Brachial artery coiling: Anatomical and clinical considerations

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Abstract
Introduction
The brachial artery coiling is an unusual condition with a suggested frequency of less than 1%. This paper reports a case of brachial artery coiling.

Case report
Herewith we present an interesting dissectional case of a superficial brachial artery making a full circle (a 360º coil) in the distal part of the brachium closer to the elbow crease. A second, deep brachial artery was also observed in this case.

Conclusion
Reviewing the pertinent literature we suggest two main types of arterial sources for the coil formation both of which present some diagnostic and therapeutic challenges.

Introduction
The brachial artery is usually described as a part of the axis artery of the upper limb between the lower border of the teres major muscle and a point just beyond the elbow joint.¹ This artery may show a more or less contorted course and not infrequently may be split along the brachium into two vessels - superficial and deep brachial arteries that further extend distally in the main forearm arteries or rarely, reunite in a single vessel.¹

Of all these unusual patterns, the pronounced bending along the brachial artery may affect some transarterial procedures such as thrombectomy or transradial catheterization.²³

In some extreme cases there might be a full circle made by the artery – the so called “coiling” of the brachial artery.²⁴ Such an interesting case is reported here, that was found during routine anatomical dissection.

This study was approved by the medico-legal office and local Ethic Committee.

Case report
On the initial external examination of the left upper limb of a 73-year-old Caucasian female cadaver, a small swelling was noted that was located on the medial site of the brachium proximal to the elbow crease. Further dissection revealed an interesting disposition of the main arteries of the brachium. Just distal to the teres major lower border, the main brachial artery (external diameter – 8.1 mm) split into two arteries that traveled distally on both sides of the median nerve so were named the superficial and the deep brachial arteries.¹

The superficial brachial (external diameter 4.6 mm) had a contorted course, waving along the external side of the median nerve just under the

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Figure 1: Fig.1. Photograph of the dissected upper limb showing the coil (arrow) made by the superficial brachial artery (asterisks). Deep brachial artery (DBA), median nerve (MN), biceps brachii (BB), aponeurosis of the biceps brachii (aBB), triceps brachii (TB), brachioradialis (BR).

Figure 2: Fig. 2. Scheme of the main arteries of the brachium, a possible source for the coil formation: (a) usual brachial artery; (b) superficial brachial artery.
brachial fascia (Figure 1). Upon reaching the antecubital fossa this artery made a complete circle thus forming a 360º coil and continued distally under the bicipital aponeurosis. This arterial coiling seemed to be the cause of the observed swelling. The slightly larger deep brachial artery (external diameter 5.8 mm) had a relatively straight course through the brachium.

On completing the limb dissection it was revealed that the superficial brachial artery, the one with the coiling, was extending into the radial artery of the forearm, while the deep brachial artery extended into the ulnar artery also containing the common intersosseous artery.

Discussion

Literature data suggest that coiling of the brachial artery is an unusual entity with a frequency less than 1%.4 The first clinical case of an extreme brachial artery bending observed after routine arteriography was reported by Casten and Forman in 1962.5

The brachial artery coiling is seldom reported because it probably remains asymptomatic and without clinical relevance.2 This condition may mimic brachial artery aneurysm and might be suspected as a cause of a painless pulsating mass along the course of the brachial artery causing mild ischemic symptoms.4

Its nature may be revealed by further duplex Doppler sonography or multidetector computed tomography examination.4 If all the main arteries of the brachium are considered, however, including the cases of variant superficial brachial artery extending into the radial artery (radial artery of high origin), a higher percent of brachial artery coiling might be expected.

In fact, brachial arteries of two basic types might be implicated in the coil formation. In the first type (Figure 2a) the coiling affects the common brachial artery in its distal half.2,4 In the second type (Figure 2b) a coiling of the superficial brachial artery is only present as reported by ours and the study of Patel et al.2 From a review of the pertinent literature it seems that the distal part of the brachial artery, either the common or the superficial, is predominantly affected.

The arterial coiling is reported to be more common in the elderly and thought to be a result of hypertrophy and elongation of the arterial wall3 exacerbated by arteriosclerosis or fibromuscular dysplasia.3 A congenital condition may however be considered in some cases of isolated arterial coiling and lack of underlying causes such as trauma or cardiovascular disease.4

Conclusion

When diagnosing pulsating mass in the brachium, either asymptomatic, with associated mild ischemic symptoms4 or meeting catheterization difficulties2,3 in a relatively non-diseased brachial artery, the rare case of brachial artery coiling must be kept in mind.

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References