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Mycotic aneurysm of the radial artery of the hand

A case report

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Summary

Aneurysms of the hand (including the wrist region) are reviewed; a case is reported, and the relevant surgical anatomy is discussed.

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Aneurysms of the hand are rare, the traumatic variety being more frequent than the mycotic aneurysm.[1-8] Patients should be treated surgically if any complication arises, the Allen test being the most important pre-operative evaluation because it assesses the collateral circulation.[2,4]

Aneurysms outside the major body cavities (skull, thorax and abdomen) are rare.[9] If those due to trauma and congenital malformations are excluded almost all of the rest are arteriosclerotic, for syphilitic aneurysms are seldom seen today.

Aneurysms of the hand are rare lesions of the peripheral arterial tree, which is quite surprising because the hand is often subject to trauma as well as the disease patterns affecting the major arterial system.[1]

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Surgical anatomy

The hand

The hand is supplied by the radial and ulnar arteries which meet in the midline, forming two separate arterial arches within the palm.[1] The superficial arch is composed mainly of the ulnar artery, which joins the superficial branch of the radial artery. Conversely, the deep arch is composed mainly of the radial artery, which joins the deep branch of the ulnar artery. The greatest number of aneurysms reported to date have involved the superficial arch.[1]

Because of this anastomotic relationship between the two major vessels supplying the hand and the digits, aneurysms of the hand can often simply be excised after ligation of the supplying arteries.[1,6,10,11]

The superficial palmar arch is protected by a barrier, the thinnest regions of which are over the hypothenar and thenar eminences. These two areas are the most prominent and yet have the poorest protection, which explains why they are the most frequent site of aneurysms.[1,4,8,12]

The wrist

The ulnar artery is particularly vulnerable to trauma from the distal border of the continuation of the transverse carpal fascia

until it enters the protection of the palmar fascia.[1,12] Aneurysms may occur along the course of the superficially located radial artery (distal forearm) where radial artery pulsations are quite prominent over the radial styloid and along its dorsal route over the scaphoid, the edge of the trapezius and the first metacarpal where it rapidly dips between the heads of the first dorsal interosseous muscle.[1,2,4]

Classification of hand aneurysms

Hand aneurysms are classified as traumatic, arteriosclerotic and mycotic.

Traumatic aneurysms are the most common. The site is usually the thenar or hypothenar area, although 6 cases in which the aneurysm was located in the anatomical snuff-box area have been reported in the world literature.[1,4,6,8] Most of these have been due to trauma. The 'hypothenar hammer syndrome' has been described in people who use their hypothenar eminences to push, twist or hammer objects.[12]

A few arteriosclerotic aneurysms have been reported, but these are rare.[1,3] Because of the usual associated widespread systemic arteriosclerosis, these aneurysms have different therapeutic implications. It is essential to excise the aneurysm and re-anastomose the vessels, as the collateral blood supply is usually unable to maintain adequate perfusion of the hand.[1,10]

Mycotic aneurysms are extremely rare, only 3 cases having been reported.[1,2,5] They are usually associated with bacterial endocarditis but can occur in any patient with septicaemia.[1]

Clinical presentation

Aneurysms cause variable degrees of pain, with hypaesthesia and paraesthesia in the distribution of the relevant superficial nerve branch, due to pressure effects,[1,13] together with vascular insufficiency (ischaemic pain of cold intolerance).

There is a mass of varying size, usually compressible and pulsatile and with an audible systolic bruit or thrill or both. Nerve signs are due to neuropraxia (from compression), ischaemia of the artery and veins of the nerve, or direct trauma to the nerve at the time of the original injury. These affect the specific area supplied by the particular nerve.

Signs of vascular insufficiency include coldness, cyanosis, pallor of the fingers, ischaemic soft-tissue changes and frank fingertip necrosis.

Ganglia are commonly found around the wrist but have their own distinctive features. They should, however, be kept in mind even in a clear-cut case.[6]

Investigations

Allen's test was first described by a Dr Allen of the Mayo Clinic and is extremely valuable. It is performed as follows. Simultaneously occlude the radial and ulnar arteries at the wrist and ask the patient to exercise the fingers and then to stop with the hand partially relaxed (holding the hand with the fingers extended causes tightening of the palmar fascia and can cause a false-positive result). Release compression on the ulnar artery; if the ulnar artery is occluded by some pathological process the hand remains white in colour. If the ulnar artery is patent the circulation returns and the hand becomes pink in colour. Allen's test also applies to the radial artery and to the digital arteries of the fingers. The radial artery is tested in a similar fashion to the ulnar artery.

For evaluation of the blood supply to the fingers, the digital arteries on each side of the finger must be occluded and then one side must be released and observed for return of circulation, the procedure varying according to the site being investigated.[2]

Allen's test should always be carried out prior to surgery; if it is positive, resection and end-to-end anastomosis of the vessels is indicated.[1,2,6,10]

Routine radiographic examination[4] often shows calcium deposits in the wall of the aneurysm.

Arteriography is controversial. Some authors feel that it is purely academic and is associated with a degree of risk, while others consider that it is necessary and should include the whole upper limb to exclude proximal arterial lesions which may be the source of further complications.[1,12] This investigation determines the presence of the lesions as well as the collateral circulation.[6]

Indications for surgery

Any complication, such as trophic changes, neurological deficit, rupture or impending rupture, signs of embolization of clots to the digits or elsewhere, or signs of thrombosis in the presence of inadequate collateral supply, indicates surgical intervention.

Treatment is by ligation of the feeding vessels and excision of the aneurysm with end-to-end anastomosis of the feeding vessels.[2,3,9,10]

Case report

A 14-year-old Coloured boy was admitted to the burns unit at Tygerberg Hospital with 45% superficial and deep burns sustained when a paraffin fridge had exploded. There was no history of any serious illness.

During his stay in hospital he developed septicaemia and a high swinging temperature. *Staphylococcus aureus* sensitive only to neomycin and cefamandole nafate was cultured from a blood sample. Appropriate therapy was administered, with only partial success. Subsequently *Proteus mirabilis* and *Staph. aureus* were cultured from the burn wounds.

Ten days after this episode the patient noticed a tender mass in the region of his left wrist (Fig. 1). It enlarged rapidly over the next 2 weeks and was pulsatile, compressible and associated with a bruit. There were no nerve palsies or signs of compression or cardiovascular disease. The diagnosis of a radial artery aneurysm was made, and Allen's test was negative, proving that the ulnar collateral blood supply was adequate.

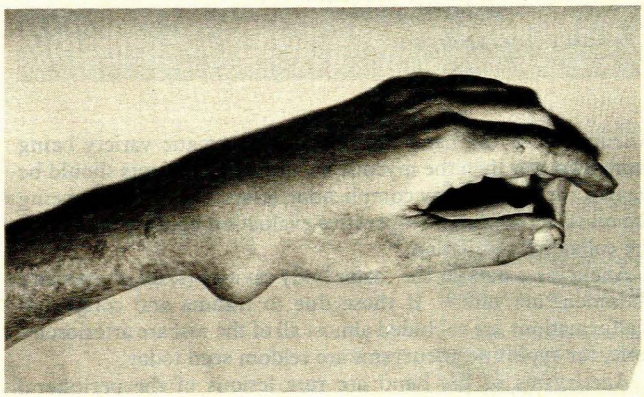

Fig. 1. Aneurysm of the radial artery in the anatomical snuff-box area of the left hand.

The patient was taken to theatre with a 2 x 2,5 cm aneurysm which was still enlarging. It was found to be situated in the left anatomical snuff-box area, the feeding artery being the distal branch of the radial artery. The feeding artery was ligated and the lesion (Figs 2 and 3) excised.

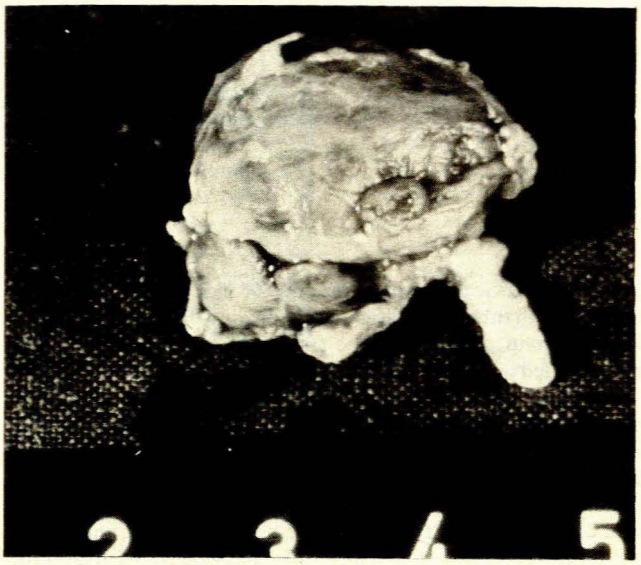

Fig. 2. The aneurysm excised, with its feeding artery very evident.

Histopathological examination revealed a muscular artery with the lumen filled with organized thrombus; the intima and parts of the media were replaced by granulation tissue. These findings supported the clinical diagnosis of a mycotic aneurysm.

Conclusion

Aneurysms of the peripheral arterial tree are rare, but inevitably develop complications requiring surgery. Because of their superficial location these aneurysms are fortunately very amenable to treatment. Pre-operative evaluation of the collateral blood supply is essential.

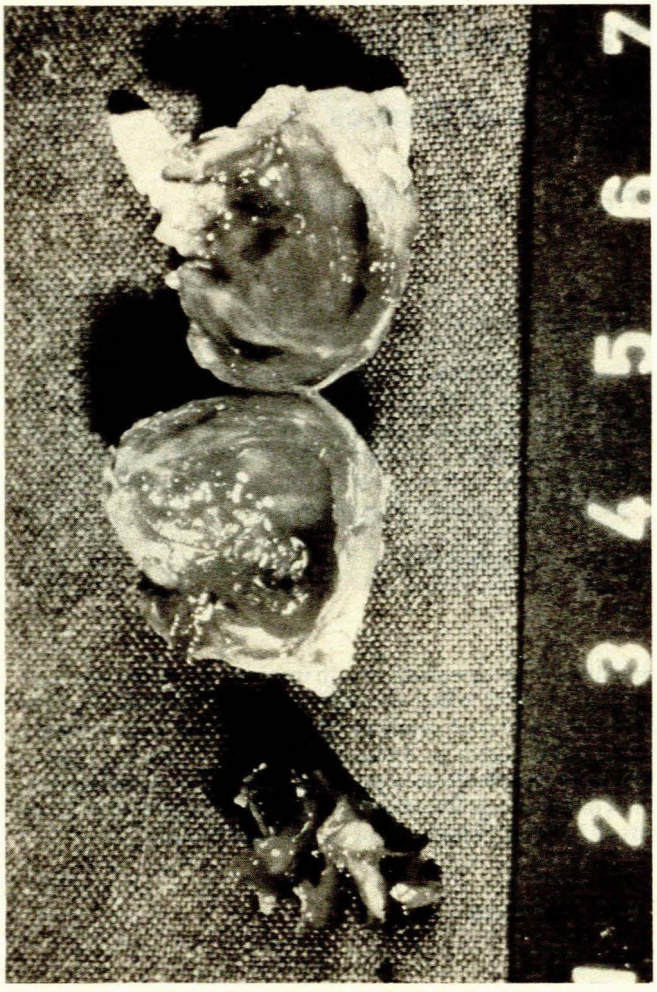

Fig. 3. A view after the aneurysm had been opened. The organized thrombus which was found in the aneurysmal sac is seen at the bottom of the photograph.

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