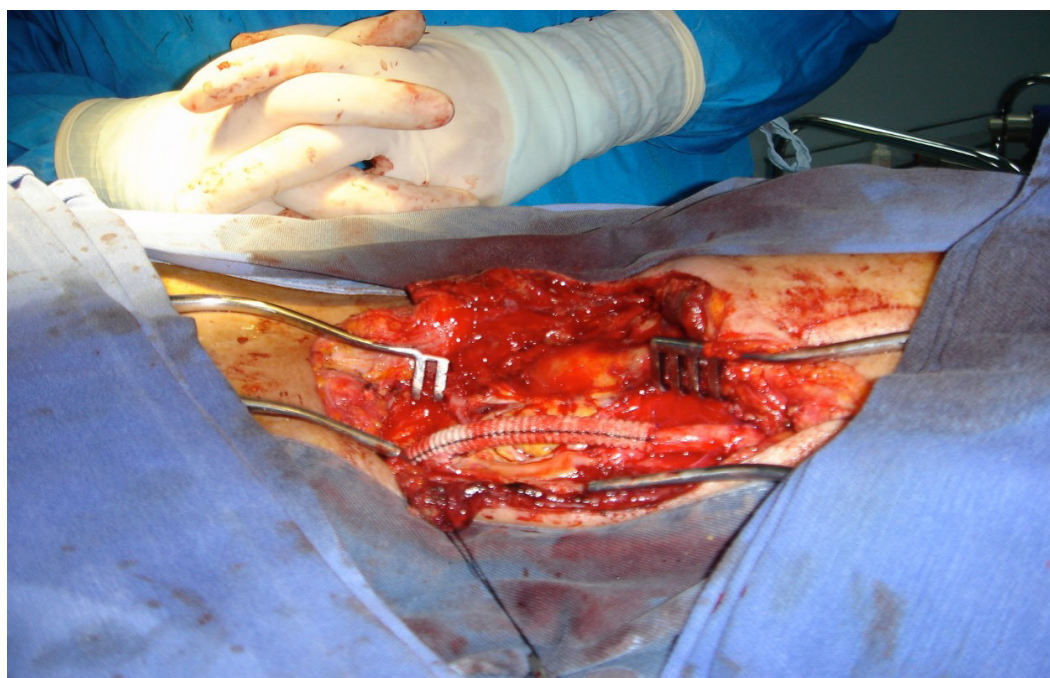


Figure 2. 8 mm Dacron graft in place

Upon awakening from general anaesthesia, the patient exhibited no neurological symptoms. She remained in an intermediate care unit for 24 hours and was discharged 3 days after the operation.

Histopathological analysis of the wall of the aneurism revealed it to be of atherosclerotic origin.

After 2 weeks at follow up the patient manifested no neurological symptoms and no alteration of her voice, ability to swallow or any peripheral nerve injuries. The skin was healing without complications.

Discussion

Extracranial carotid aneurysms are very rare (8) with a reported incidence of approximately 0.2 cases per year. The clinical history of these aneurysms is not clear, given that the various reports show that management is based solely on the prevention of potential complications (9-11).

The main causes also differ in terms of the frequency of presentation, such as atherosclerosis, iatrogenic pseudoaneurysms, trauma and mycotic aneurysms, usually secondary to some type of intervention on the carotid artery (12,13). Other reports have mentioned Takayasu's and Marfan's disease as a cause for this presentation (14,15). There was a case of a paediatric patient with a common carotid artery aneurysm secondary to fungal infection following extracorporeal membrane oxygenation (16).

In the analysed series, surgery is justified primarily for prevention of neurological complications, emboli, compression of adjacent structures and even rupture. Nevertheless, rupture of a carotid aneurysm is extremely rare. In the reviewed literature, there are just 5 reports of ruptured carotid artery aneurysms, 1 related to mycotic aneurysms and 4 related to iatrogenic aneurysms; only 1 case of a true atherosclerotic aneurysm rupture has been described (1,7,17-19). In the latter case, the aneurysm rupture was facilitated by the patient's previous psychiatric disorder, which allowed the aneurysm to grow to giant proportions and eventually rupture.

There is no consensus on the surgical approach for this condition (20,21). In most cases, adaptation to the anatomy is essential to gain control of the common and internal carotid artery. Fortunately, in this case we had no difficulty establishing control over the distal internal carotid artery, which permitted the resection of the aneurysm without having to perform mandible osteotomy. A temporary shunt was placed between the 2 ends to establish cerebral blood flow within less than four minutes. This process provided maximum control of the situation, thus enabling resection of the aneurysm and damaged skin.

There is no consensus in the literature, however, on the use of shunts. Older studies appear not to use them (22,23), while more recent series use various shunts such as the Pruitt-Inahara and Javid shunts (24,25). Interestingly, the recent case series also report a lower incidence of neurological events.

There seems to be an increasing tendency towards reconstruction of the carotid artery. Previous series have performed simple end to end reconstruction where possible. Aneurysmorrhaphy and even ligation of the carotid artery has been considered. Unfortunately, there has been no report on the long-term results of these techniques, thus they can only be inferred from previous experience. In the more recent series, reconstruction using polytetrafluoroethylene, Dacron and saphenous vein interposition grafts have been used with good initial results (4,26) and a lower incidence of complications.

In our case, we used a Dacron interposition graft, with good results. An endovascular approach was not considered, because the rupture size and subsequent necrosis of the overlying skin demanded a surgical intervention.

The patient's recovery was satisfactory, with no adverse neurological events despite the two cardiac arrests during anaesthesia induction. There was also no evidence of peripheral nerve palsy.

Surgery is justified primarily for prevention of neurological complications, emboli, compression of adjacent structures and even rupture. Nevertheless, rupture of a carotid aneurysm is extremely rare.

At the 2-year follow-up, the patient was still asymptomatic and a Duplex scan showed a normal blood flow of 78 cm/sec in the vascular graft with no anastomotic stenosis.

Conclusion

Large carotid aneurysms are extremely rare entities. The surgical approach should be aggressive once an aneurysm has been diagnosed, because the clinical evolution shows that they can rupture. Surgical management should be aimed at placing a temporary shunt and reconstructing the carotid artery to restore blood flow to the brain, which appears to offer the best results in the short and medium term.

Declaration of conflicting interests

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Surgical management should be aimed at placing a temporary shunt and reconstructing the carotid artery to restore blood flow to the brain, which appears to offer the best results in the short and medium term.

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