SHORT REPORT

Clinical Case Report: Digital Emboli and Aneurysm of a Trapped Brachial Artery

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We present an original case study of an adult patient with thrombo-embolic ischaemia of the fingers in relation to an aneurysm of a trapped brachial artery. The entrapment was within an abnormally high insertion of the pronator teres muscle above the humeral epicondyles. The clinic treatment and a brief overview of the literature available on the subject are presented.

Key Words: Brachial; Artery; Aneurysm; Entrapment.

Introduction

The first person to diagnose an aneurysm of an upper extremity was Hippocrates, in 460 BC. In 200 AD, Galen made the distinction between aneurysms of the forearm caused by a single traumatic event (such as bloodletting) and those caused by successive micro-traumas.¹ In 1710, Anel treated a false aneurysm of the brachial artery by proximal ligation.²

Upper extremity aneurysms are rare, but have been described many times in the literature. The originality of this case study rests on the unusual entrapment picture, with the aneurysm forming distal to the entrapped segment.

Report

A 68 year old man was admitted for sub-acute ischemia of the right hand present for several days. The symptoms were blueness of the index and middle fingers with paresthesia. The radial and brachial pulses were palpable. Oedema of the hand and forearm were also noted. There was no palpable mass.

In the past medical history he had been treated with antibiotics for streptococcus bovis endocarditis 2 years previously. We noted absence of trauma and the occupation of the patient was clobber for more than 20 years.

Doppler ultrasound examination on admission revealed a good signal from the main arm arteries and a patent deep palmar arch. The superficial palmar arch and the digital arteries could not be insonated. Angiography (Fig. 1) revealed the presence of a partially thrombosed aneurysm of the lower brachial artery at the level of the elbow joint. There was no evidence of thoracic outlet syndrome. The angiogram of the other arm was identical except for the aneurysm.

Under a combination of local and regional anaesthesia a large anterior exposure centred on the elbow was carried out. During the dissection an abnormally high insertion of the pronator teres muscle on the medial aspect of the humerus above the humeral epicondyles was noted. This abnormal insertion was trapping the brachial artery above the aneurysm (Fig. 2). We released the artery. The aneurysm measured 2 × 3 × 4 cm and it was excised en bloc followed by an end-to-end anastomosis.

The patient made a good postoperative recovery which was maintained at two months.

Histological examination of the aneurysm sac confirmed a partially thrombosed aneurysm of the brachial artery, probably caused by atherosclerosis. There were no signs of infection.

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Aneurysms of the hand and forearm arteries are rare. In antiquity they were more common and were usually associated with incompetent bloodletting, a practice which has thankfully passed into limbo. In 1933, Middleton reported 70 aneurysms of the upper extremity; among those 54 were false aneurysms. Between 1981 and 1990, 10 patients with arm vessel aneurysms were treated at the Chicago University. Only 3 of these patients developed symptoms of distal emboli. More recently in 1998, Gray et al. from the Mayo Clinic reported 12 aneurysms of the upper extremity, of whom only two developed distal emboli. These two reports show that the right arm was affected twice as often as the left extremity and that 90% of the patients were male. The patient age was highly variable with a peak for people in the fourth

**Fig. 1.** Angiography showing the aneurysm profile of the distal humeral artery and the dolicho-aspect of proximal segment.

**Fig. 2.** Comparison between usual anatomy and case report anatomy. 1: biceps, 2: pronator teres, 3: brachial artery, 4: radial artery, 5: ulnar artery, 6: high origin of pronator teres and 7: aneurysm.
decade. In 1994, Fann reported a three year old child suffering from bilateral brachial aneurysms with thrombo-embolic symptoms in one hand. These aneurysms were not related to trauma, autoimmune disease or to a connective tissue disorder.\(^5\)

There seem to be two main causes for these aneurysms; blunt trauma and infection. The rest are idiopathic. Repetitive minor trauma due to sporting or professional activities are the most frequent cause of media arterial lesions.

In our case, entrapment of the brachial artery was probably the cause of the degenerating aneurysm distal to the entrapment. The patient was a right-handed cobbler who had been shaping shoes and hammering soles for more than 20 years. This activity could have exacerbated any trauma caused by the entrapment.

The embolic symptoms which were the first signs of trouble in this case are a complication that can be avoided by early diagnosis and treatment. The other major complication of aneurysm is pressure on nearby vessels and nerves. During surgery, we discovered that the brachial veins were occluded; this finding probably explains the forearm oedema.

The ‘blue finger syndrome’, that revealed the problem in our case, is a complication that can be avoided by an early diagnosis and treatment. The other major complication of aneurysm is the squashing of close vasculo-nervous parts. During the surgery, we were also impressed by the squashed aspect of the humeral veins which was partially responsible of the observed oedema.

Asymptomatic aneurysms should be treated surgically; the risk of developing symptoms is greater than 33\% and the morbidity of resection and grafting is low.\(^4\)

The musculo-aponeurotic entrapment found during dissection was not simple aponeurotic expansion of the biceps muscle; rather it was due to an epicondylar anomaly. The insertion of the pronator teres muscle was higher than usual on the medial surface of the humerus. This anomaly is rare and its frequency in the European population is around 1\%.\(^6\) The diagnosis can be made on plain X-ray when there are calcified deposits on the abnormal insertion.\(^7\) In our case, the plain X-ray images didn't show this anomaly.

**Conclusion**

We present an original case of a symptomatic embolic aneurysm of a entrapped brachial artery. The degenerative aneurysm was probably due to both an abnormal insertion of the pronator terres muscle creating a trap and repetitive minor trauma caused by a work activity.

**References**


*Accepted 8 May 2003*