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Radial artery aneurysm in the anatomical snuff box: A case report and literature review

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ABSTRACT

INTRODUCTION: Distal radial artery aneurysms of the hand are rare. We herein report a rare case of radial artery aneurysm in the anatomical snuff box.
PRESENTATION OF CASE: A 61-year-old woman presented with a chief complaint of a mass on the back of her left hand. A radiological examination showed a distal radial artery aneurysm. The patient underwent successful surgical excision of the aneurysm with radial artery ligation.
DISCUSSION: We discuss the etiologies and surgical management of radial artery aneurysms in the anatomical snuff box according to the published literature.
CONCLUSION: An accurate diagnosis and a preoperative blood flow evaluation are necessary for appropriate surgical management of radial artery aneurysms.

1. Introduction

Upper extremity arterial aneurysms are rare, and distal radial artery aneurysms of the hand are even rarer. We herein report a case of radial artery aneurysm in the anatomical snuff box with the clinical, angiographic, and pathological findings and discuss the etiologies and surgical management according to the published literature.

2. Presentation of case

A 61-year-old woman presented with a chief complaint of a mass on the back of her left hand. A puncture of the mass was performed at a local hospital, and on aspiration of the arterial blood, she was referred to our hospital due to the suspicion of an aneurysm. The mass had been present for a year and had gradually increased in size. The patient had no history of any underlying medical conditions. A physical examination revealed a pulsatile mass in the left anatomical snuff box (Fig. 1), and the findings on Allen's test was positive. Laboratory examinations showed no evidence of systemic inflammation, metabolic disorders, or autoimmune diseases. Computed tomography showed a 22-mm radial artery aneurysm containing a thrombus. Angiography demonstrated a saccular aneurysm of the distal radial artery (Fig. 2a), and an adequate ulnar and interosseous supply to the digital arteries was demonstrated by a study with the radial artery compressed using a compression device (Fig. 2b). Considering the likelihood of aneurysm complications, surgical intervention was performed. Under general anesthesia, upon the patient's request, the aneurysm site was incised (Fig. 3). An excision of the aneurysm and proximal and distal ligation of the artery were performed according to the preoperative Allen's test and angiography results. The pathological examination revealed the disruption of three layers of the arterial wall in most parts of the aneurysm wall, indicating a false aneurysm, and an organized thrombus attached to its lumen (Fig. 4). The postoperative period was uneventful, and the patient was discharged two days after surgery. The patient was symptom-free at three months of follow-up.

3. Discussion

Upper extremity arterial aneurysms are rare, and radial artery aneurysms are even rarer [1,2]. Previously reported cases of radial artery aneurysms have typically been secondary to penetrating trauma or iatrogenic injury at the level of the wrist. In the present case, the aneurysm was observed in an unusual location, involving the distal radial artery in the anatomical snuff box. The anatomical snuff box is a triangular depression between two tendons, the extensor pollicis longus and the extensor pollicis brevis, where the radial artery lies relatively superficial and unprotected. The most common location of aneurysms of the hand is the distal ulnar artery [2]. Distal ulnar artery aneurysms have been well described as a clinical finding of the hypothenar hammer syndrome [3]. Distal radial artery aneurysms of the hand, however, are reported only

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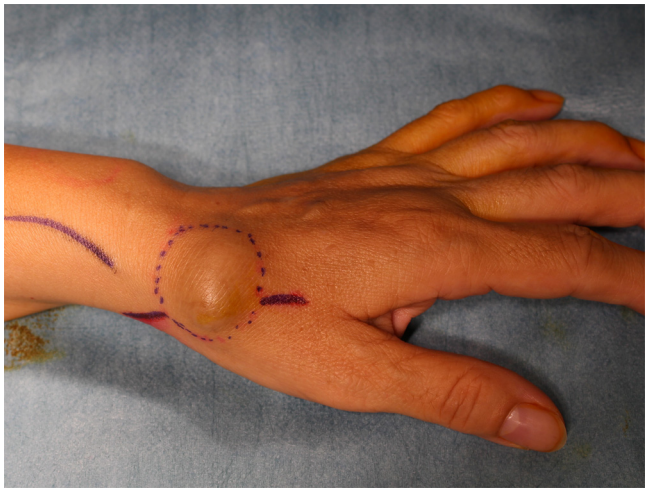

Fig. 1. Representative image of the left hand showing the mass at the anatomical snuff box.

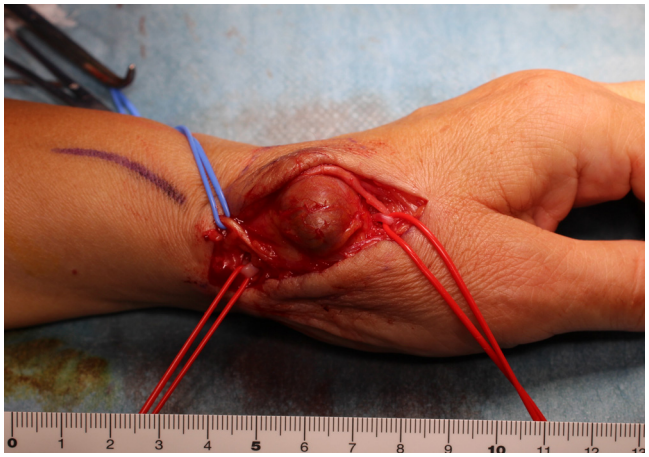

Fig. 3. An intraoperative photograph showing the aneurysm.

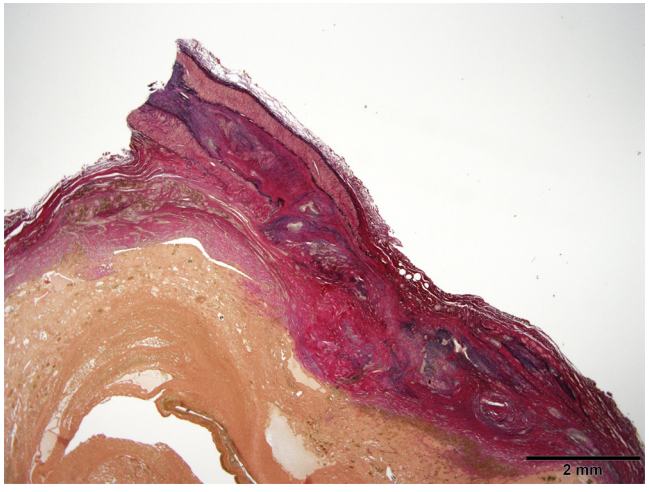

Fig. 4. Pathological findings show the disruption of three layers of the arterial wall and an organized thrombus attached to its lumen (Elastica van Gieson stain 20×).

as case reports in the literature. We found 16 cases in 14 reports of radial artery aneurysms located in the anatomical snuff box in the English literature (Table 1) [4–17].

In our literature review, three traumatic false aneurysms [6,9] and one true aneurysm resulting from repetitive occupational injury [14] have been reported. In addition to those traumatic aneurysms, three others were related to underlying vasculopathy [8,10,15], two were arteriosclerotic [4,7], one was a mycotic aneurysm [5], and six remained idiopathic. On encountering a patient with a radial artery aneurysm, it is important to consider and investigate the rarer causes of an aneurysm as well as the history of trauma.

In the present case, no obvious predisposing factors were detected by a careful review of the patient's medical history and preoperative examinations, but pathological findings indicated that a previously unnoticed trauma was the cause of the aneurysm.

The diagnosis of an aneurysm in the upper extremity can be made by the detection of a pulsatile mass during a physical examination. Some patients present with nonspecific symptoms, such as an asymptomatic mass [4,7,11] or hand pain [5]. The misdiagnosis of a ganglion or a soft tissue tumor remains a pitfall. Imaging modalities such as duplex ultrasonography, CT angiography, and conventional angiography are useful for a definitive diagnosis of an aneurysm and preoperative planning.

Upper extremity aneurysms should be treated, although rupture is thought to be very rare [18], due to the risk of thromboembolic

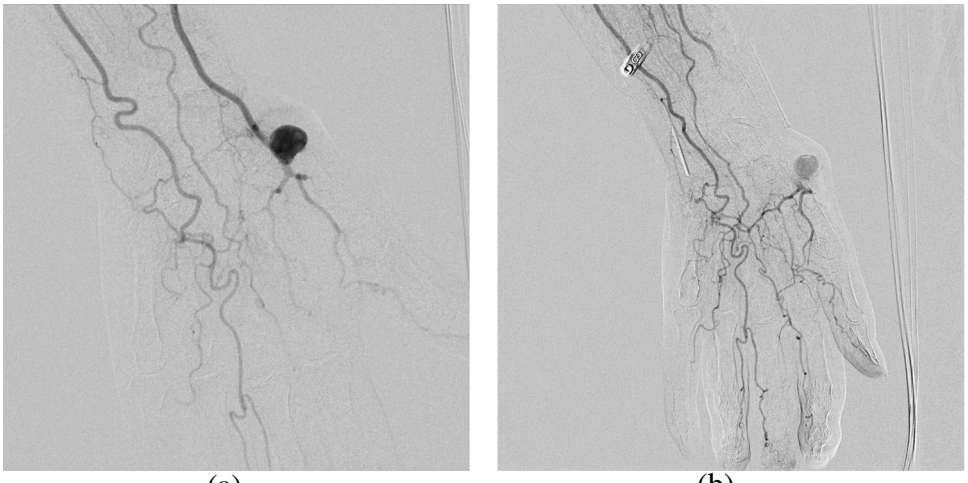

Fig. 2. (a) Angiography shows a saccular aneurysm of the radial artery. (b) Angiography with the radial artery compressed shows adequate ulnar and interosseous supply to the digital arteries.

Table 1
Reported cases of radial artery aneurysm in the anatomical snuff box.

Author(year)	Age/Sex	Presentation	Cause	Evaluation of blood flow	Treatment	Type of aneurysm
Thorrens et al. (1966) [4]	60/M	Asymptomatic mass	Arteriosclerosis	Allen's test, angiography	Excision and revascularization	N.D
Poirier and Stansel (1972) [5]	69/M	Pain in the hand	Mycotic	Angiography	Excision	N.D
Kleinert et al. (1973) [6]	47/M	Painful mass	Trauma	Angiography	Excision and revascularization	False
Kleinert et al. (1973) [6]	53/F	Painful mass	Idiopathic	N.D	Excision	False
Malt (1978) [7]	56/M	Asymptomatic mass	Arteriosclerosis	Angiography	Excision and revascularization	True
Giler et al. (1979) [8]	51/M	Pulsatile mass, pain in the hand	Buerger's disease	Angiography	Observation	–
Wenger et al. (1980) [9]	60/M	Painful mass	Trauma	N.D	Excision	False
Wenger et al. (1980) [9]	23/M	Painful mass	Trauma	N.D	Excision	False
Leitner et al. (1985) [10]	69/F	Painful mass	Granulomatous arteritis	Angiography	Excision	True
Walton and Choudhary (2002) [11]	40/M	Asymptomatic mass	Idiopathic	N.D	Observation	–
Luzzani et al. (2006) [12]	63/F	Pulsatile mass	Idiopathic	Allen's test, doppler	Excision	True
Yaghoubian and de Virgilio (2006) [13]	77/M	Pulsatile mass	Idiopathic	Allen's test, angiography	Observation	–
Behar et al. (2007) [14]	62/M	Mass, numbness in the hand	Repetitive trauma	Allen's test	Excision	True
Yukios et al. (2009) [15]	74/F	Pulsatile mass	Marfan	Allen's test, pulse oximeter	Excision	True
Jadynak and Frydman (2012) [16]	60/M	Pulsatile mass	Idiopathic	Allen's test, CT-angiography	Excision	True
Shaabi (2014) [17]	65/F	Pulsatile mass	Idiopathic	Doppler	Excision	True
Present Case (2016)	61/F	Pulsatile mass	Trauma	Allen's test, angiography	Excision	False

N.D not described.

complications, distal ischemia, and symptoms resulting from nerve compression. Surgical excision of an aneurysm is the standard treatment of choice, and the decision to perform revascularization should be made based on an evaluation of the distal blood flow. In our review of the pertinent literature, out of 16 cases, 10 received excision of the aneurysm and ligation of both arterial ends. In three cases, including two arteriosclerotic cases, an insufficient collateral blood supply was diagnosed by preoperative angiography [4,7,13]. Primary anastomosis or interposition grafting of the radial artery is essential for such cases. In the present case, the decision to excise the aneurysm and ligate the artery was made based on the preoperative Allen's test results. Additionally, we confirmed the safety of the ligation of the radial artery by an angiographic study with the radial artery compressed.

4. Conclusions

We herein reported a rare case of a radial artery aneurysm in the anatomical snuff box. In our case, the excision of the aneurysm with ligation of both arterial ends was considered to be a safe treatment option. An accurate diagnosis and a careful preoperative blood flow evaluation are necessary for performing appropriate surgical management.

Conflicts of interests

All authors have no conflict of interests.

Funding

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Ethical approval

Ethical approval was not required for this case report.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Authors' contributions

YY drafted the manuscript under the supervision of TK and YI. KI and TT contributed to data collection.

Guarantor

Yohei Yamamoto, Yoshinori Inoue.

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