



African Federation for Emergency Medicine
African Journal of Emergency Medicine

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Emergency ultrasound clinches unusual diagnosis in a case of suspected pulmonary embolism



Une échographie d'urgence conclut à un diagnostic inhabituel dans un cas de suspicion d'embolie pulmonaire

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Received 15 August 2014; revised 23 September 2014; accepted 23 September 2014; available online 11 December 2014

Introduction: Emergency point of care ultrasound is an essential skill for clinicians involved in the emergency care of adults and children. Occasionally, unusual or unexpected findings are made with ultrasound.

Case report: We present a case where emergency point of care ultrasound altered the diagnosis of a suspected pulmonary embolism in a 25 year old female.

Conclusion: The use of point of care ultrasound has expanded greatly in the recent past, with numerous different applications now recognised as potential adjuncts in patient diagnosis and management. The literature is replete with cases of unexpected findings.

Introduction: Une échographie au point de service d'urgence est une compétence essentielle pour les cliniciens impliqués dans les soins d'urgence auprès des adultes et des enfants. Parfois, l'échographie donne des résultats inhabituels ou inattendus.

Rapport de cas: Nous présentons une femme de 25 ans, avec un antécédent de trois mois de dyspnée d'effort, une douleur à la poitrine et un malaise général, chez qui une embolie pulmonaire a été diagnostiquée à l'échographie.

Conclusion: L'utilisation de l'échographie au point de service a considérablement augmenté ces derniers temps, avec de nombreuses applications différentes maintenant reconnues comme des auxiliaires potentiels dans le diagnostic et la gestion des patients. La littérature décrit de façon abondante des cas de résultats inattendus.

African relevance

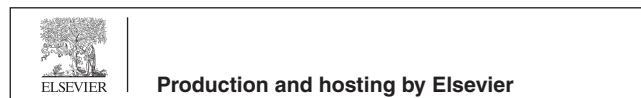
- Emergency point of care ultrasonography (EPCUS) is an attractive option in resource constrained settings, given that it is non-invasive, repeatable, and with inexpensive consumables.
- Clinicians working in Emergency Centres in Africa should develop basic skills in EPCUS whenever the opportunity is available to them.
- Basic ultrasound equipment is becoming more affordable and, as seen in this case presentation, can contribute significantly to solving diagnostic dilemmas.

Introduction

Emergency point of care ultrasound (EPCUS) is an essential skill for clinicians involved in the emergency care of adults and children.¹ The accepted definition of EPCUS is “a diagnostic or procedural guidance ultrasound that is performed by a clinician during a patient encounter to help guide the evaluation and management of the patient.”² It has become a valuable tool for EM clinicians not only as an adjunct to resuscitative efforts but also in more routine case diagnosis and management. EPCUS should be a limited, goal directed examination with the goal to answer a specific binary (yes/no) question. It does not replace formal ultrasonography conducted by radiologists. Occasionally, as in this case as well as others described in literature,³ unusual or unexpected findings are made with ultrasound. Such findings can be very helpful, but appropriate steps should be taken to further clarify the unexpected pathology. This case illustrates how EPCUS can add value to bedside consultation with the potential for early, accurate, and independent diagnosis in the emergency centre (EC).

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Peer review under responsibility of African Federation for Emergency Medicine.



Case report

A 25 year old female with a three month history of exertional dyspnoea, chest pain, and general malaise presented to our EC. She had been examined and treated by several general health practitioners over this three month period but her symptoms persisted. During initial history taking, the patient denied any medical conditions or recent surgeries. Clinically, she appeared apathetic and was mildly tachypnoeic. The rest of her vital data, including pulse oximetry, were within normal limits. ECG demonstrated a right ventricular strain pattern with right axis deviation. Respiratory examination was normal except for mild tachypnoea.

Despite having a low pretest probability, a pulmonary embolism was suspected due to the clinical and ECG findings. An ultrasound DVT assessment, performed in the EC, showed no signs of a lower limb DVT. A focused cardiac ultrasound was then conducted looking for signs of right atrial or ventricular dilatation. Unexpectedly a hyperechoic foreign body was seen in the right atrium on the subxiphoid view of the heart (Fig. 1). Further views showed what appeared to be an endovascular stent lodged in the IVC and extending into the right atrium (Fig. 2). A chest X-ray confirmed the ultrasound findings (Fig. 3).

The patient was questioned specifically about previous vascular procedures. It was only then that she recalled seeing a vascular surgeon a few years earlier. She reported, “because she had Turner syndrome she had a procedure performed due to an obstructed vein in her groin”. As this information and clinical findings were not in keeping with Turner syndrome, her previous surgical notes were requested. These notes indicated that in fact she had May–Thurner (MTS) or iliac vein compression syndrome. This syndrome was suspected following a Caesarean section, during which large varicosities were observed on her pelvic organs. The patient had been asymptomatic. Subsequent radiological investigations confirmed the diagnosis. Management included percutaneous endovascular stenting of the left external iliac vein early in 2011.

Detailed echocardiography, performed by an expert cardiologist, confirmed the presence of an endovascular stent

lodged in her right atrium. This was further complicated by a large, loosely attached thrombus at the end of the stent. Features of right atrial and ventricle dilatation as well as raised pulmonary artery pressures were also noted. Anticoagulation was commenced and the stent was subsequently removed via sternotomy and atriotomy. The patient’s post-operative course was uneventful and she was discharged 19 days later.

Discussion

This case demonstrates the utility of EPCUS in diagnosing and managing the undifferentiated patient presenting to the EC. The use of EPCUS has expanded greatly in the recent past, with numerous different applications now recognised as potential adjuncts in patient diagnosis and management. The literature is replete with cases of unexpected findings seen on EPCUS.^{3,4}

With a wide range of clinicians using ultrasound it is of utmost importance that they are aware of its limitations, especially when encountering unusual findings. Appropriate consultation or additional investigations should be requested in these instances.

Virchow, in 1851, suggested the increased incidence of DVT in the left compared to the right leg was due to venous compression. In this anomaly the right common iliac artery (RCIA) compresses the left common iliac vein (LCIV) as it passes anterior to it.⁶ Cadaver studies reported this finding in 19–29% of the samples studied.⁷ The most cited study was published in 1957 by May and Thurner, which led to the naming of the syndrome. Twenty two percent of their adult subjects had vascular thickening of the left iliofemoral venous wall at the point where the RCIA intersected the LCIV.⁸ May–Thurner syndrome occurs in approximately 2–5% of all patients being evaluated for chronic lower limb insufficiency syndromes.⁵ The clinical manifestation of MTS is most often chronic venous insufficiency in young to middle aged women. It should also be considered in patients presenting with recurrent left lower limb DVTs.

Neither ultrasonography nor computed tomography is sensitive or specific enough to make a definite diagnosis of

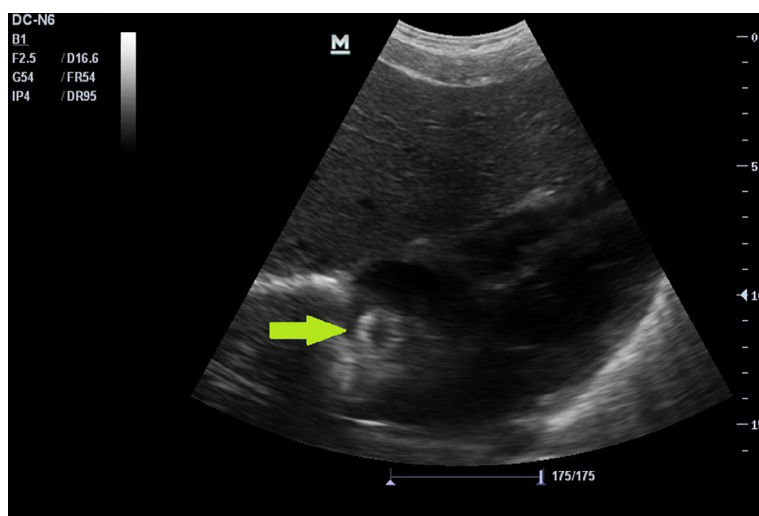


Figure 1 Subxiphoid view of the heart with round hyperechoic foreign body in the right atrium.

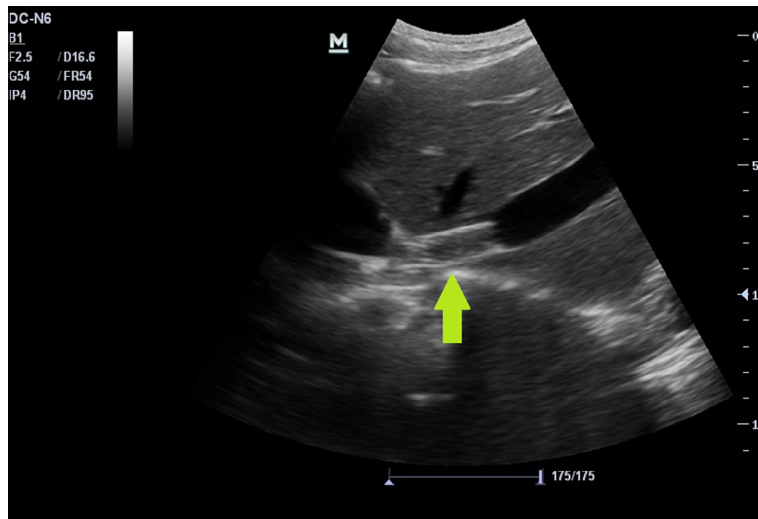


Figure 2 Subcostal longitudinal view of IVC with endovascular stent lodged in IVC at entrance to the right atrium.

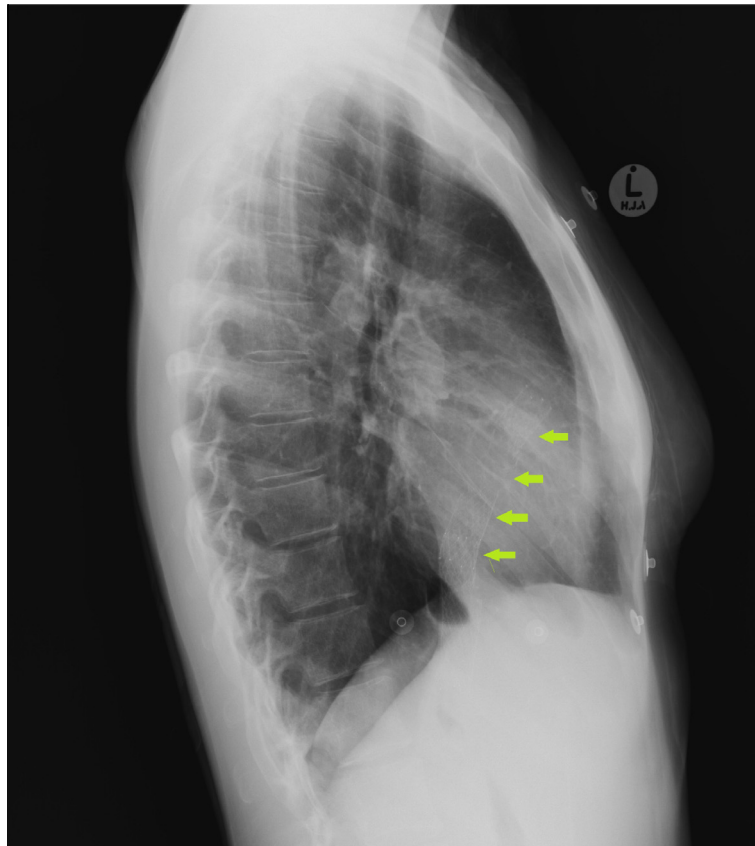


Figure 3 Lateral chest radiograph showing endovascular stent extending into the right atrium.

MTS. The diagnostic gold standard is magnetic resonance angiography (MRA).⁹ Currently, percutaneous endovascular management is the treatment of choice for MTS. The highest risk for stent migration is within the first 48 post-operative hours, prior to the stent becoming integrated within the vein. However, long-term analysis of lower limb venous stenting

seems to show low morbidity and mortality, high long-term patency rates, and low restenosis rates.¹⁰

A Medline and Pubmed search was conducted to find similar previously published case reports. According to our search only one previous case of stent migration in MTS was published by Mullens et al. in 2006.¹¹ They reported on a 55 year

old female with known MTS who presented with progressive dyspnoea, fatigue, and new onset atrial fibrillation. She had undergone iliac vein stenting one year earlier. Diagnosis of stent migration was made with transesophageal echocardiography showing two stents in the right ventricle. Our case differs in that our patient was unsure of her underlying medical condition, had presenting features suggestive of a pulmonary embolism, and was diagnosed using transthoracic ultrasonography.

Conclusion

EPCUS is an essential tool for clinicians working in an EC. It allows the clinician to make accurate and time saving decisions in the diagnosis and management of undifferentiated patients. Filly lamented that “*ultrasound (sonography) is the stethoscope of the future.*” He felt that the proliferation of ultrasonography use in untrained hands would be detrimental to patient care. In his editorial in *Radiology* 1988 he implored the powers that be to incorporate this technology into medical education and thus ensure proper training, because otherwise “*diagnostic US will indeed be the new stethoscope: used by many, understood by few.*”¹²

This case report illustrates that EPCUS, when used correctly as an adjunct to good history and clinical examination, is a valuable tool in the EC. Our patient was diagnosed within minutes of arriving in the EC despite having an unusual and unexpected cause for her presentation. This led to prompt referral and correct treatment, which is what all patients (and EC clinicians) ultimately seek.

Conflict of interest

The authors declare no conflict of interest.

References

1. Reardon R, Heegaard B, Plummer D, et al. Ultrasound is a necessary skill for emergency physicians. *Acad Emerg Med* 2006;**13**(3):334–6.
2. Jehle D. Emergency department sonography by emergency physicians. *Am J Emerg Med* 1989;**7**:605–11.
3. Volpicelli G, Mussa A, Frascisco MF. Sonographic diagnosis of pulmonary embolism with cardiac arrest without major dilation of the right ventricle or direct sign of lower limb venous thrombosis. *J Clin Ultrasound* 2012;**40**:529–33.
4. Shiver S, Lyon M. Challenging ultrasound diagnoses. *TOEMJ* 2010;**3**:27–31.
5. Brazeau NF, Harvey HB, Pinto EG, et al. May–Thurner syndrome: diagnosis and management. *Vasa* 2013;**42**:96–105.
6. McMurrich JP. The occurrence of congenital adhesions in the common iliac veins, and their relation to thrombosis of the femoral and iliac veins. *Am J Med Sci* 1908;**135**:342–6.
7. Ehrich WE, Krumbhaar EB. A frequent obstructive anomaly of the mouth of the left common iliac vein. *Am Heart J* 1943;**26**:18–31.
8. May R, Thurner J. The cause of the predominantly sinistral occurrence of thrombosis of the pelvic veins. *Angiology* 1957;**8**:419–27.
9. Gurel K, Gurel S, Karavas E, et al. Direct contrast-enhanced MR venography in the diagnosis of May–Thurner syndrome. *Eur J Radiol* 2011;**80**:533–6.
10. Neglén P, Hollis KC, Olivier J, et al. Stenting of the venous outflow in chronic venous disease: long-term stent-related outcome, clinical and hemodynamic result. *J Vasc Surg* 2007;**49**:979–90.
11. Mullens W, De Keyser J, Van Dorpe A, et al. Migration of two venous stents into the right ventricle in a patient with May–Thurner syndrome. *Int J Cardiol* 2006;**110**:114–5.
12. Filly RA. Ultrasound: the stethoscope of the future, alas. *Radiology* 1988;**167**:400.