

An Anomalous Median Nerve Avoiding Injury In A Gunshot Wound To The Antecubital Fossa

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ABSTRACT

We report the case of a 19 year old man who received a gunshot wound to the soft tissues of his left elbow. He presented with an ischaemic hand due to transection of the brachial artery bifurcation anterior to the elbow joint. He was spared an associated median nerve injury by an anomalous course of the nerve through the antecubital fossa.

Introduction

Penetrating extremity trauma from stab and gunshot wounds, although uncommon in UK civilian surgical practice, is on the increase. It is now becoming an important cause of vascular injury and there is a high rate of associated nerve injury. We report a case of high-energy gunshot wound traversing the antecubital fossa and dividing the brachial artery at the level of the bifurcation rendering the forearm and hand ischaemic. The patient was spared an associated median nerve injury by an unusual anatomical variation.

Case Report

A 19 year old man sustained a single high-energy gunshot wound to his left arm with a 9mm entry wound on the lateral aspect of his elbow approximately 4cm distal to the epicondyle exiting through a 12mm exit wound below the medial epicondyle. He had absent left radial and ulnar pulses, poor capillary refill and a cool mottled hand. Sensation could not be reliably assessed because of the overt limb ischaemia. Anteroposterior and lateral X-rays of the elbow showed no bony injury but several small metallic fragments in the soft tissues

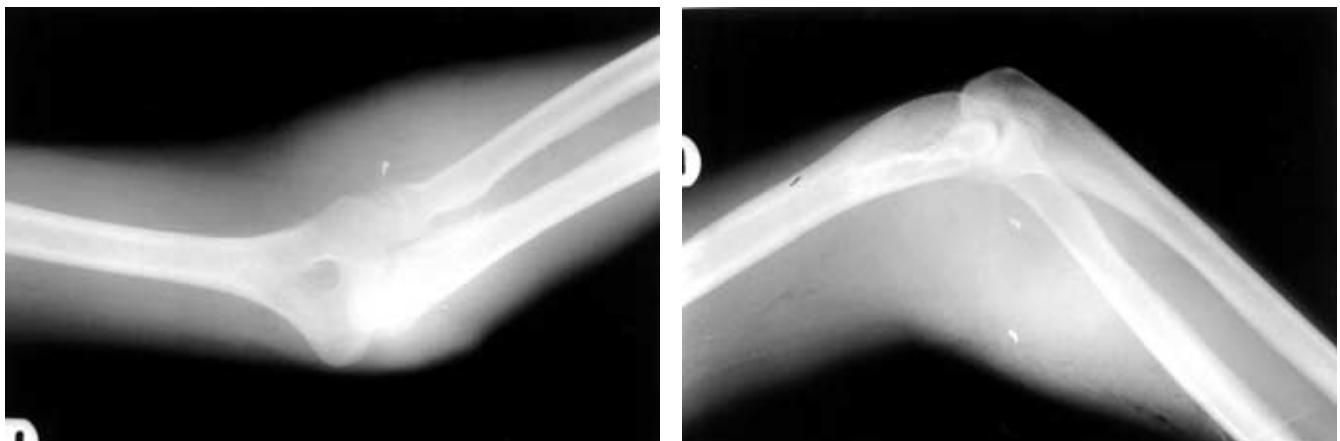
(Figures 1 & 2). In view of the limb-threatening ischaemia reflecting obvious arterial injury he was taken directly to the operating theatre for exploration and revascularisation without any attempt to delineate the injury further.

Following exposure and proximal control of the brachial artery in the arm, the injured bifurcation was identified. The radial artery was completely divided and the ulnar artery partially so with only a small part of the posterior vessel wall remaining in continuity. The fascia over the forearm muscles was opened widely to release the tense ischaemic muscles beneath. Interposition grafts of reversed native vein were used to reconstruct both divided arteries. After release of the vascular clamps good pulses were easily palpable at the wrist.

During the operation the median nerve was not identified in its usual position medially adjacent to the brachial artery in the antecubital fossa. It was assumed that the nerve had been transected by the bullet with retraction of the severed ends. The arm and forearm were thus further explored. The median nerve was identified just proximal to the flexor retinaculum and followed upward where it was seen to lie deep to the repaired vessels in the antecubital fossa, on the anterior aspect of the elbow joint capsule, beneath both heads of pronator teres (Figure 3). The nerve was uninjured throughout its course. The wounds and missile tracks were debrided, left open and dressed. The surgical wounds were closed by direct delayed primary suture four days later. The patient was discharged from hospital 14 days after his

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Figures 1 & 2. Anteroposterior and lateral radiographs showing metallic fragments around the elbow joint but no bony injury.

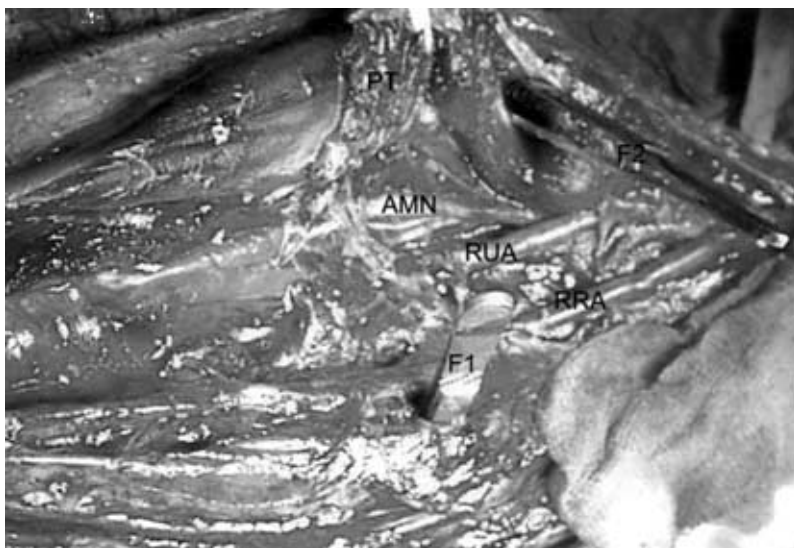


Fig 3. An operative photograph showing the anomalous median nerve (AMN) passing deep to both the reflected pronator teres (PT) muscle and the reconstituted ulnar (RUA) and radial (RRA) arteries. F1 and F2 are forceps demonstrating the missile track.

injury with excellent distal pulses and no neurological or functional deficit, confirmed at subsequent follow up.

Discussion

Penetrating trauma from stab and gunshot wounds was previously an uncommon occurrence in civilian UK surgical practice (1). In recent years there has been a rise in the number of gunshot wounds seen in some inner city UK hospitals (2) and a concomitant rise in extremity neurovascular injury. In one centre in the United States 2.5% of patients admitted with upper extremity injury had penetrating vascular trauma (3).

An acute vascular injury may be arterial, venous or both and is often found in association with injury to adjacent structures (4), particularly nerves (5). It is commonly the neurological injury that gives rise to the post-operative morbidity. One series from the United States found that 44% of patients suffering an upper limb vascular injury had a neurological deficit at time of hospital discharge and 27% had serious functional limitations (6). A separate study demonstrated that following repair of the median nerve below the axilla only 55% of patients were able to return to work (7).

A review of the literature reveals many cases of anatomical variation of the median nerve. Variations at the level of the carpal tunnel are particularly common with one operative study reporting an abnormal configuration of the median nerve in 48% of wrists studied (8). More proximal variations are less usual, but the nerve or a significant branch running anterior to the muscle belly of flexor digitorum superficialis is well described (9,10). Variation of the median nerve about a ligament of Struthers, an abnormal fibrous connection between a

rudimentary supracondylar spur and the medial humeral epicondyle, present in about 1.5% of cadaveric arms (11), has also been reported (12). Roberts (13) describes three cadaveric limbs in which the median nerve passed deep to the pronator teres and lay on the anterior aspect of the elbow joint medial to the trochlear. He was able to find only three other descriptions of such anomalous anatomy, none more recent than 1937. These four anatomical reports are the only previous accounts of an aberrant median nerve in the antecubital fossa, none of which have presented clinically as in this case.

The common surgical approaches to the elbow, for both open and endoscopic procedures have evolved to take safe account of the anatomy of the neurovascular structures around the joint. Aberrations of this anatomy may therefore expose patients to an increased risk of neurovascular injury at surgery and possibly also in trauma (13). Perversely, it appears that in this case the anomalous course of the median nerve saved the patient from serious neurological injury.

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