



# Double Pseudoaneurysm of the Superficial Palmar Arch: A Unique Case

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## Abstract

### Keywords

- ▶ pseudoaneurysm
- ▶ false aneurysm
- ▶ double pseudoaneurysm
- ▶ palmar arch

We present the case of a 22-year-old male patient who developed “double” pseudoaneurysm of the superficial palmar arch of the left hand after trivial trauma with a kitchen knife. Following an unsuccessful embolization attempt, surgical excision of the pseudoaneurysm was performed during which the pseudoaneurysm was found to arise from the anterior wall of the palmar arch. Intraoperatively, a second pseudoaneurysm arising from the deeper surface of the superficial palmar arch was found and excised. This is probably the only reported case of double pseudoaneurysm of the palmar arch in literature. The possible mechanism of arterial injury, diagnosis, and management is discussed.

## Introduction

Pseudoaneurysms are outpouchings from arteries arising due to gradual leakage of blood from defects/punctures following penetrating trauma, iatrogenic injury (surgery, angiography), or infection. They communicate with the arterial lumen, are lined only by adventitia and a fibrous wall, and are distinct from “True” aneurysms which have all the three layers of arterial wall.

Pseudoaneurysms can arise at any site of trauma to the arterial wall—those following femoral artery puncture for vascular imaging/intervention and splenic artery pseudoaneurysms following pancreatic trauma/pancreatitis are few examples.

Pseudoaneurysm of the superficial palmar arch of the hand is a rare occurrence.<sup>1–4</sup> We report a case of “double pseudoaneurysm” of the superficial palmar arch following penetrating trauma in a 22-year-old male patient.

## Case Report

A 22-year-old male student presented to our outpatient department (OPD) with a swelling over the left palm since

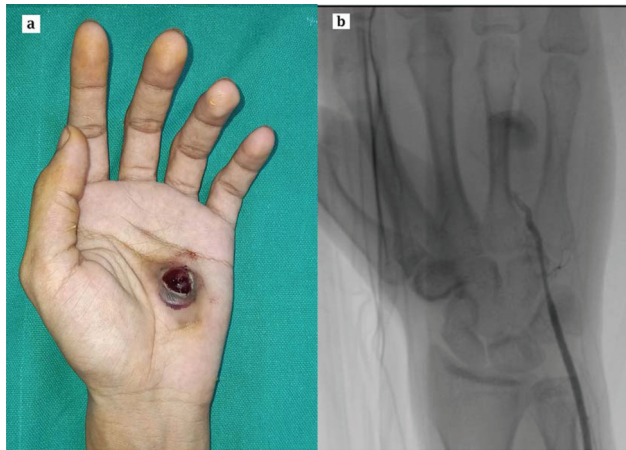
1 month. He had sustained an accidental penetrating injury to the left palm with a kitchen knife 6 weeks previously. It bled profusely but the bleeding stopped following pressure dressing. The wound was not formally sutured; only regular dressings were done for a few days. He developed a gradually enlarging lump at the site of injury with mild serous discharge from the wound site. Two weeks after the trauma he consulted a local hospital where an abscess was suspected and an incision and drainage was attempted under local anesthesia. The procedure was abandoned when profuse bleeding was encountered and he was referred to vascular interventional radiology for embolization. An emergency angiography was done which revealed a pseudoaneurysm of the superficial palmar arch (▶ Fig. 1) and embolization was done. However, the swelling did not subside and he was referred to our OPD.

On clinical examination, there was a firm swelling of approximately 3 cm × 2.5 cm over the left palm just proximal to the proximal palmar crease in line with the ring finger (▶ Fig. 1). It was noncompressible and nonpulsatile. The central part was ulcerated revealing dark clot inside while the skin overlying the rest of the swelling was discolored.

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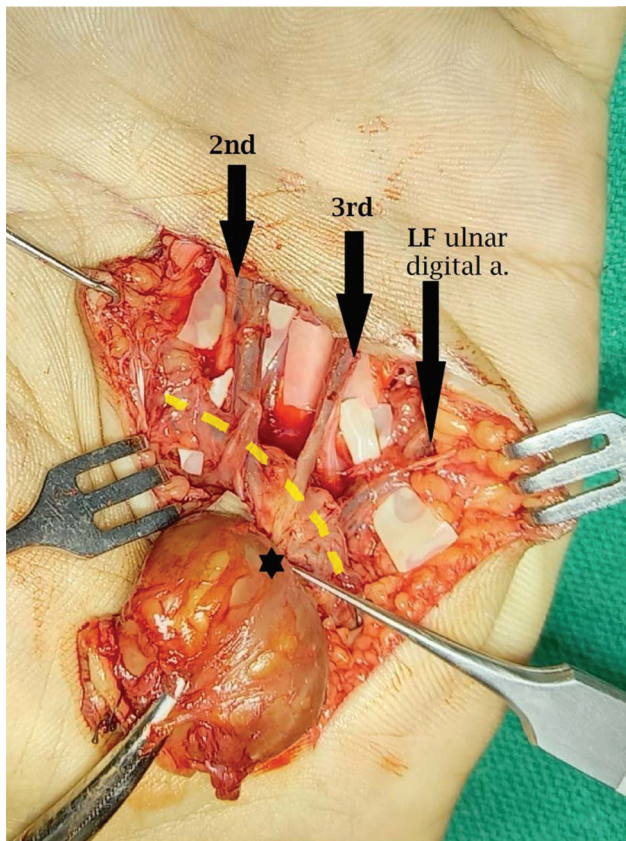
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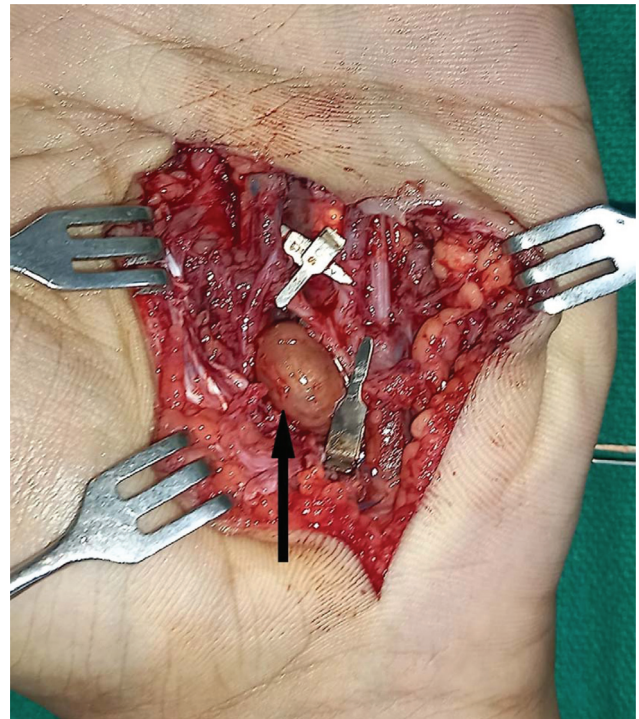
**Fig. 1** (A) Swelling over left palm 3 weeks post-embolization. (B) Digital subtraction angiography (DSA) showing the pseudoaneurysm before embolization.

There was no distal neurovascular deficit. Long flexor tendon movements were intact.

Based on the clinical examination and angiography findings, the patient was posted for excision of the pseudoaneurysm. Under regional anesthesia, skin flaps were raised to expose the swelling. The pseudoaneurysm was carefully dissected out; it was found to be arising from the anterior wall of the palmar arch (→ **Fig. 2**) opposite the origin of the



**Fig. 2** The neck of the bigger pseudoaneurysm (PSA) marked with a "★" with the common digital vessels dissected. The yellow dashed line is the palmar arch.



**Fig. 3** The smaller pseudoaneurysm (arrow) exposed after resection of the bigger one.

3rd common digital artery—the pseudoaneurysm and a short segment of the palmar arch with the 3rd common digital vessel were thrombosed.

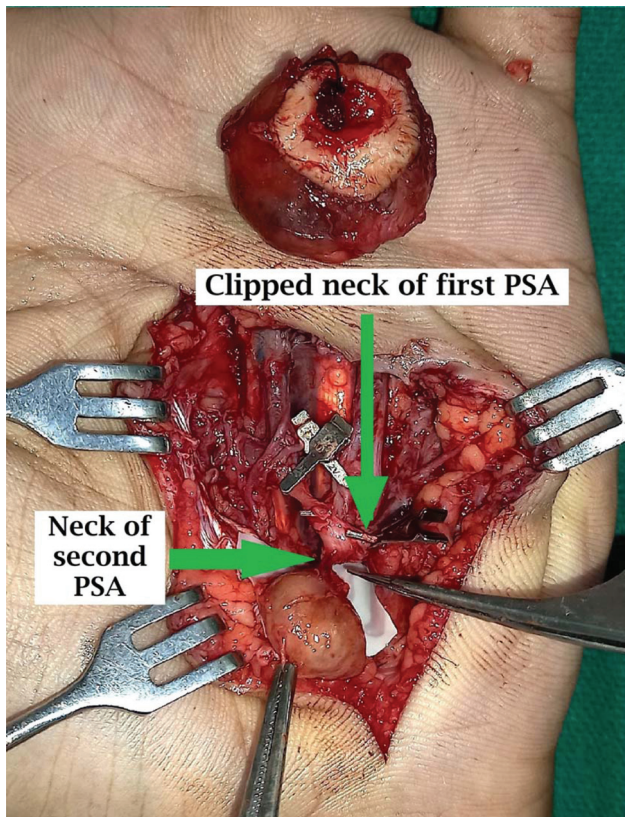
However, on retracting the pseudoaneurysm, we were surprised to see another smaller swelling deep to the palmar arch. For better visualization and access, we clipped the neck of the bigger pseudoaneurysm and excised it. The smaller one arose from the same segment of palmar arch but from its deep surface (→ **Figs. 3–5**). The thrombosed segment of the arch and the 3rd common digital artery were isolated along with the smaller pseudoaneurysm and clamps were applied on both radial and ulnar sides of the segment and to the digital artery. The tourniquet was deflated and good vascularity of the palm and all fingers was confirmed. The thrombosed segment was excised along with the second pseudoaneurysm. In view of the intact vascularity despite clamping the 3rd common digital artery and the palmar arch on either side of the pseudoaneurysm, the subacute nature of the lesion, friable surrounding tissues, and history of embolization, a vein graft reconstruction was not attempted. The wound was closed over glove drains. The postoperative course was uneventful with good wound healing and hand function.

We analyzed the location of the two pseudoaneurysms and concluded that the bigger one was the result of the original trauma with knife. As for the second one, the tip of the kitchen knife could have injured both the anterior and posterior walls of the palmar arch (→ **Fig. 6**) during the initial trauma itself.

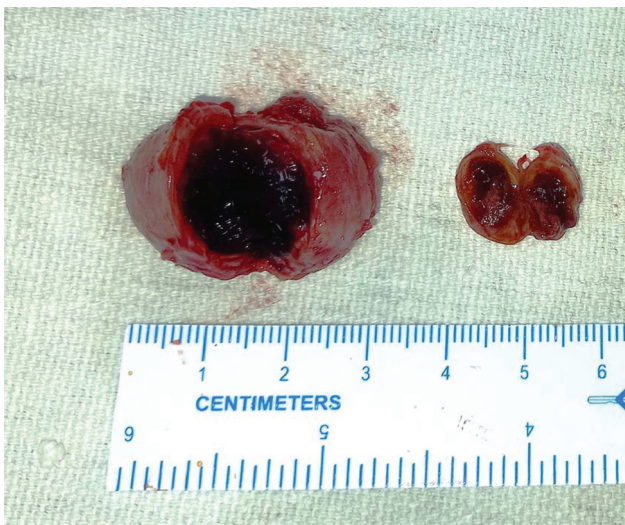
## Discussion

Pseudoaneurysms are peculiar swellings arising from medium to large sized arteries following minor disruption of the



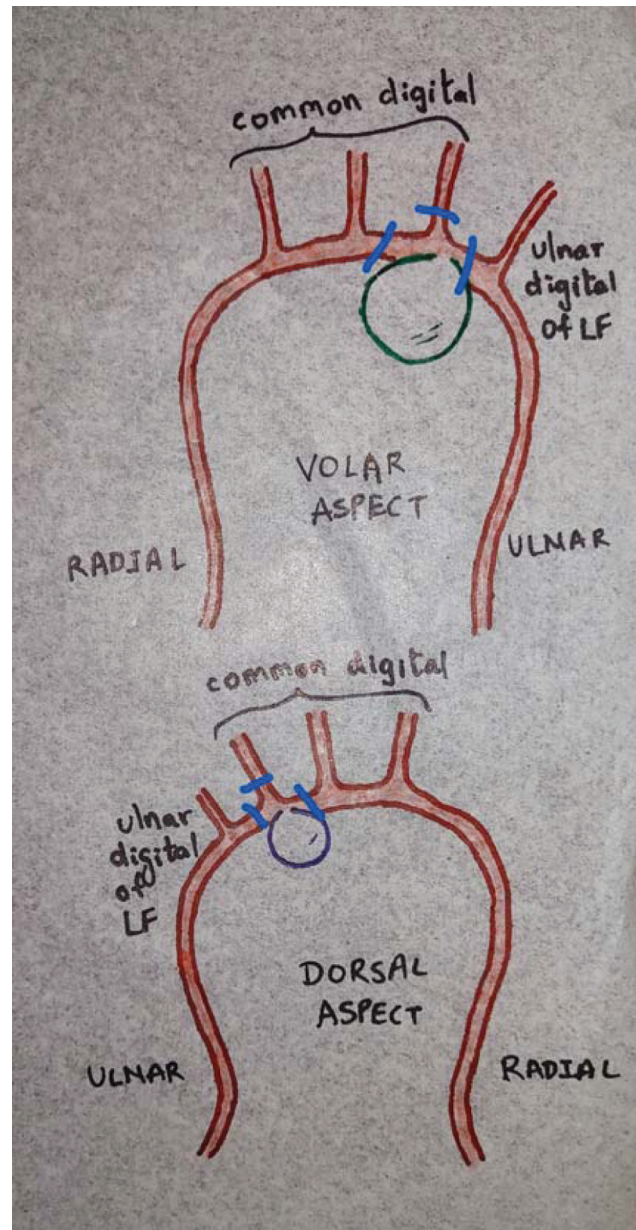


**Fig. 4** The deeper pseudoaneurysm arising from the posterior wall of the palmar arch; the neck of the bigger pseudoaneurysm has been clipped as shown.



**Fig. 5** Both the pseudoaneurysms cut open revealing organized clot and fibrous walls.

arterial wall. The trauma is usually small enough that the defect in the fascia and superficial structures seals off. However, arterial blood under systolic pressure continues to leak out from the rent—the rate of bleeding is usually limited by pressure in the enclosed space. The hematoma thus formed is gradually walled off by fibrous tissue formed from the organized clot and blood products and is lined by adventitia while its lumen is in continuity with the arterial



**Fig. 6** A diagrammatic representation of the two pseudoaneurysms—the bigger one on the volar aspect and the smaller one on the dorsal aspect of the superficial arch; the blue darts represent the sites of clipping of the vessels.

lumen. Many of these show partial thrombosis—symptoms are usually swelling, pain, profuse bleeding, and pressure symptoms due to nerve/muscle compression. Doppler ultrasound and angiography help in confirming the diagnosis and delineating the origin of the pseudoaneurysm. Pseudoaneurysms of the superficial palmar arch are rare entities with only a few case reports.<sup>1–3</sup> We could not find any reports of double pseudoaneurysm of the upper limb in literature. The angiography done for embolization revealed only one pseudoaneurysm; the deeper lesion was not seen. In view of the numerous arterial structures in the palm (superficial and deep arches and their digital branches), the possibility of a pseudoaneurysm should be considered when a posttraumatic swelling is encountered. Meticulous dissection and thorough exploration

are essential during surgery. Also, use of a tourniquet during any attempted surgical procedure on the palm is recommended. Pseudoaneurysms are managed by surgical excision which often entails excising the friable segment involved; if distal arterial supply is intact, no further procedure is necessary. This may depend on the variant/dominance of the superficial palmar arch. Various cadaveric and radiological studies have described the detailed anatomy of the superficial palmar arch.<sup>5-7</sup> The incidence of an ulnar type of superficial palmar arch with no contribution from the radial artery varies from 25.5 to 37% according to various studies.<sup>5-7</sup> If distal blood supply is in doubt, continuity of the vessel must be reestablished by end-to-end anastomosis or by using vein grafts. With a high index of suspicion and proper planning, pseudoaneurysms of the superficial palmar arch can be diagnosed and excised with minimal morbidity and excellent results.

#### Conflict of Interest

None declared.

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