

A yoga related aneurysm? An internal carotid artery aneurysm

¿Un aneurisma relacionado con el yoga? Aneurisma de la arteria carótida interna

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Abstract

Background: Aneurysms of the internal carotid artery (ICA) are a rare finding, only accounting for 0.4-4% of all peripheral aneurysm and 1% of all carotid diseases. **Objective:** To evaluate the clinical findings of a carotid aneurysm, considering the patient's background. **Methods:** A 54-year-old woman intense yoga practitioner presented with 3 weeks development of a pulsatile mass on the right side of the neck. No history of intravenous catheters, traumatism, or local infections. Ultrasound images revealed a 1.6 cm patent saccular aneurysm ICA dependent. During surgery, visualization of the aneurysm was seen without sign of endothelial damage. **Results:** Patient underwent elective resection with primary repair and was discharged 2-day postoperatively. Follow-ups revealed complete resolution of the symptoms with intraoperative tissue samples coming back without abnormalities. **Conclusions:** It is of utmost importance to inquire into the patient's background and perspective in being able to find an etiological case in rare findings.

Keywords: Case report. Yoga practitioner. Aneurysm. Internal carotid artery. Surgical treatment.

Resumen

Antecedentes: Los aneurismas de la arteria carótida interna (ICA) son hallazgos inusuales, representado el 0.4-4% de todos los aneurismas periféricos y el 1% de la patología carotídea. **Objetivo:** Evaluar el diagnóstico poco común de un aneurisma de carótida, considerando los antecedentes y estilo de vida del paciente. **Métodos:** Se presenta el caso clínico de una mujer de 54 años practicante de yoga, con tres semanas de evolución de sensación de masa pulsátil en el lado derecho del cuello. No relataba antecedentes de cateterismos, traumatismos o infecciones. Las imágenes de ultrasonido revelaron un aneurisma sacular permeable de 1.6 cm dependiente de la ICA. Durante la cirugía no encontramos signos de daño endotelial. **Resultados:** Se realizó resección electiva primaria, siendo dada de alta en el segundo día post-operatorio. Los seguimientos mostraron resolución completa de la imagen y síntomas. Las muestras tomadas en el intraoperatorio no demostraron alteraciones. **Conclusiones:** Es de suma importancia el poder indagar en los antecedentes del paciente para poder filiar una causa etiológica en hallazgos poco comunes.

Palabras clave: Reporte de caso. Practicante de yoga. Aneurisma. Arteria carótida interna. Tratamiento quirúrgico.

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Introduction

Extracranial carotid artery aneurysms (ECAA) are a rare finding, accounting for only 1% of all carotid diseases^{1,2}, although due to its rarity, true incidence is still unknown^{1,3}. The majority of ECAA are mostly secondary to degenerative diseases (atherosclerosis), post-traumatic causes (such as penetrating traumas and iatrogenic injuries), post-endarterectomy aneurysms, local head-and-neck history of infections, and connective tissue disorder (arterial dysplasia, Ehlers-Danlos syndrome, and between others), most cases being able to associate the cause directly to the prevalence of group age²⁻⁵. A rising and more popular practice in the western hemisphere, yoga, has appeared and modeled new mechanisms of injuries within those practitioners. The most common and severe injuries involve the neck and shoulders due to repetitive low impact microtrauma and excessive exercise postures⁶.

Within the neck injuries, the relationship between the styloid process and its proximity to the Carotid arteries, might not be as casual as previously thought. The carotid artery and its bifurcation located within the dense fascia, does not make the rotational movement with the skull but rather with the neck, to the opposing movement of the styloid process rotation of the skull, from this mechanism of action, excessive rotating of the neck, might predispose microtraumas from such practices like yoga, resulting in a degenerative process of the anatomic area⁷.

Clinical findings range from pulsatile mass (being the most common symptom) presenting as a painless neck mass². Neurologic symptoms secondary to atheroembolism from the aneurysmal sac or due to direct compression of the ECAA creating a mass effect and stroke rate ranging from 50 to 70%^{2,4}.

The diagnostic pathway ranges from duplex ultrasound as an initial diagnostic tool, to magnetic resonance and computerized tomography angiography (CTA) to provide intracranial imaging³. Although hemorrhage and rupture are very uncommon ways of manifestations, it is recommended to intervene all aneurysms, even asymptomatic cases, due to high prevalence of neurological events^{3,8,9}. The treatment of choice should be fitted to every patient and needs. Surgical options embody ligation, extracranial to intracranial bypasses (which has been left as mere anecdotal or in life threatening scenarios)^{10,11}, resection and reconstruction using autologous or prosthetic grafts for tortuous ECAA aneurysms allow resection and a primary end-to-end anastomosis^{1,4,8,12}. Endovascular therapy may be advantageous for selected cases^{8,9}, reducing

cranial nerve injuries and periprocedural complications, although due to the anatomical features of the aneurysms, open surgery still remains to be the standard procedure^{1,3,13}.

Case report

A 54-year-old female patient, originally from the Caribbean, active smoker and intense yoga practitioner, was referred to vascular surgery due to an acute appearance of a lump in the right side of the neck 3 weeks of evolution. Denying catheterization of intravenous access, trauma, fever, head-and-neck or local infections.

Physical examination revealed a pulsatile mass on the right side of the neck without external signs of complication, skin suffering, or neurological focality, rest of the examination was anodyne. Laboratory tests with inflammatory reaction parameters came back normal.

To further evaluate the pulsatile mass, the right supra aortic trunk ultrasound duplex was performed, revealing a patent 1.6 cm anteroposterior diameter internal carotid artery (ICA) dependent saccular aneurysm is seen on the proximal third, with no evidence of atherosclerosis dissection or thrombus images, no hemodynamic repercussion and antegrade flow throughout the artery (Figs. 1 and 2). Common carotid artery with a normal diameter of 0.6 cm. No intimal hyperplasia was seen. External carotid artery was 0.45 cm. Patent vertebral artery with antegrade flow was present.

Based on the imaging study, the diagnosis of a patent saccular aneurysm ICA dependent was made and surgical elective resection and reconstruction of the ICA aneurysm was decided. Under general anesthesia, open surgery was performed, visualizing an ACI dependent aneurysm no signs of local infections nor tissue-related affection (Fig. 3). Resection and a primary end-to-end anastomosis was performed (Fig. 4) with no intraoperative complication. Samples were taken for pathology analysis. Microbiology samples were sterile. Post-operative evaluation showed no neurological events or focality, with a favorable evolution. Patient was discharged asymptomatic 2 days after.

Pathology samples described intense fibrosis and fragmentation of elastic fibers, compatible with a degenerative arterial aneurysm.

Extended study through CTA shows a 9 cm an idiopathic renal angiomyolipoma being studied by the urology department pending embolization, no other signs of arteriomegaly or aneurysm were seen on the study. The genetic team at our center, evaluated the patient concluding no findings of suggestive connective tissue

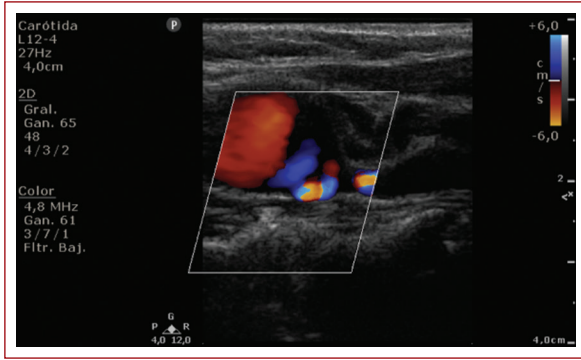


Figure 1. Doppler ultrasound internal carotid artery: a patent saccular aneurysm is seen.

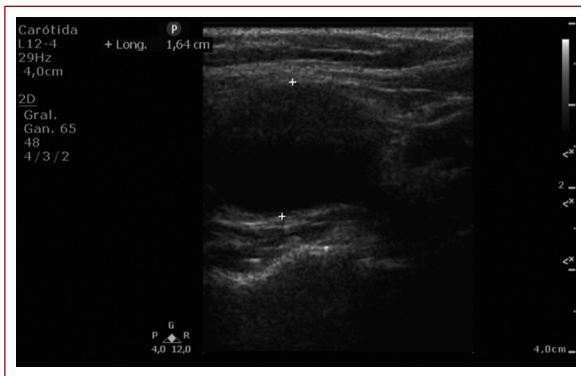


Figure 2. Doppler ultrasound internal carotid artery (ICA): measurement of 1.6 cm ICA aneurysm

disorders, including fibrodysplasia, vasculitis workshop or any related disease to justify a patient outreach study with no further follow up.

On annual revisions, ultrasound duplex demonstrated no signs of residual or new aneurysms, no intimal hyperplasia, slight elongation of the ICA, with no hemodynamic repercussion. Patient physical examination was normal (Figs. 5 and 6).

Discussion

ICA aneurysms although being rare, the risk of transient ischemic attack or amaurosis fugax or less frequent and higher mortality, rupture, debut symptoms result it an important morbidity related pathology, where resection and reconstruction of a normal flow is recommended in nearly all cases^{1,8}. Although correlation to the aneurysm etiology with age and population seems to be the rule in nearly all patients^{3,10}, mostly seen in older population or those who have gone through carotid endarterectomy,



Figure 3. Intraoperative image: aneurysm under direct vision.

we must not let slip those cases where the clinical assessment or patient's history could be easily overlooked due to the scarcity of information related to a rare cause, in our case, a yoga practitioner. It might not be anecdotal the relationship between yoga poses and the resulting injuries deriving from this new and arising culture. Although the degenerative process of the aneurysm from the repetitive microtraumas of the styloid process would query for further anatomical findings, such as elongated styloid process or findings of indented arteries, it is important to consider our patient's background and conclude that the findings may have not occurred by chance.

Open surgery and endovascular repair are both valid and safe proven techniques, each with their own advantages¹². The anatomic area for surgical exposure will dictate, in most cases, which technique will fit reasonably¹³. Open surgery after exclusion of the aneurysmal sac from the artery can vary from primary closure, a patch, bypass grafts and in some, tortuous enough to perform an end-to-end anastomosis with excellent outcomes¹¹. Open surgery is most fitted to those lesions involving the proximal ICA. Endovascular repair is reversed for those fragile patients

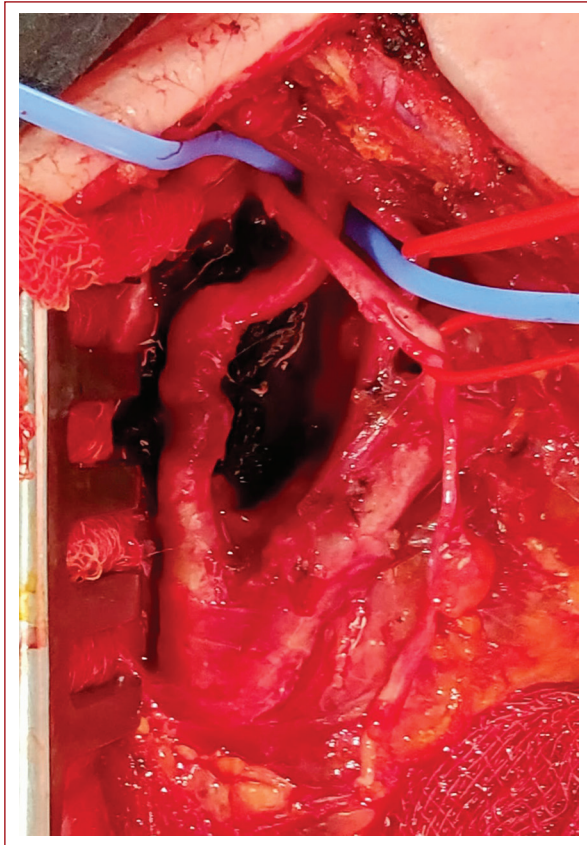


Figure 4. Intraoperative image: an end-to-end anastomosis on the internal carotid artery is performed.

and/or where surgical exposure is impaired⁸. Options such as open surgery and endovascular procedure would have to be individualized to the patient's needs depending on size, location, and nature of the aneurysm.

Patient perspective

After the first post-operative year, patient resumed a more relaxed yoga practice. The patient expressed relieve from the favorable post-surgery development, although still concerns from what might have caused the aneurysm, and worried of the future diagnosis of the same nature. Overall she believes to lives a healthy lifestyle, but will do yearly check-ups with corresponding health-care physicians.

Conclusion

Therefore, to prevent any neurological deficits, and eventually low quality of life due to cognitive impairment, it is recommended to perform restoration of a normal



Figure 5. Doppler ultrasound internal carotid artery: yearly duplex examination was made, with normal anterograde flow and no sign of aneurysm is seen.

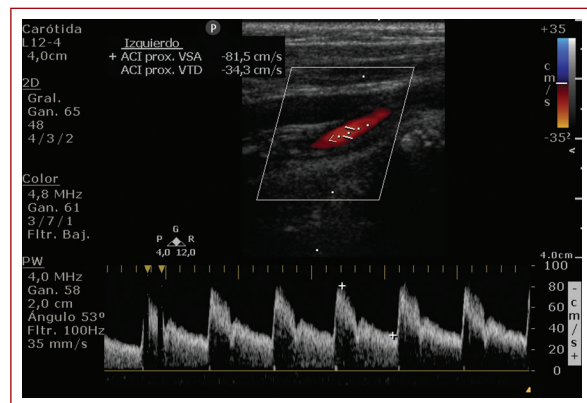


Figure 6. Doppler ultrasound internal carotid artery (ICA): in the yearly follow-up, a patent ICA is seen with no aneurysmal lesions.

anterograde flow. Our patient, with blank medical personal history of interest and a proximal ICA saccular aneurysm, underwent resection of the aneurysmal sac and primary end-to-end anastomosis, with no post-operative complications. During follow-ups, remaining asymptomatic, the genetic team discarded any suggestive finding of connective tissue disorder. Despite the efforts to affiliate any etiology, we remained with an idiopathic ICA dependent saccular aneurysm. As a reflection, we hypothesize whether intense yoga involving neck twisting may have played a role in the pathogenesis of carotid aneurysm, being, possibly, the first ICA aneurysm reported derived from this practice, increasingly common in the western hemisphere.

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Conflicts of interest

The authors declare no conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the

patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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