



Case report

Dorsalis pedis artery pseudoaneurysm: A rare entity in the field of vascular surgery

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ABSTRACT

Introduction: Dorsalis pedis artery aneurysms (PDAA) and pseudoaneurysms are rare conditions of lower limb vasculature. The rarity of the disease increases in the pediatric age group where only 4 cases of pediatric patients with PDAA.

Presentation of the case: We present A case of a 2-year-old baby girl who was diagnosed with dorsalis pedis pseudoaneurysm, which was treated successfully with pseudoaneurysm dissection and anastomosis.

Clinical discussion: The dorsalis pedis pseudoaneurysm in this case has a rare anatomical location in addition to the unusual onset at this age group. Due to the rarity of this condition among all age groups, there is not a well-structured approach.

Conclusion: DPAA/pseudoaneurysm is a rare entity in the field of vascular surgery. Medical treatment is not suitable for DPAA/pseudoaneurysm to avoid the future risk of thrombosis or ischemia. The surgical approach is the Mainstay of treatment.

1. Introduction

Dorsalis pedis artery aneurysms (PDAA) and pseudoaneurysms are rare conditions of lower limb vasculature [1–4]. This condition is even extremely rare in the pediatric age group, only four cases have been reported in the literature [5–8]. In this case a two years old baby girl has presented with pulsating swelling in the right dorsal surface of the right foot with no other significant history.

This case report has been written in line with the SCARE criteria [9].

2. Case presentation

A 2-year-old baby girl medically free, a full-term baby delivered with spontaneous vaginal delivery with normal developmental milestones to her age. No history of genetic abnormalities. The patient presented to the Emergency Department with swelling in the dorsal surface of her right foot. This swelling has been noticed by the mother to grow in the size over the past three months before her presentation. However, the patient didn't experience any symptoms in association with the

swelling. The patient is known to be COVID-19 positive one month before her presentation. Her remaining clinical and family history was unremarkable. Upon physical examination generally patient was stable. The local examination of the right lower limb revealed a right foot pulsatile non-tender and compressible mass that measured 2.0×1.3 cm that was felt over the dorsalis pedis artery Fig. 1. The tibial pulse was palpable. A normal capillary refill time of three seconds in the foot. A right foot lateral view X-ray was obtained and indicated an oval-shaped mass in the dorsal surface without any evidence of fractures Fig. 2. In addition to the X-ray a Doppler Ultrasound of the right lower limb was done that demonstrated an oval-shaped dorsalis pedis artery pseudoaneurysm measuring 2.4×0.67 cm which demonstrated a mural thrombosis, with patent anterior and posterior tibialis arteries Fig. 3. Under general anesthesia, the patient underwent Exploratory surgery of the right dorsalis pedis artery aneurysm. A 4 cm vertical skin incision was made above the aneurysm, the incision was extended through the subcutaneous and deep fascia of the ankle until we reached the aneurysm with proper visualization Fig. 4. The vessel loops were applied proximal and distal to control the dorsalis pedis artery bleeding. Lastly,

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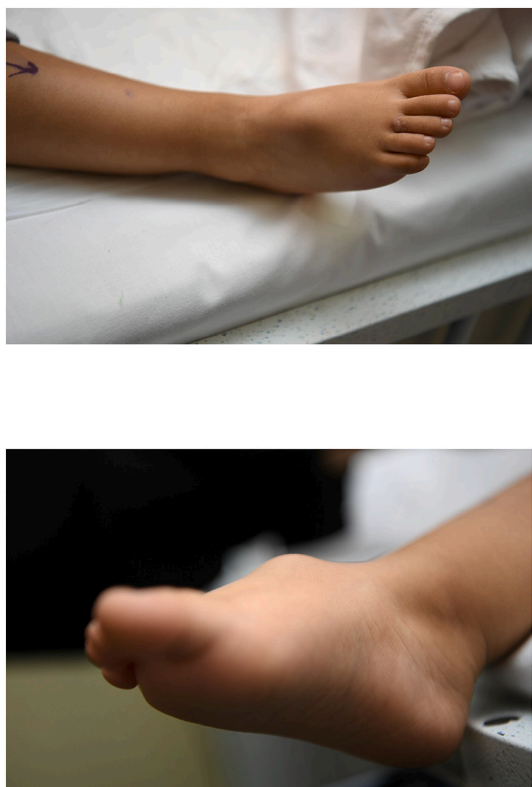


Fig. 1. Local examination of the right foot revealed a pulsatile non-tender and compressible mass that measures 2.0 × 1.3 cm was felt over the dorsalis pedis artery.

artery was closed. After the closure, the foot was warm with a good capillary refill. Ten minutes after the clamping pulse oximetry was measured using the big toe that indicated 100% oxygen saturation. Dissection around the aneurysm was completed. The aneurysm was excised completely. The anastomosis was done under tension. All toes were tested, and they didn't reveal any signs of ischemia. Pulse oximetry 15 min after the dorsalis pedis clamping showed 100% oxygen saturation. Proximal and distal ligation was done using 3–0 silk sutures. The proximal artery was transfixed using 7–0 Prolene sutures. A 3–0 Vicryl sutures were used to close the subcutaneous tissue. The skin was reapproximated. The patient tolerated the procedure pretty well with no reported complications. Post-operative course the patient was doing fine, and walking normally. Upon post-operative examination posterior tibial artery was palpable. Post-operative Doppler Ultrasound was done, and it was triphasic. The patient was discharged day two post-operative. A two weeks later the patient was followed up in the clinic, patient showed complete recovery with no active issues. X-ray of the right foot obtained and has shown complete resolution of previously oval-shaped mass Fig. 5. The histopathological studies of the resected segment of the right dorsalis pedis artery reported a thrombus formation and disrupted vascular wall with blood collection within the arterial layers compatible with the clinical diagnosis of pseudoaneurysm Fig. 6.

3. Clinical discussion

Peripheral arteries aneurysm in the extremities is a rare entity [10]. It occurs more often in the popliteal artery (70%), femoral artery (20%), and (10%) of aneurysms present in other different locations [10]. The vast majority of Dorsalis pedis artery pseudoaneurysms are caused by traumatic injury, either acute trauma or repetitive insignificant chronic trauma such as wearing tight shoes, other causes include multiple iatrogenic procedures [1,2,4,5,10–14]. In addition to collagenopathies and bacterial embolization, however, no single pediatric case of DPA pseudoaneurysm has been reported as a result of one of these two causes. The usual clinical presentation of DPAA is occasionally painful pulsating



Fig. 2. A lateral view Right foot X-ray was obtained and indicated an ovalshaped mass in the dorsal surface of the right foot without any evidence of fractures.

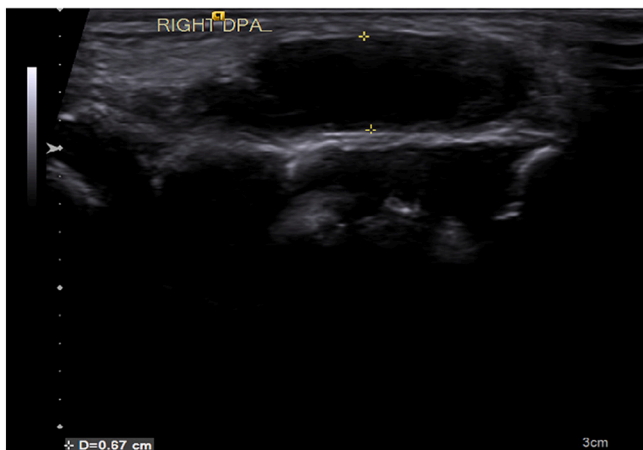
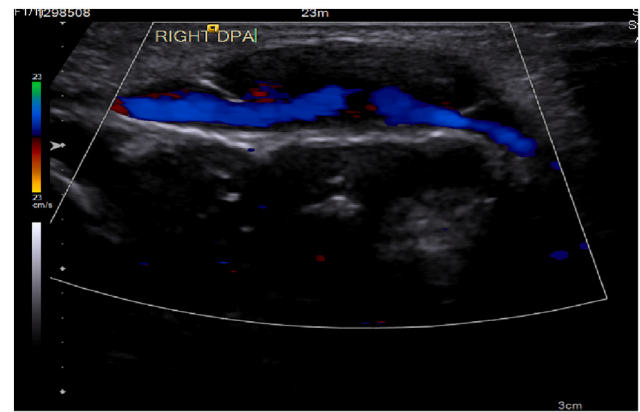
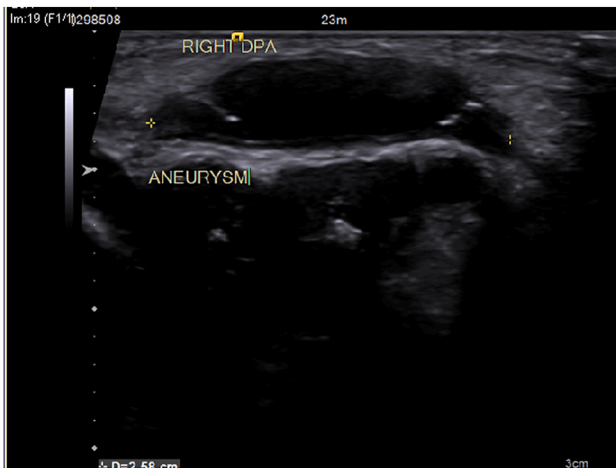


Fig. 3. Doppler Ultrasound of the right lower limb showed oval-shaped dorsalis pedis artery pseudo-aneurysm measuring about 2.4×0.67 cm which demonstrates mural thrombosis, with patent anterior and posterior tibialis arteries.

mass in the dorsum of the foot in contrast to the adult presentation, which is usually painless associated with itching, paresthesia, and discomfort [1,2,4,5,10,13–15]. More serious presentation such as rupture and limb ischemia has been reported. It has a higher incidence in males with a percentage of 63%, and the mean age of onset is fifty-five years old [14]. In contrast to the patient in our case who was a two-year-old baby girl. Due to the rarity of the disease, there is not a well-structured approach algorithm [4]. Doppler Ultrasonography and arterial duplex are the first-line diagnostic modality to be used in cases of DPAA [1,2,4,5,11,12–15]. It is considered the modality of choice because ultrasound is a noninvasive modality, cost-effective, and doesn't require using contrast [1,2,4]. In addition to that, ultrasonography can localize DPAA accurately and identify the presence of mural thrombus [4]. Other imaging modalities have been considered in doubtful cases such as Computed Tomography Angiogram (CTA), and Magnetic Resonance Imaging (MRI) [1,2,4,11–13].

DPAA treatment is surgical [1–8,10–15]. The surgical approach to DPAA depends on the competency of perfusion of the forefoot [1,2,4–6,10–15]. If the forefoot and the toes are sufficiently perfused with intact posterior tibial artery, the ligation with or without simple resection will be the surgical approach of choice [1,2,4–6,10–15].

Fig. 4. Intra-operative image of DPA aneurysm, a 4 cm vertical skin incision.

In cases with insufficient perfusion or occlusion vascular reconstruction of the dorsalis pedis artery is the satisfactory surgical approach [1,2,4–6,10–15]. In our case patient has adequate perfusion to the forefoot and the only intervention was done is ligation.

4. Conclusion

DPAA/pseudoaneurysm is a rare entity in the field of vascular surgery [1–8,10–15]. The mean age of onset is fifty-five years old. Although, our case is the fifth reported case of a pediatric patient presenting with DPA pseudoaneurysm [5–8,14]. Medical treatment is inapplicable for DPAA/pseudoaneurysm to avoid the future risk of thrombosis or ischemia [1]. The surgical approach is the Mainstay of treatment. The choice of surgical intervention depends on the perfusion adequacy to the forefoot and the toes from the posterior tibial artery [1,2,4–6,10–15].

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Ethical approval

Approval to publish this case report was waived by the institution.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.



Fig. 5. Post-operative right foot X-ray demonstrated a complete resolution of previously oval shaped mass.

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Mohammed Dahman MD: Critical revision of the article.
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Fig. 6. Histopathological studies of the resected segment of the Right DPA. Indicated thrombus formation and disrupted vascular wall with blood collection within the arterial layers compatible with clinical diagnosis of pseudoaneurysm.

and implementation of the research, data collection.

Abdulaziz A. Howil MD: Data collection, and Editing.

Abdullah M. Alsultan MD: Writing, Editing, Data Collection.

Meshare A. albattah MD: Finalized the manuscript.

Nahar Alenazi MD: Treating physician, Critical revision of the article, and drafting the article.

Declaration of competing interest

Authors have no conflict.

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