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GIANT PSEUDOANEURYSM OF THE EXTRACRANIAL VERTEBRAL ARTERY

CASE REPORT

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ABSTRACT - Pseudoaneurysms of the extracranial vertebral artery are extremely rare due to their deep location and the anatomical protection of this artery. They can be caused by cervical traumas (firearm injuries, sports, hyperextension of the neck and iatrogeny). The authors report the case of a patient who developed a giant pseudoaneurysm of the extracranial vertebral artery after surgery for the removal of a tumor of the cerebellopontine angle in which surgical lesion of the artery occurred. Treatment was performed by endovascular approach. Literature is reviewed and comments are made on the physiopathogeny of the lesion and the different forms of treatment.

KEY WORDS: aneurysm, vertebral artery aneurysm,endovascular treatment

Pseudoaneurisma gigante da artéria vertebral extracraniana: relato de caso

RESUMO - Os pseudoaneurismas da artéria vertebral extracraniana são extremamente raros pela localização profunda e proteção anatômica desta artéria. Podem ser ocasionados por traumas cervicais (ferimentos por armas de fogo, esportes, hiperextensão do pescoço e iatrogenias). Os autores relatam o caso de um paciente que desenvolveu um pseudoaneurisma gigante da artéria vertebral extracraniana após cirurgia para retirada de tumor de ângulo ponto cerebelar em que ocorreu a lesão cirúrgica desta artéria e cujo tratamento foi endovascular. A literatura é revisada e são feitas considerações sobre a fisiopatogenia da lesão e as várias formas de tratamento.

PALAVRAS-CHAVE: aneurisma, aneurisma da artéria vertebral, tratamento endovascular

Pseudoaneurysms of the extracranial vertebral artery are rare lesions[5,36] since this artery is anatomically protected[20]. The initial description was made by Matas in 1893[32], and there are few reports of iatrogenic pseudoaneurysms. The resolution of these lesions is rather controversial, always with a high degree of difficulty and various rates of morbidity and mortality[3,6,7,9,14,17-19,21-23,40].

The formation of a pseudoaneurysm of the extracranial vertebral artery by craniectomy for a tumor of the cerebellopontine angle, observed in the present case, as far as we know has not been reported previously. We employed endovascular treatment.

CASE REPORT

EDDT, male, white, 30 years old, born in Porto Alegre, was hospitalized in our department in November 1993 complaining of increasing hypoacusia of approximately 6 months standing and neuralgia of the mandibular

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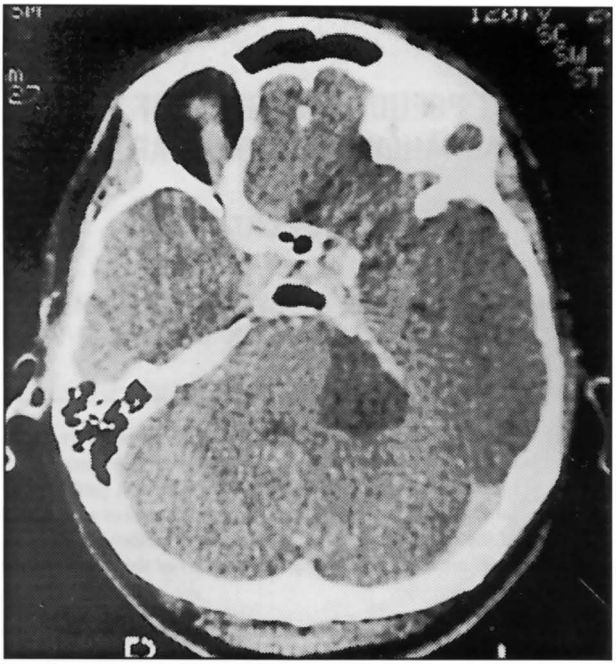

Fig 1. Contrast-enhanced computed tomographic scan showing a hypodense lesion at the left cerebellopontine angle, with a probable diagnosis of epidermoid cyst.

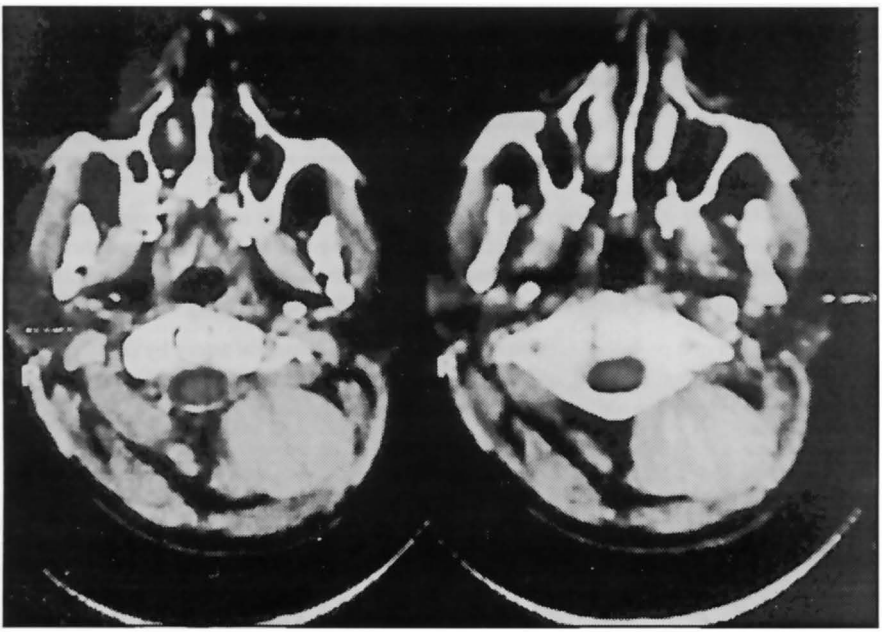

Fig 2. CT scan showing a voluminous hyperdense extracranial lesion in the left suboccipital region with aneurysmatic characteristics.

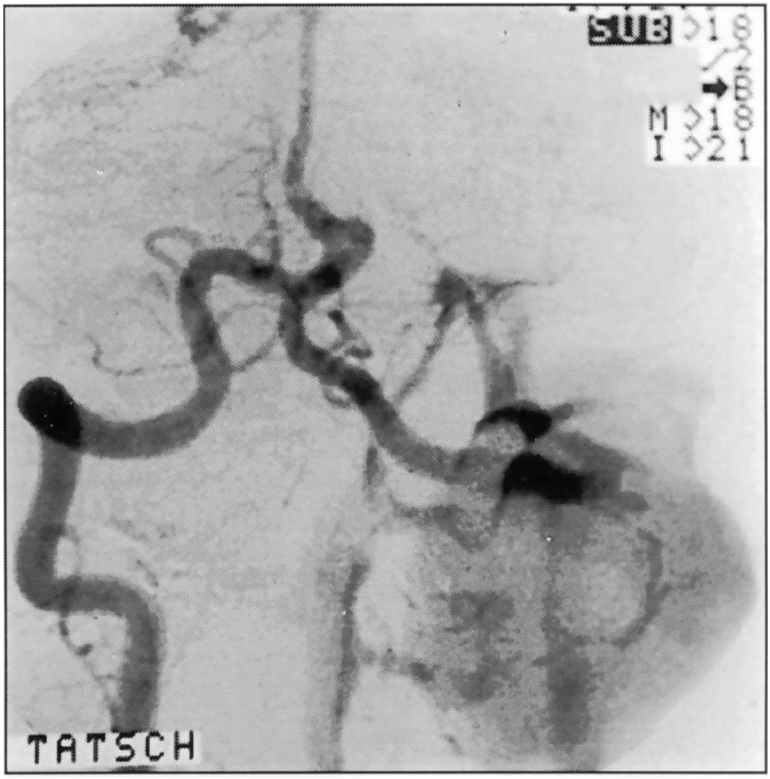

Fig 3. Frontal view of a digital angiography showing a giant aneurysm of the left vertebral artery in the cervical segment.

branch of the fifth left cranial nerve. The other aspects of the neurological examination were normal, and his recent medical history did not present any noteworthy aspects. He was submitted to computed tomography of the brain which showed a hypodense lesion at the left cerebellopontine angle, with a probable diagnosis of epidermoid cyst (Fig 1). The angiography of the four brain vessels did not show any abnormalities. Lateral suboccipital craniectomy was performed to extract the tumor with the patient in a seated position, and during the removal of the first cervical lamina profuse bleeding occurred due to direct lesion of the vertebal artery. This was controlled with hemostatic agents and temporary compression. Once the hemorrhage was under control, surgery continued normally with complete removal of the tumor. Approximately one hour after surgery ended, when the patient was already in recovery room, profuse bleeding occurred again in the region of the surgical incision, and the patient was reoperated immediately. As soon as the sutures were reopened, bleending ceased spontaneously although the source of the hemorrhage could not be located.

After this episode, the patient recovered from surgery without incident, and was released from hospital 7 days later with normal neurological examination and laboratory tests. The pathological result confirmed the initial hypothesis of epidermoid cyst. Twenty-five days after leaving hospital the patient returned, complaining of pain in the left occiptal region and the reccurrence of the occipital pulsatile mass, with clear bruit at auscultation.

A new computed tomography was performed, showing a voluminous hyperdense extracranial lesion in the left suboccipital region with aneurysmatic characteristics (Fig 2). A digital angiography of the brain was immediately performed and showed a giant aneurysm of the left vertebral artery in the cervical segment (Fig 3).

A decision was made to treat this pseudoaneurysm by arterial embolization. The left vertebral artery was catheterized by femoral approach, using a 6F guiding catheter (Ingenor, France), and a detachable GVB(16)

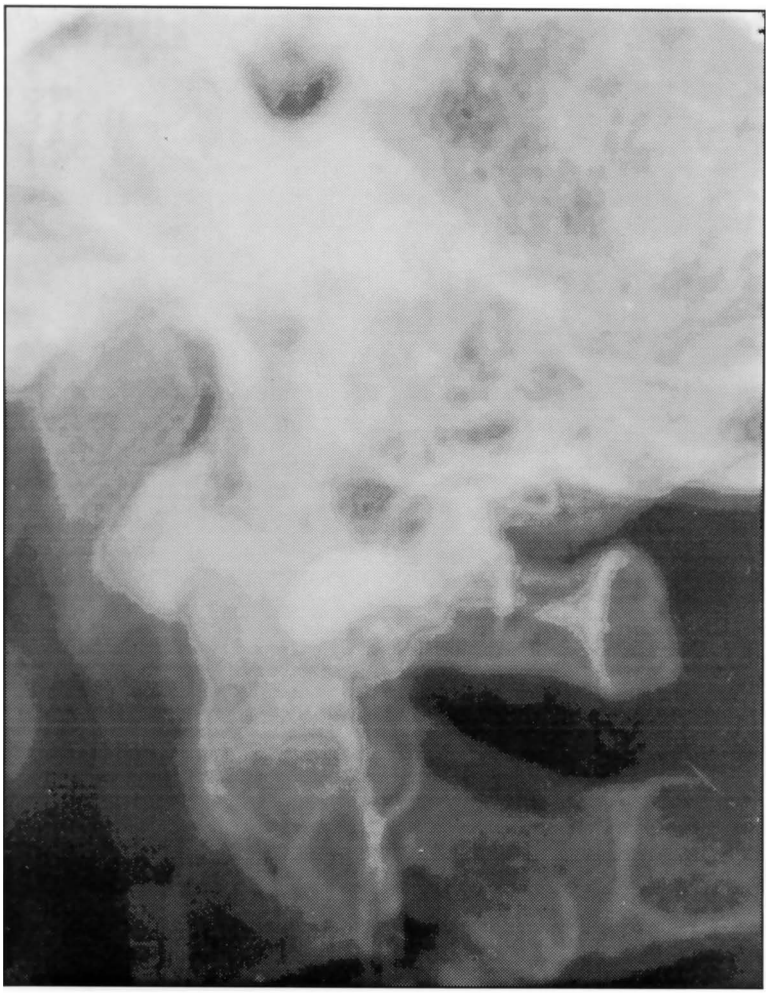

Fig 4. Lateral view showing the balloon placed proximally to the aneurysm.

(Ingenor) balloon was introduced on the tip of a Tracker 18(Target therapeutics) catheter. The balloon was placed proximally to the aneurysm and a 20-minute occlusion test was performed, after which the balloon was detached and the left vertebral artery occluded. Due to the presence of an associated fistula, the pseudoaneurysm was still filled in retrograde fashion through the right vertebral artery. The right vertebral artery was catheterized and a MAGIC 1.8F(Balt, France) catheter was introduced. By intraarterial navigation it was led to the contralateral vertebral artery after exiting the right PICA (Fig 4), and a mixture of NBCA was injected with a rapid polymerization time which partially filled the aneurysm and occluded the fistula. The control angiogram showed the complete occlusion of the fistula and disappearance of the aneurysm preserving the left PICA (Fig 5). The patient remained asymptomatic.

DISCUSSION

The pseudoaneurysms of the extracranial vertebral artery are unusual and up to 1990 the review of English literature showed 18 patients with pseudoaneurysm of this artery who were treated by surgery or embolization[9]. According to Rich and Spencer who reviewed a total of 7,048 arterial traumas found throughout the human body, lesions in the vertebral artery represent 0.12% of this

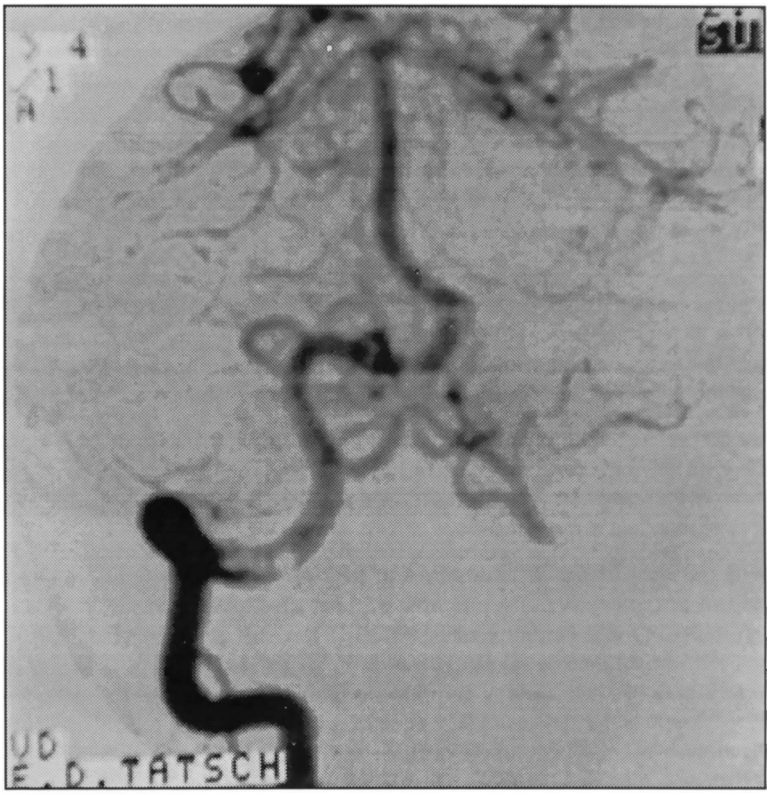

Fig 5. Control angiogram showing the oclusion of the fistulla and disappearance of the aneurysm preserving the left PICA.

number[41]. However, Meier et al. report that the lesions of the vertebral artery occurred in 19.4% of the vascular cervical traumas in their patients[35].

Aneurysms of the vertebral artery, which constitute the first and largest caliber branch of the subclavian artery, are classified anatomically according to the portion of artery involved. Due to the unique bone protection inherent to the second portion and the deep anatomical location of the first, reports on lesions of the vertebral artery of these two segments are rare[51].

They are also classified as acquired or congenital aneurysms. The acquired ones are subdivided into those caused by penetrating and non-penetrating cervical trauma such as chiropratic manipulations[8]. However, the congenital ones develop in patients who have disorders of the connective tissue (Ehler-Danlos syndrome and neurofibromatosis)[4,15,45],or complications of atherosclerotic diseases[50].

The diagnosis should be suspected depending on the type of lesion and symptoms present. The most common finding is a cervical mass, usually pulsatile, with emission of sounds[30]. It is also possibile to find changes in the cranial nerves, cerebellar dysfunctions, Horner's syndrome and neurological symptoms with ischaemic episodes[9,51]. The patient tends to develop symptoms related to the compression of the adjacent structures or as a result of the mechanical effects of aneurysmal dilatation. In our report, the symptoms were limited to the presence of a painful cervical mass, reccurrence of the trigeminal pain in the mandibular branch before surgery and, at examination fremitus and bruit were found on auscultation of the left occipital region.

In reviewing the literature on aneurysms of the extracranial vertebral artery, several etiological factors are found, such as: penetrating injuries due to knife wounds or bullets[25,38,43], tocotrauma[53], contusion due to blunt cranial trauma[24,33], sports[27,29], yoga[27] and forced movements of rotation hyperextension of the neck, considered physiological[12,29,37,48]. Vertebrobasilar ischaemia after manipulations by masseurs working on the cervical spine is also described[8,28,29,31,34,39,44,46]. Some iatrogenic lesions of the vertebral arteries have also been reported[1,5,20]. In the case of our patient, this iatrogeny occurred during a craniectomy for a tumor of the cerebellopontine angle, in wHich, inadvertently, during the removal of the C1 lamina, a lesion of the left vertebral artery occurred, and this is the only case we have found reported.

The physiopathogeny of the pseudoaneurysm is as yet unknown, but it is believed that the initial lesion of the artery causes an interruption of the intima, which may lead to more devastating consequences due to the formation of a thrombus at the site of interruption, leading to an occlusion due to arterial thrombosis or, on a larger scale, an embolism of the whole vertebrobasilar circulation.

Dissection of the subintima may be caused by the lesion of the intima which may lead to thromboembolism or vessel occlusion. Based on this lesion of the intima or subintima, pseudoanerysm formation follows the natural evolution of the formation of intracranial aneurysms, and may therefore carry a risk of rupture and hemorrhages[52].

Among the most frequently used forms of treatment for these lesions are trapping of the pseudoaneurysm and arterial ligation[9], as well as direct approach to this lesion which, however, present high morbidity and mortality rates[3,7,14,17-19,22,23,40]. Other therapeutic alternatives such as embolization[2,10,11,42,43] and arterial revascularization[6,19,21] have also been used. The ligation of the vertebral artery may produce serious complications such as ischaemia of the vertebrobasilar system[13,19,43,47,49,51] with an incidence of 8%[51]. The direct surgical approach to the vertebral artery, on the other hand, also becomes extremely difficult and results in high risks due to the extensive periarterial plexus, a number of sources of collateral circulation, anatomical site and the risk of ischaemic attack and infarction of the vertebrobasilar system during its manipulation[3,10,16]. Recently, interventional neuroradiology employing endovascular techniques under local anesthesia has been described[10,26], with excellent results, and alterations in the neurological status of the patient may be observed when the vertebral artery is temporarily occluded using the balloon. This technique should always be considered for the resolution of these lesions because it reduces risks of surgery and its complications, by diminishing the hospital stay, as occurred in this report.

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