CASE REPORT

Brachial artery pseudoaneurysm in a premature infant

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A case of brachial artery pseudoaneurysm in a premature infant is reported. The lesion was surgically resected, and arterial continuity restored by end to end anastomosis. The postoperative period and follow up were uneventful.

Pseudoaneurysms, particularly brachial ones, are rare in neonates, and can be complications of percutaneous puncture of the brachial artery, a procedure generally not recommended in these small infants.

CASE REPORT

A boy was born at 28 weeks gestational age with a birth weight of 807 g. He had respiratory distress syndrome and was treated with surfactant and assisted ventilation. Umbilical catheters were replaced by percutaneous central lines in the left antecubital vein on day 7. Two days later, the baby developed *Staphylococcus aureus* sepsis. Intravenous antibiotic treatment was started and the central venous line removed. On day 18, an echo Doppler ultrasound showed vegetations on the right atrial septum and on the tricuspid valve, measuring 4 mm in diameter, confirming the diagnosis of *S aureus* endocarditis. No evidence of atrial or ventricular shunt was detected. Fibrinolytic treatment with three doses of tissue plasminogen activator was given until the vegetations were no longer detectable by echo Doppler ultrasound, and a full six week course of antibiotics was implemented.

During this time, blood was drawn daily, by either venous or arterial puncture at different sites including the left cubital fossa.

During routine physical examination on the 30th postnatal day, a soft pulsatile mass, 1 cm in diameter, was palpated on the anteromedial aspect of the left distal arm just proximal to the cubital fossa. No flow disturbance was detected in the radial and ulnar run off arteries.

The location, the medical history, and the clinical findings strongly suggested that the vascular lesion was compatible with a pseudoaneurysm. Colour coded duplex ultrasound supported this diagnosis, as did contrast enhanced computed tomographic angiography (fig 1), which showed a saccular lesion distinct from the normal inflow and outflow tracts. An eccentric small thrombus was seen within the cavity. Two attempts to induce intracavitary thrombosis by ultrasound guided compression obliteration failed. The mass progressively increased in size (fig 2).

Surgical intervention was postponed until the baby was 3 months of age and weighed about 3000 g. No neurological deficits were identified in the involved arm. The lesion was resected, and arterial continuity was restored by end to end anastomosis. The postoperative period was uneventful and so was the follow up. Histopathology of the lesion showed no elements of normal arterial wall and was compatible with a pseudoaneurysm. There was no evidence of inflammation or infection.

Figure 1 (A) Computed tomography angiogram of the involved upper extremity showing the pseudoaneurysm (arrow) and run off vessels. (B) Cross sectional image at the level of the lesion (arrow) showing eccentric partial thrombosis and contrast media in the residual lumen. (C) Schematic view of the cross sectional image.

Figure 2 Photograph of arm showing the swelling.

DISCUSSION

Aneurysms in children are rare. They can be congenital or caused by infection, inflammation, or trauma.¹

Pseudoaneurysms result from disruption of a vessel wall continuity resulting in bleeding into the surrounding tissues and circulating blood being contained in a cavity surrounded only by adjacent tissues, fascia, and thrombus but not by normal arterial wall components as in true aneurysms. They are usually the result of local arterial damage caused by diagnostic or therapeutic catheterisation. Less often they develop at other vascular access puncture sites such as arterial lines and following trauma. They occur at a rate of about 0.05% after diagnostic catheterisation and up to 1.2% after more complex procedures.² Only a few cases have been reported in neonates, including two cases of aortic pseudoaneurysm secondary to umbilical catheterisation.³ Pseudoaneurysms of the brachial artery have been described in two young children: one in a 1 month old baby and the other following multiple venepunctures in the neonatal period with accidental arterial trauma.^{4,5} Similar inadvertent arterial trauma may be the cause in our case with or without infection.

The presenting sign in our case was the appearance of an asymptomatic, painless, pulsatile mass in the cubital fossa. In many cases, unless a complication such as acute disruption, thrombosis, or bleeding occurs,³ the diagnosis is incidental. Differential diagnosis includes simple haematoma, tissue oedema, thrombosed pseudoaneurysm, and lymphadenopathy. Diagnosis is assisted by colour coded duplex Doppler scan.

The computed tomography angiograms show the anatomic relations (fig 1). Ultrasound guided compression obliteration is usually achieved by applying continuous pressure to the lesion at the area of the neck (the communicating channel between the vessel lumen and the cavity of the false aneurysm). Placing of the ultrasound transducer is guided by continuous imaging throughout the pressure period and

watching for no flow in the sac. We attempted ultrasound guided compression obliteration, despite the remote possibility that infection was the cause, because there was no local or systemic evidence of infection and the technique had a 95% success rate in our institution.⁶ Unfortunately, two separate attempts, three weeks apart, failed. This was thought to be due to the large size of the defect in the arterial wall in relation to the small arterial diameter and the very short neck of the lesion. Intracavitary thrombin injection was not performed because complications in infants have been reported.⁷ When treatment is indicated on clinical grounds (progressive enlargement, pain, neurological deficits, or chance of life threatening arterial bleeding from any minor trauma), but non-operative measures have failed or are contraindicated, only then is surgery necessary.

Surgical options include repair or simple arterial ligation. In this young age group, unlike in adults, simple arterial ligation without repair of its continuity does not lead to limb loss because of the small muscular mass and the good neoangiogenic potential. We performed a primary repair by excision with end to end anastomosis.

We conclude that percutaneous catheterisation or venous and arterial punctures may lead to serious vascular complications such as pseudoaneurysm. This phenomenon needs to be readily recognised by carers of sick neonates requiring different invasive procedures for monitoring and treatment, in order to be promptly diagnosed and successfully treated.

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