

An unusual case of a radial artery pseudoaneurysm following complicated trans-radial arterial catheterisation

Dorina Roy, Milosz Kostusiak

Background

Radial artery pseudoaneurysm is a rare vascular abnormality with an incidence of 3 to 20 per 10000¹. It is caused by damage to the arterial wall, resulting in turbulent blood flow through a persistent tract. It does not contain any layers of the arterial wall, but crosslinks between fibrin and platelets from the arterial wall defect in a locally contained haematoma². Arterial injury, inflammatory conditions and arterial line infections are known to increase the risk¹⁻³. Here we report, an unusual case of a radial artery pseudoaneurysm developing one week following the removal of an arterial line, allegedly appearing after inflation of a sphygmomanometer cuff for routine blood pressure measurement on the same arm.

Case Presentation

History of presenting illness : A 36 years old male was admitted to neurosurgery with subarachnoid haemorrhage (SAH) due to a ruptured anterior communicating artery (ACOM) aneurysm. He underwent coil embolisation and had invasive arterial monitoring. A twenty-gauge radial arterial line was inserted using a Seldinger's technique, successful only by the fourth attempt, with no immediate complications. He was also started on short-term once daily aspirin (75 mgs) and nimodipine (60 mgs) every four hours. Seven days after removal of the arterial line, on taking routine blood pressure measurement with a sphygmomanometer, the patient described intense pain and immediate swelling at the site of previous arterial line.

Examination: There was a 4cm by 4cm pulsatile and erythematous swelling over the radial border of the right wrist. Three needle punctures were visible, with a small patch of skin erosion (Figure 1).

Investigation: An ultrasound scan revealed a 1.6cm x 1.7cm pseudoaneurysm of the right radial artery with a neck diameter of 0.2cm, (Figure 2 and 3).

Treatment: The pseudoaneurysm was explored surgically, revealing a disintegrated ten millimeters segment of the radial artery; This was resected and ligated. There were no immediate complications following the procedure and the patient was discharged ten days later (Figure 4).



Figure 1. Right radial artery pseudoaneurysm presented as a 4cm by 4cm swelling with overlying skin erosion and surrounding erythema



Figure 4: Surgical excision was performed leaving a 9cm scar



Figure 2: Ultrasonography scan (US) revealed a 1.6cm by 1.7cm pseudoaneurysm

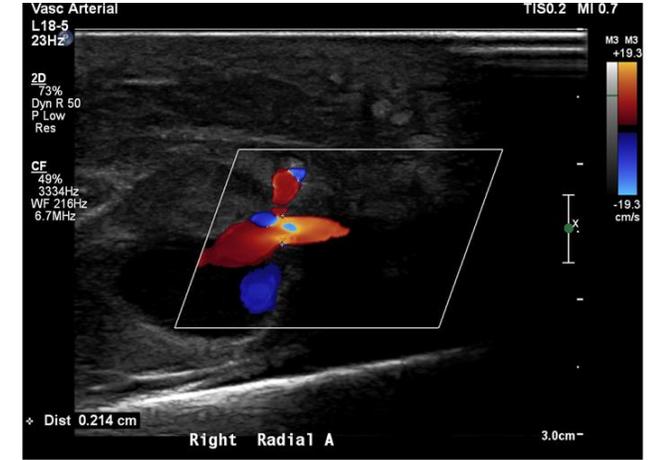


Figure 3: The pseudoaneurysm was arising from the radial artery with a neck diameter of 0.2cm as visualised on colour doppler

Discussion

Our patient had a history of multiple attempts at arterial cannulation. He was also on antiplatelet and routine anticoagulation therapy. All confer an increased risk of formation of pseudoaneurysms³. Furthermore, daily nimodipine was administered. Nimodipine is a dihydropyridine (DHP) and blocks L-type voltage dependent calcium channels on skeletal, smooth and cardiac muscle cells. Nimodipine was shown to reduce peripheral vascular resistance by reducing the contraction of arterial smooth muscle, causing vasodilation⁴. This affects the autoregulation of the peripheral vascular system, which is dynamically changing during and after blood pressure measurements taken with a sphygmomanometer. During inflation of the pneumatic cuff on the arm, at certain cuff pressures, there is a sudden increased inflow of blood downstream to the cuff, leading to rapid increase in mean distal arterial pressure⁵. However, after the cuff is completely deflated, the arterial wall pressure goes down, with further increase in blood velocity⁶. We hypothesize that the volume and pressure changes occurring during the blood pressure measurement with a sphygmomanometer, could have further affected the formation of this patient's pseudoaneurysm.

We recommend that manual blood pressure measurements be avoided on the recently decannulated arm. and that additional caution should be taken in patients with concurrent use of anti-platelet therapy. Furthermore, removal of the line should be smooth, done under aseptic conditions as well as substituted with the application of mechanical pressure for a considerable amount of time. In high risk patients, a competent operator should be performing the insertion of the arterial line to prevent excessive arterial trauma.

References:

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