

# An Unusual Volar Wrist Mass: Radial Artery Pseudoaneurysm Following Transradial Catheterization

CME Credits

Mathieu Boudier-Revéret<sup>1</sup>, Meng-Ting Lin<sup>2</sup>, Tyng-Guey Wang<sup>2\*</sup><sup>1</sup>Department of Physical Medicine and Rehabilitation, University of Montreal Health Center, Montreal, Canada,<sup>2</sup>Department of Physical Medicine and Rehabilitation, National Taiwan University Hospital, College of Medicine, National Taiwan University, Taipei, Taiwan

## Abstract

Arterial pseudoaneurysms can develop secondary to a vessel injury, for example, an arterial line installation. We present a case of an 18-year-old female with mitochondrial encephalopathy, lactic acidosis, and stroke-like episodes syndrome who developed left radial artery and right brachial artery pseudoaneurysms secondary to arterial line placement and repeated blood draws, respectively. The ultrasonographic features of pulsating mass in connection with an artery and the yin-yang sign, combined with the patient's history, allowed accurate diagnosis. She was referred to vascular surgery for definitive treatment.

**Keywords:** Pseudoaneurysm, radial artery, yin-yang sign

## INTRODUCTION

Arterial pseudoaneurysms, also referred to as false aneurysms, can develop secondary to a vessel injury, sometimes an iatrogenic complication of arterial catheterization or arterial blood draw.<sup>[1]</sup> It is not a true aneurysm, in that its wall is not composed of the arterial wall three layers but only the outermost two, as the blood gets trapped between the tunica media and the tunica adventitia.<sup>[2]</sup>

## CASE REPORT

This is a case of an 18-year-old female with a medical history of IgM nephropathy with resultant end-stage renal disease undergoing regular peritoneal dialysis for the past 2 years. She presented to the emergency department with visual hallucinations and intermittent jerky movements of her distal limbs and trunks and was hospitalized due to her worsening neurological condition.

After serial workups on the neurology ward, mitochondrial gene analysis revealed that she had mitochondrial encephalopathy, lactic acidosis, and stroke-like episodes (MELAS) syndrome.

During hospitalization, she was transferred to the intensive care unit (ICU) because of deteriorating heart function and she received medications for acute decompensated heart failure. Repeated needling for blood tests was performed on bilateral elbow and hand areas, as well as arterial line placement for ICU monitoring in the left radial artery at the level of the wrist.

After discharge, two tender pigeon egg-sized nodules developed on the left wrist and right cubital fossa [Figure 1]. The nodules enlarged gradually over a 1-month period, so she sought medical attention and was referred to the physical medicine and rehabilitation department for a musculoskeletal ultrasound (MSKUS). Prescanning physical findings showed that there was pulsation in the two nodules. MSKUS findings revealed one pseudoaneurysm of the left radial artery at the wrist, measuring approximately 1.5 cm × 1.5 cm × 1.0 cm [Figures 2-4 and Video 1], and another one of the right brachial artery at the cubital fossa,

**Address for correspondence:** Dr. Tyng-Guey Wang,  
Department of Physical Medicine and Rehabilitation, National  
Taiwan University Hospital and National Taiwan University College of  
Medicine, Taipei, Taiwan.  
E-mail: tgw@ntu.edu.tw

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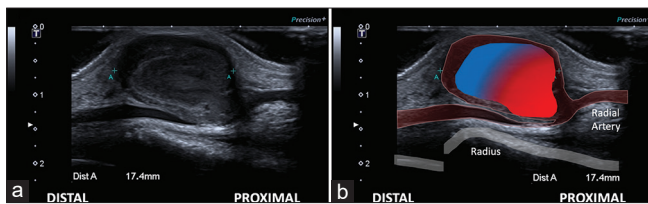
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**Figure 1:** A picture showing the patient's both elbows extended, and forearms supinated. The continuous arrow points to the large left radial pseudoaneurysm and the dashed arrow points to the smaller right brachial artery pseudoaneurysm



**Figure 3:** An ultrasound image of the pseudoaneurysm measuring up to 17 mm in the longitudinal axis, without Doppler is shown (a), as well as its schematic representation (b). The stalk of the pseudoaneurysm measured 10 mm

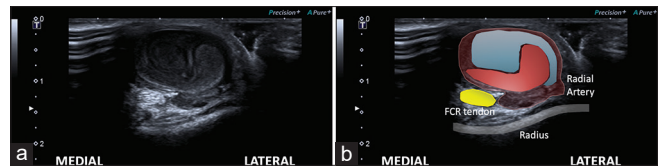
measuring approximately 1.0 cm × 1.0 cm × 1.0 cm, without active blood flow, suggesting complete thrombus formation within the pseudoaneurysm.

She was referred to a vascular surgeon and excision was scheduled. A video case of her left radial artery pseudoaneurysm is presented with this article [Video 1].

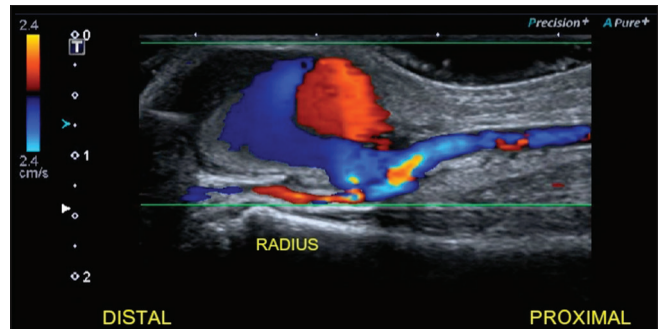
## DISCUSSION

A pseudoaneurysm, sometimes referred to as a traumatic aneurysm, is the consequence of a tear in the arterial wall with ensuing hemorrhage contained by a thin-walled capsule, which explains why it tends to expand rapidly. It does not contain all three layers of a true aneurysm (intima, media, and adventitia) but only the two outermost ones (media and adventitia).<sup>[3]</sup> Management can include early compression, US-guided thrombin injection, or surgical excision.<sup>[4]</sup>

On Doppler ultrasound, one can appreciate the typical bidirectional flow caused by swirling of blood, referred to as the yin-yang sign [Video 1]. Although this can be seen both in true and pseudoaneurysms, it is helpful in distinguishing them from other vascular masses such as angiomyolipomas.<sup>[5]</sup>



**Figure 2:** An ultrasound image of the pseudoaneurysm in transverse axis without Doppler is shown (a), as well as its schematic representation (b). FCR: Flexor carpi radialis



**Figure 4:** An ultrasound image of the pseudoaneurysm in the longitudinal axis with color Doppler, showing the typical yin-yang sign

The incidence of radial pseudoaneurysm following arterial line placement has been studied in a retrospective chart study of 12,500 patients, and the rate was only 0.048%.<sup>[6]</sup>

Even though mitochondrial arteriopathy has been recognized as a pathological entity,<sup>[7]</sup> there is no clear association in the literature between MELAS syndrome and pseudoaneurysms, as only one other case report has been published (carotid pseudoaneurysm).<sup>[8]</sup>

## CONCLUSION

Although physical medicine and rehabilitation specialists are not the ones managing these types of vascular masses, they might encounter them in rehabilitation patients who have had arterial lines while in the ICU or with patients referred for MSKUS in the context of a wrist mass.

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## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published

and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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