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Case Report

Radial Artery Aneurysm Requiring Reconstruction Following Previous Ulnar Artery Ligation: A Case Report

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Abstract

Radial artery aneurysms are uncommon, and management is particularly challe,nging when alternative arterial perfusion of the hand is inadequate. A 70-year-old woman presented with a three-month history of a slowly enlarging pulsatile swelling in the right anatomical snuffbox. Ten years earlier, she had sustained a laceration of the same wrist requiring ulnar artery ligation. Examination demonstrated a 1.5 × 1.2 cm pulsatile mass with a warm, well-perfused hand. Duplex ultrasonography demonstrated an 8-mm saccular distal radial artery aneurysm without intraluminal thrombus and no detectable ulnar arterial flow. Allen testing was abnormal, with delayed reperfusion of >10 seconds. Because radial artery sacrifice could not be assumed to be safe, the aneurysm was excised and arterial continuity restored by primary end-to-end anastomosis. Recovery was uncomplicated. At three months, duplex ultrasonography demonstrated a patent anastomosis with normal flow, and the patient had full hand function without ischaemic symptoms. This case highlights the importance of assessing hand perfusion before treatment of radial artery aneurysms and supports preservation of arterial continuity when alternative arterial inflow is inadequate.

Keywords: radial artery aneurysm; anatomical snuffbox; ulnar artery ligation; hand perfusion; arterial reconstruction; case report

Introduction:

Radial artery aneurysms are uncommon and are frequently associated with trauma or iatrogenic arterial injury. Distal radial artery aneurysms within the anatomical snuffbox are particularly rare. [1–3] Management depends not only on aneurysm characteristics but also on the adequacy of alternative hand perfusion. Excision with arterial ligation has been reported when alternative perfusion is adequate, whereas reconstruction may be required when preservation of radial arterial flow is important for maintaining hand perfusion. [1,2,4]

We report an anatomical-snuffbox radial artery aneurysm in a patient with previous ipsilateral ulnar artery ligation and inadequate alternative hand perfusion, managed by aneurysm excision and primary end-to-end radial artery reconstruction.

Case Presentation:

A 70-year-old woman with type 2 diabetes mellitus and hypertension presented in December 2024 with a three-month history of a slowly enlarging, pulsatile swelling in the right anatomical snuffbox (Figure 1A). Ten years earlier, she had sustained a deep laceration to the volar aspect of the same wrist, resulting in ulnar artery transection treated by ligation without reconstruction. She reported no subsequent symptoms of hand ischaemia. On examination, a 1.5 × 1.2 cm non-tender, pulsatile mass was present in the anatomical snuffbox. The hand was warm and well perfused, with capillary refill of <2 seconds. Allen testing was abnormal, with delayed reperfusion of >10 seconds, indicating inadequate alternative hand perfusion.

Duplex ultrasonography demonstrated an 8-mm saccular aneurysm of the distal radial artery at the anatomical snuffbox. The adjacent proximal radial artery measured 1.7 mm in diameter. Laminar flow was present within the aneurysm, with no evidence of intraluminal thrombus. No flow was detected in the ulnar artery. Together with the history of previous ulnar artery ligation and abnormal Allen testing, these findings indicated inadequate alternative arterial inflow to the hand.

Given the progressive enlargement of the aneurysm and inadequate alternative arterial inflow, surgical excision with preservation of radial arterial continuity was undertaken. Under general anaesthesia, a longitudinal incision was made over the anatomical snuffbox. The

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of the radial artery was obtained (Figure 1B). The aneurysm was opened, confirming the absence of intraluminal thrombus, and the aneurysmal segment was completely excised (Figure 1C).

Sufficient arterial length and mobility remained after excision to permit tension-free primary end-to-end reconstruction using 7-0 polypropylene suture under loupe magnification (Figure 1D). Intraoperative Doppler assessment demonstrated triphasic flow, with a palpable distal pulse following reconstruction.

The postoperative course was uncomplicated. The hand remained warm and well perfused, with a palpable radial pulse and no clinical evidence of hand ischaemia. The patient was discharged on postoperative day 2 receiving antiplatelet therapy. At three-month follow-up, duplex ultrasonography demonstrated a patent radial artery anastomosis with normal flow. The patient remained free of ischaemic symptoms and had full hand function.

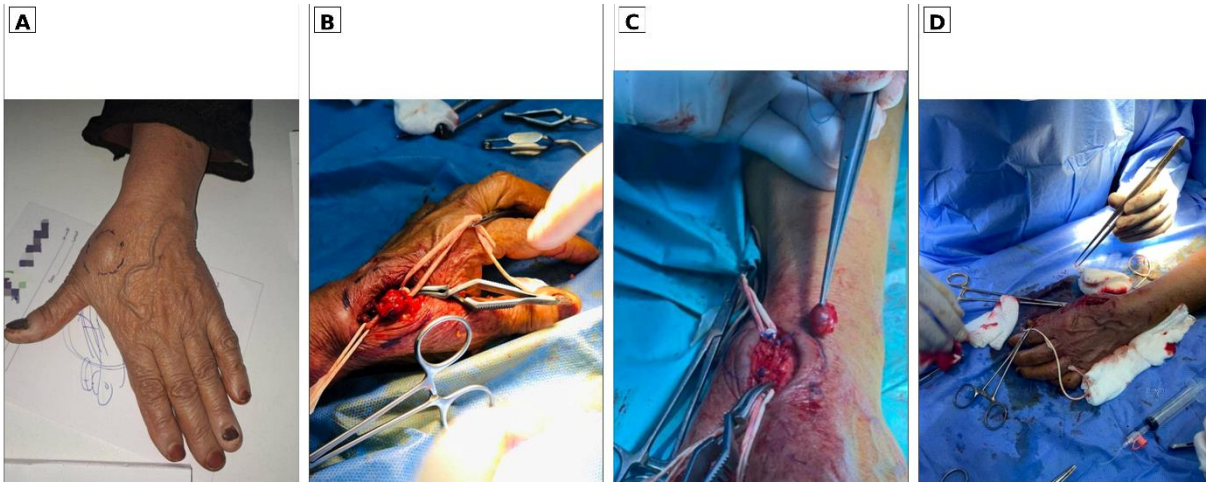

Figure 1. Clinical presentation and operative management of the radial artery aneurysm. (A) Preoperative appearance showing the pulsatile swelling in the right anatomical snuffbox. (B) Intraoperative exposure and dissection of the radial artery aneurysm with proximal and distal arterial control. (C) Operative appearance following complete excision of the aneurysmal segment. (D) Operative field following primary end-to-end radial artery reconstruction.

Discussion:

Anatomical-snuffbox radial artery aneurysms are rare, with only a small number of cases reported. [1–3] Reported aetiologies include trauma, iatrogenic injury, repetitive mechanical stress and systemic arterial disease, while histologically confirmed true radial artery aneurysms without an identifiable cause have also been reported. [3,5–10] Histopathological examination is required for definitive pathological classification as a true aneurysm or pseudoaneurysm. Histopathology was not performed in this patient, and previous substantial trauma to the same wrist precludes confident classification as idiopathic. The lesion is therefore conservatively described as a radial artery aneurysm without assigning a pathological subtype.

The principal therapeutic issue was whether radial artery sacrifice could be safely tolerated. Published cases illustrate the importance of a perfusion-directed strategy. Yamamoto et al. excised and ligated a snuffbox aneurysm after demonstrating adequate alternative hand perfusion.[1] Jawas et al. similarly performed excision without reconstruction where perfusion assessment supported safe radial artery sacrifice.[2] By contrast, Ghaffarian et al. reported a radial-dominant hand with poor ulnar collateralisation and reconstructed the radial artery using an interposition great saphenous vein graft.[4] These contrasting reports support basing the decision to reconstruct on the adequacy of alternative arterial inflow rather than aneurysm diameter alone.[1,2,4]

In the present patient, previous ulnar artery ligation, absent detectable ulnar arterial flow on duplex ultrasonography and abnormal Allen testing indicated inadequate alternative perfusion. Although these findings

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do not establish that the radial artery was the anatomically exclusive arterial supply because collateral and interosseous contributions may persist, they provided insufficient reassurance that radial artery sacrifice would be safely tolerated. Preservation of radial arterial continuity was therefore preferred to ligation.

Reconstructive options include primary end-to-end anastomosis and autologous vein interposition. [4,6,9] In this case, sufficient arterial length and mobility permitted tension-free direct reconstruction without an interposition conduit. Technical adequacy was demonstrated by a palpable distal pulse and triphasic intraoperative Doppler flow. At three months, duplex ultrasonography confirmed continued patency with normal flow, while the patient remained asymptomatic with full hand function. These findings provide objective evidence of early technical success, although the three-month follow-up period does not establish long-term durability.

Importantly, ulnar artery ligation had been clinically tolerated for approximately 10 years. Its significance became apparent when pathology subsequently affected the radial artery. This case therefore does not suggest that ulnar artery ligation inevitably causes hand ischaemia; rather, it demonstrates how previous loss of one major forearm artery may reduce vascular reserve and materially influence management when pathology later affects the other.

Conclusion:

Management of radial artery aneurysm should incorporate careful assessment of alternative hand perfusion. In this patient, previous ulnar artery ligation, absent detectable ulnar arterial flow on duplex ultrasonography and abnormal Allen testing meant that radial artery sacrifice could not be assumed to be safe. Aneurysm excision with primary end-to-end reconstruction preserved radial arterial continuity, with triphasic intraoperative Doppler flow and duplex-confirmed patency at three months. Previous loss of one major forearm artery should therefore be considered when planning treatment of subsequent pathology affecting the other.

Authors' Contributions:

Author was responsible for the clinical and surgical management of the patient, conception of the case report, acquisition and interpretation of the clinical information, and drafting and critical revision of the manuscript. The author approved the final version of the manuscript and accepts responsibility for its content.

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Conflict of Interest and Funding:

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Patient Consent:

Written informed consent was obtained from the patient for publication of the clinical details and accompanying images.

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