

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: <http://Elsevier.com/locate/radcr>

Sonography

Spectral Doppler findings in a rare case of acute compartment syndrome following leg burn

Omer A. Mahmoud^a, Mustafa Z. Mahmoud^{b,*}

^a Medical Ultrasound Imaging Department, Dr. Mohamed Abdel Mageed Ali Medical Complex, Alnohood, Sudan

^b Radiology and Medical Imaging Department, College of Applied Medical Sciences, Prince Sattam bin Abdulaziz University, P.O. Box 422, Al-Kharj 11942, Saudi Arabia

ARTICLE INFO

Article history:

Received 26 October 2017

Accepted 4 January 2018

Available online 3 February 2018

Keywords:

Compartment syndrome
Spectral Doppler

ABSTRACT

Acute compartment syndrome (ACS) is an orthopedic emergency condition, which is rarely attributed to burns. It occurs when pressure in an enclosed space rises to a point where it reduces blood flow and impairs tissue perfusion. Its consequences often lead to ischemia and possible necrosis within that space. Until now, the use of Doppler assessment to explore different types of compartment syndrome has yielded contradictory findings. Here, we present a significant increase of blood flow velocity in the arteries proximal to the burned area. Thus, the combination of Duplex ultrasound results with clinical findings will help vascular surgeons to make immediate decision to perform fasciotomy.

© 2018 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

The acute compartment syndrome (ACS) is an orthopedic emergency condition, which occurs when pressure in an enclosed space rises to a point where it reduces blood flow and impairs tissue perfusion. Its consequences often lead to ischemia and possible necrosis within that space [1–3]. It is most common in the anterior and deep posterior compartments of the leg and the volar compartment of the forearm. However, it can occur anywhere in the body where an osseofascial compartment is present, including the hand, arm, foot, thigh, buttock, and abdomen [4]. The most common causes of ACS include limb trauma, arterial injury, soft tissue injury without fracture, limb compression, ischemia, poor positioning for prolonged surgical procedures, and burns [5,6]. In addition, other causes of acute

incidence of compartment syndrome include minimal trauma to the upper arm and after instrumentation or procedures such as prolonged compression from a tourniquet, arterial access devices, and venipuncture [7].

Clinical suspicion of ACS warrants a prompt surgical consultation and fasciotomy to prove limb-saving [3]. Delayed treatment can result in several complications such as nerve damage, muscle contracture, muscle weakness, and sensory changes. Thus, awareness of these complications of the syndrome may reduce delays in diagnosis [8]. The diagnosis of ACS often uses a combination of clinical signs and continuous monitoring of compartment pressure, thus allowing early diagnosis and minimization of complications [5,9,10].

To our knowledge, no previous study has investigated the use of spectral Doppler to study hemodynamics of arterial flow responses to ACS. The hypothesis that the artery proximal to

* Corresponding author.

E-mail address: m.alhassen@psau.edu.sa (M.Z. Mahmoud).

<https://doi.org/10.1016/j.radcr.2018.01.006>

1930-0433/© 2018 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

the injured limb would reflect the intracompartment pressure modifications suggests a strong correlation between Doppler velocities and acute pressure increments in the lower limb. In this case report, we observed abnormal pulsed Doppler flow velocities in the popliteal artery and tibioperoneal trunk, proximal to a third-degree burned right leg in a patient diagnosed with ACS.

Case report

A 35-year-old previously fit and healthy man had leg burn injuries in a tribal violence. He was admitted to our medical center 2 hours after burns. The burns were located in his right leg, mainly in its anterior compartment. Upon admission, routine physical examination revealed the following: heart rate of 75 beats per minute, respiratory rate of 22 breaths/min, blood pressure of 127/90 mm Hg, and body temperature of 37.2°C. In addition, the arterial blood gas analysis of the patients' toes demonstrates arterial oxygen saturation (SaO₂) of 97%. The wounds were cleansed and dressed with silver sulfadiazine cream to avoid contamination, besides absorbing the exudates, and to keep the level of moisture adequate for healing. Resuction through the indwelling and intravenous catheters started immediately after the physical examination. An amount of 6500 mL of fluid was administrated intravenously in 24 hours. Urine output of the patient was about 2100 mL. The burns on

his right leg were of third-degree burns, which presents a positive evidence of dermal vasculature coagulation. Although these wounds were with deep partial thickness, escharotomies were not performed because there were no edema and alteration of the distal blood circulation of the affected leg.

On the following day of admission, the patient starts to complain of increasing severity of pain, extensive swelling in the right calf with altered sensation on its back compared with the other one; difficulty in walking; and numbness in the sole of his right foot. Findings on clinical examination were tense and tenderness of right calf, no neurovascular deficit, a 7-cm increase in right calf circumference compared to the left one, and positive pain noticed in ankle joint passive dorsiflexion. Spectral Doppler scans for the right limb vessels showed no evidence of deep vein thrombosis, but a significant increase of blood flow velocity in the arteries proximal to the area of the burn was noted, especially in the popliteal artery (Fig. 1) and the tibioperoneal trunk (Fig. 2) with a peak systolic velocity (PSV) of 80 and 90 cm/s, respectively. Consequently, the Stryker intracompartmental pressure (ICP) monitor (Stryker India Pvt. Ltd., Chennai, Tamil Nadu, India) confirmed the diagnosis of ACS, which revealed a compartment pressure of 65 mm Hg. Furthermore, laboratory investigation revealed an increase in creatinine kinase (CK) titer up to 2735 U/L (normal range of 38-174 U/L), whereas others such as blood urea nitrogen, calcium, potassium, sodium, sodium bicarbonate (HCO₃), glucose, chloride, and serum lactic acid were in their normal ranges.

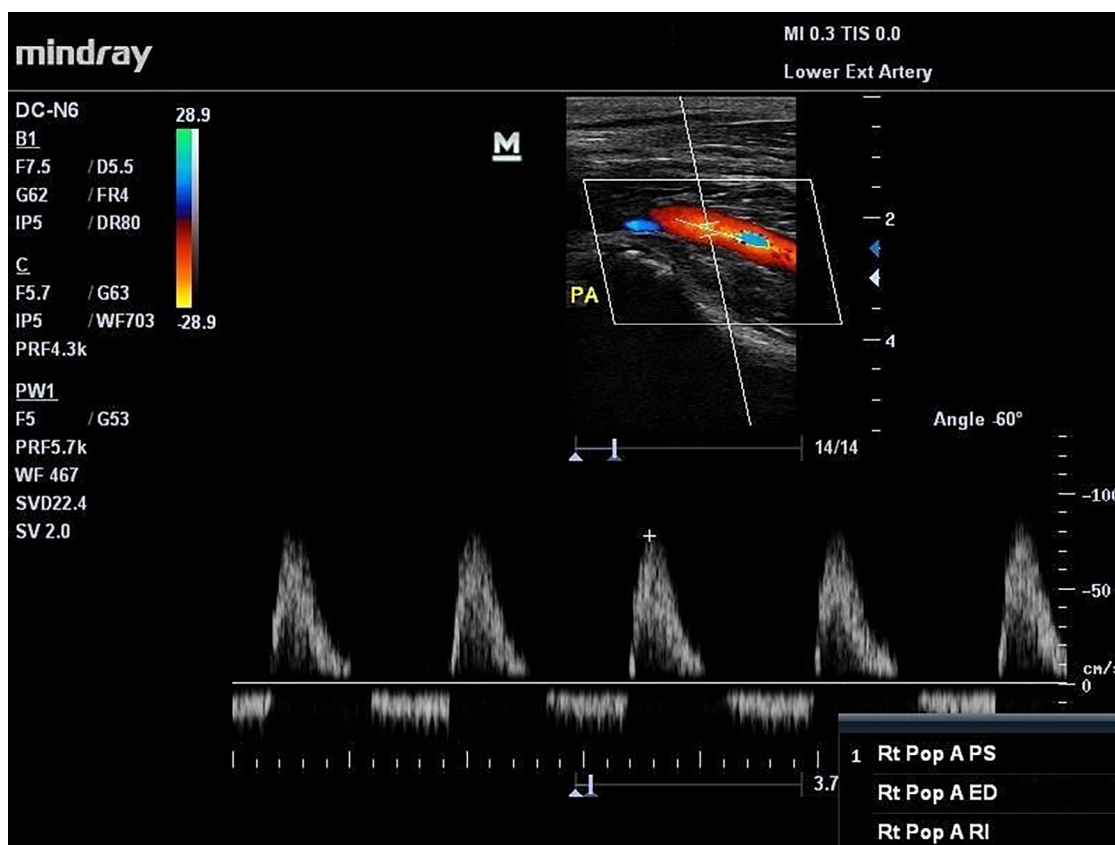


Fig. 1 – Right popliteal artery (PA) presents increased blood flow velocity (PSV = 80 cm/s) with features of spectral broadening and absence of the triphasic high-resistance waveform pattern. PSV, peak systolic velocity.

Download English Version:

<https://daneshyari.com/en/article/8825139>

Download Persian Version:

<https://daneshyari.com/article/8825139>

[Daneshyari.com](https://daneshyari.com)