Incidental finding of a persistent median artery (palmar type) during a routine carpal tunnel decompression: a case report

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ABSTRACT

Carpal tunnel syndrome is characterised by compression of the median nerve. The mainstay of treatment is surgical decompression. This case report highlights the occurrence of a persistent median artery, which could complicate surgery. A 55-year-old woman underwent carpal tunnel decompression. An incidental finding of a large-calibre persistent median artery, which was superficial to the flexor sheath, could have been damaged. This was carefully retracted and the procedure was completed, without any complications. Several studies have shown the prevalence of persistent median artery to range from 1.1–27.1%. It is usually found deep to the flexor retinaculum but in this case it was found to be just beneath the palmar fascia. There is increased chance of iatrogenic injury with this particular variant. Surgeons performing the procedure should be mindful of this variation, because accidental damage could result in devastating consequences to the hand.

KEYWORDS

Median artery – Carpal tunnel decompression – Carpal tunnel syndrome – Persistent Median Artery

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Introduction

The median artery provides the blood supply to the forearm and hand during the first 2 months of gestation. Later, it regresses to become the smaller artery, the *comitans nervi mediani*.¹ The median artery persists into adulthood, located next to the median nerve, and may contribute a significant proportion of the blood supply to both the hand and the median nerve. The importance of the persistent median artery lies in the fact that a large-calibre persistent median artery may lead to an early compression of the median nerve in the carpal tunnel in patients who are prone to compression, such as those with rheumatoid arthritis. It has also been related to the compressive pathology of the median nerve, which is secondary to arterial calcification,² thrombosis³ and atherosclerosis.⁴

These persistent median arteries have been described as having two distinct variations, the antebrachial and palmar types. Antebrachial median arteries terminate in the proximal forearm and have a high incidence (approximately 76%), such that they can be considered normal. Palmar median arteries terminate in the hand and contribute to the blood supply of the digits; these are considered to be an anatomical variant.⁴ Persistent median arteries are not

documented to lie superficial to the flexor retinaculum and are therefore not routinely encountered on initial incision beneath the palmar fascia.

Case history

A 55-year-old woman was referred to our orthopaedic clinic by her general practitioner for pain and numbness in both hands of 1 year's duration. She had been managed conservatively but her symptoms had worsened and she found it difficult to cope with daily activities.

Clinical examination revealed wasting in the thenar muscles of the left hand. She exhibited reduced sensation in the median nerve distribution of the left hand. Tinel's sign was positive over the median nerve on the left side. Phalen's test was positive on the left side. Motor function was still maintained. Magnetic resonance imaging of the cervical spine and nerve conduction studies showed degenerative changes but no compression of the spinal cord. Electrophysiology confirmed distal lesions of the median nerve on both sides. Left hand median nerve lesion was moderate and right-sided lesion was of a mild degree, in keeping with her symptoms.

Surgical decompression was commenced through a standard skin incision. After dissecting through the skin and superficial fascia, the anomalous vessel was encountered. This vessel was lying superficial to the palmar aponeurosis (Fig 1). This was identified as a median artery (palmar type) closely accompanied by its venae comitantes. The artery was carefully retracted towards the ulnar and the sheath divided completely. The artery remained undamaged. The artery was found to be pulsating after the release of tourniquet and no immediate postoperative complications were encountered. The hand was well perfused. The ulnar and radial arteries were also palpated after the release of the tourniquet and were found to be separate from this anomalous vessel.

Discussion

When a persistent median artery is present and reaches the hand, it may form the only blood supply to the median nerve and neighbouring muscles, and may be a significant supply of blood to the hand, by contributing to the superficial palmar arch. The presence of a persistent median artery can vary widely. Pathology of the persistent median artery has been implicated in median neuropathy and may cause or mimic carpal tunnel syndrome, pronator syndrome or anterior interosseous syndrome. Described causes include compression, calcification, thrombosis, atherosclerosis, dilatation and trauma.²⁻⁴

A surgeon operating on the hand should be aware of this variation to avoid accidental injury. We have demonstrated through this report that this artery was found to be directly in the line of a standard approach to a carpal tunnel decompression. We advise a careful step-by-step approach to this procedure, always keeping in mind that this variation could present itself.

A thorough literature search shows that the median artery (palmar type) always occurs deep to the flexor retinaculum when it is present. In our case, the artery was seated directly

Figure 1 Median artery and venae comitantes during routine carpal tunnel decompression.

under superficial fascia beneath the incision. To the best of our knowledge, there have been no reports placing the artery so superficially. It is extremely important that surgeons are aware of this extremely rare variant, as the artery can be easily damaged if one does not expect it to be so close to the skin, resulting in devastating consequences to the hand.

References

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