

# True posttraumatic radial artery aneurysm

## *Aneurisma verdadeiro de artéria radial pós-traumático*

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### Abstract

Radial artery aneurysms are rare and mostly secondary to traumatic events (posttraumatic pseudoaneurysms). Radial artery aneurysms should be treated due to the high risk of embolization, thrombosis, and compression of adjacent nerves. The authors describe a case of a 49-year-old patient complaining of a progressively growing tumor in the left wrist after a dog bite. The tumor proved to be a true posttraumatic aneurysm. Treatment consisted of removal of the aneurysm sac and ligation of the radial artery.

**Keywords:** aneurysm; radial artery; wounds and injuries.

### Resumo

Os aneurismas de artéria radial são raros, sendo, na maioria das vezes, pseudoaneurismas pós-traumáticos. Os aneurismas de artéria radial devem ser tratados devido ao risco de embolização, trombose e compressão de estruturas nervosas adjacentes. Os autores relatam o caso de um paciente de 49 anos referindo tumoração de crescimento progressivo em punho esquerdo após mordedura canina, sendo diagnosticado aneurisma verdadeiro de artéria radial pós-traumático. Optou-se pela ressecção do saco aneurismático e ligadura da artéria radial.

**Palavras-chave:** aneurisma; artéria radial; ferimentos e lesões.

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## INTRODUCTION

Radial artery aneurysms are rare and pseudoaneurysms are more common than true aneurysms. The etiology of radial aneurysms includes repeated local traumatism, atherosclerosis, vasculitis, local infection and penetrative injuries. However, the majority of radial artery pseudoaneurysm cases are the result of iatrogenic damage during diagnostic and therapeutic endovascular procedures; of blunt traumas; and of penetrative injuries inflicted by cold weapons<sup>1,2</sup>.

The objective of this study is to describe a case in which a radial artery aneurysm developed after the patient was bitten by a dog.

## CASE DESCRIPTION

A 49-year-old, healthy, male security guard with no history of comorbidities presented at emergency with a progressively growing tumor on the left wrist, at the site of a dog bite he had sustained 4 months previously.

Physical examination revealed no signs of ischemia or neurological involvement in the left hand and there was no indication of local or systemic infection. The patient had a pulsating tumoral mass on the left wrist, but no sign of skin ulceration. The tumor was not painful on palpation, was of fibroelastic consistency, and was approximately 1.5 cm in length (Figure 1). Radial and ulnar pulses were present and symmetrical. The Allen test was negative.

Doppler arterial ultrasound of the left arm revealed triphasic blood flow in the radial and ulnar arteries and a focal dilatation of the left radial artery, with a maximum diameter of 1.88 cm and a length of 2.55 cm (Figure 2). Left radial artery aneurysm was diagnosed and the patient was prepared for explorative surgery. Preoperative test results were all normal.



Figure 1. Left radial artery aneurysm.

The patient opted for local anesthetic and a longitudinal incision was made following the path of the left radial artery, which had been marked in advance, while tracing it with ultrasound. After very careful dissection of the radial artery, it was decided to resect the aneurysm sac with proximal and distal ligation, on the basis of the circulation of the hand and after having observed adequate reflux from the distal stump and also because of the extension of the resected section (longer than 3 cm) (Figure 3). The material removed was sent for histopathological analysis and cultures.

Histological results were compatible with true radial artery aneurism and no infectious agents were identified in the cultures. Microscopic analysis with Masson staining revealed all three arterial layers, but arranged in a fragmented and poorly delimited manner (Figure 4). There was considerable cell proliferation in the adventitial layer in response to the traumatic insult suffered and several grades of degeneration and fibrosis in the tunica media, which

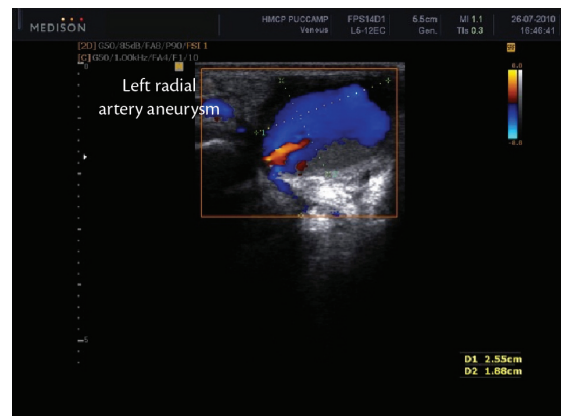


Figure 2. Doppler ultrasound, showing radial artery aneurysm.

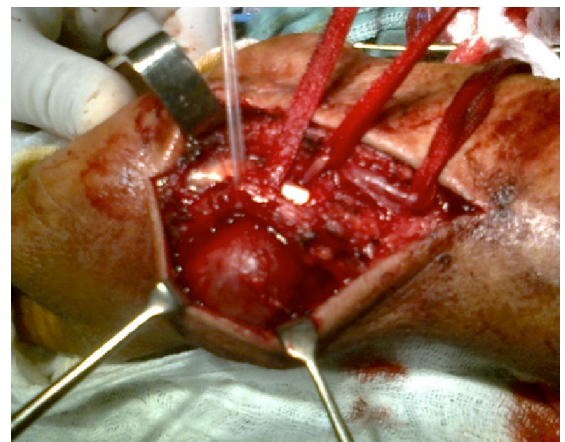
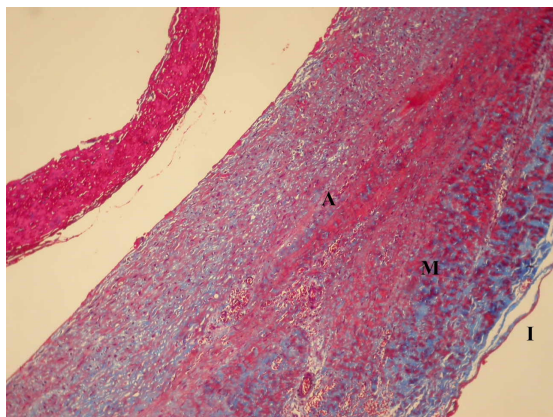


Figure 3. Intraoperative appearance of radial artery aneurysm.



**Figure 4.** Histological appearance of aneurysm sac, showing the three arterial wall layers with Masson staining. I - tunica intima. M - tunica media. A - tunica externa.

were the result of the posttraumatic repair process. No inflammatory plasmocytes were identified, nor histiocytic cells, epithelioid cells or granulomatous vascular lesions. There were also no signs of fibrinoid necrosis, acute necrotic abscess-forming inflammation or inflammatory cell migration through the vascular wall.

The patient progressed well with no ischemic or neurological intercurrent conditions during the postoperative period. At outpatients follow-up he demonstrated satisfactory active and passive movement of the left hand and no signs of ischemia were detected.

## DISCUSSION

True peripheral artery aneurysms are rare and just 5% are detected in the upper limbs<sup>1,2</sup>. They are generally linked with local traumas or systemic diseases, such as atherosclerosis, giant cell arteritis and fibromuscular dysplasia<sup>1,2</sup>.

Our review of the literature found a radial artery aneurysm incidence of 2.9% of all upper limb aneurysms<sup>3</sup>. We did not, however, find any reports of a case in which radial artery aneurysm was related to a dog bite. Feres et al. point out that, while rare, the majority of radial artery aneurysms are related to puncture or catheterization of arteries<sup>4</sup>.

In the case described here, pathology of the aneurysm sac revealed all three layers of the artery wall. However, they were irregularly and disproportionately distributed, suggesting that the radial artery aneurysm secondary to dog bite was a true aneurysm. Furthermore, there was considerable proliferation of the adventitial layer, degeneration and fibrosis of the tunica media, and the cells that make up the vascular wall were clearly viable. There

was no sign of proliferation of aberrant muscle tissue, as occurs with fibromuscular dysplasia.

We believe that the dog bite resulted in a contusion of the radial artery wall, by direct pressure, traction and/or distortion, resulting in a weakening of the vessel wall and fusiform dilation, which is one possible mechanism to explain the development of a posttraumatic true aneurysm of the radial artery.

Histopathological analysis also failed to identify inflammatory plasmocytes, histiocytic cells, epithelioid cells or granulomatous vascular lesions. Inflammatory plasmocytes could suggest a syphilitic or even neoplastic lesion<sup>5</sup>. Histiocytic cells would have been identified if there had been a chronic inflammatory component to the condition, whether linked to atherosclerosis or not<sup>5</sup>. Granulomatous vascular lesions would be observed in foreign body reactions, with multinucleated giant cells, or in the case of certain types of vasculitis<sup>5</sup>.

The primary clinical manifestation of a true aneurysm of the radial artery is localized pain followed by signs of distal ischemia, caused by thrombosis or microembolization<sup>6,7</sup>. In the case described here, there was no complaint of pain nor any indication of ischemia and the patient's main concern was the presence of a pulsating tumoral mass that was growing progressively, but was free from neurological symptoms suggestive of compressive phenomena.

Meira Junior et al.<sup>8</sup> stress that when faced with a patient with radial artery aneurysm and traumatic or iatrogenic causes have been ruled out, it is important to consider and investigate rarer causes of true aneurysms<sup>8</sup>. Laboratory tests and imaging exams such as Doppler ultrasound, abdominal ultrasonography, echocardiogram, angiotomography, vascular MRI and arteriography should be used to attempt to rule out connective tissue diseases, vasculitis and metabolic diseases, before defining the lesion as congenital or idiopathic<sup>2,8</sup>.

Doppler ultrasound has a role to play in investigation of a patient with radial artery aneurysm, both for diagnosis and for assessing the circulation in the hand (always in combination with the Allen test), and it can also reveal the presence and characteristics of blood flow through the aneurysm sac, thrombosis or hematoma<sup>8,9</sup>. In the case described here, we chose the surgical option on the basis of Doppler ultrasound alone, since the patient exhibited no signs of ischemia and ultrasound was adequate to satisfactorily assess the proximal and distal beds of the aneurysm.

Radial artery aneurysm should be treated rapidly because of the local and systemic risks of

complications, including embolization, thrombosis, erosion of the skin and infection, bleeding, and compression of adjacent nerve structures, leading to paresthesia, pain and restricted limb mobility<sup>10,11</sup>. The treatment of choice is resection of the aneurysm and arterial reconstruction with primary end-to-end anastomosis or a continuous vein graft<sup>10,11</sup>. Another surgical option involves proximal and distal ligation of the vessel<sup>9,10</sup>. In the case reported here we chose to resect the aneurysm sac and ligate the artery distally and proximally, having observed adequate reflux from the distal stump, since the ulnar and interosseous arteries maintained adequate perfusion of the hand and because the resected section was extensive (longer than 3 cm).

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Critical revision of the article: CRCS, ACGC, OCJ

Final approval of the article\*: SAG, MFMA, GCGA, CRCS, ACGC, OCJ

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