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MedJEM

Case Report

# The Challenge Of Unilateral Leg Swelling In The Emergency Department

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## ABSTRACT

Unilateral calf swelling can pose a diagnostic challenge in the Emergency Department. There are several differential diagnoses for this presentation, and the management of one may be a contraindication for another. Point-of-care-ultrasound (POCUS) can be used to identify the aetiology and guide management with confidence. We present a case of an elderly patient with unilateral leg swelling in which DVT was initially suspected. However, POCUS demonstrated a ruptured Baker's cyst with associated calf haematoma. The use of POCUS by emergency physicians can avoid the consequences of unnecessary or harmful treatment and missed diagnosis of venous thromboembolic disease.

**Keywords:** bleeding; ECMO, massive pulmonary embolism, resuscitation, thrombolytic therapy

## INTRODUCTION

Deep Vein Thrombosis (DVT) is common, with an incidence of 100-200 per 100,000. Around 2.5-5% of the population will be affected at some point in their lifetime.[1] Up to 50% of DVT patients will suffer long-term consequences, including chronic pain, pigmentation or ulceration.[1] Identifying the aetiology of unilateral calf swelling, in the absence of significant trauma, can be difficult, as history and physical examination findings are often non-specific.

## CASE PRESENTATION

A 90-year-old female presented to the Emergency Department with a three-day history of non-traumatic swelling in the left foot. This was on a background of atrial fibrillation and ischaemic heart disease. She had once-daily carers and mobilised with a walker. On examination, there was swelling with a large ecchymosis from the lower left ankle to the dorsum of the left foot (Figure 1). The leg was warm and well perfused, with normal sensation and power. Bilateral dorsalis pedis pulses were palpable. No abnormal findings were seen in other limbs. Initial blood tests showed a D-Dimer of 1576 mg/dl, leading to a working diagnosis of DVT. Subsequent POCUS was performed in the ED with a high frequency (7-12 MHz) linear array transducer (Figure 2). Femoral and popliteal veins were compressible, with no signs of DVT. However, an anechoic well-demarcated cystic area was visualised in the popliteal fossa, with a large haematoma in the left calf.

Initially, Dalteparin had been prescribed, however, due to the point-of-care-ultrasound (POCUS) findings, it was immediately stopped. The patient was subsequently admitted to the Medical Ward. A formal Doppler ultrasound was requested; femoral and popliteal arteries were identified, which were of normal dimensions carrying triphasic signals. A large haematoma was visualised within the posterior/ medial calf originating from the posterior knee joint extending through to mid-lower calf. Within the popliteal fossa, a ruptured Baker's cyst was identified.

The initial suspicion in the emergency department was calf DVT. The differential diagnosis included ankle sprain/fracture, which was ruled out with a normal X-ray and no history of recent trauma. Examination of the leg and a clear history of the patient ruled out cellulitis (fever, skin demarcation) and arterial insufficiency (pallor of the leg, absent

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**Figure 1** An extended photo of the left medial malleolus with the crescent sign (white arrows)

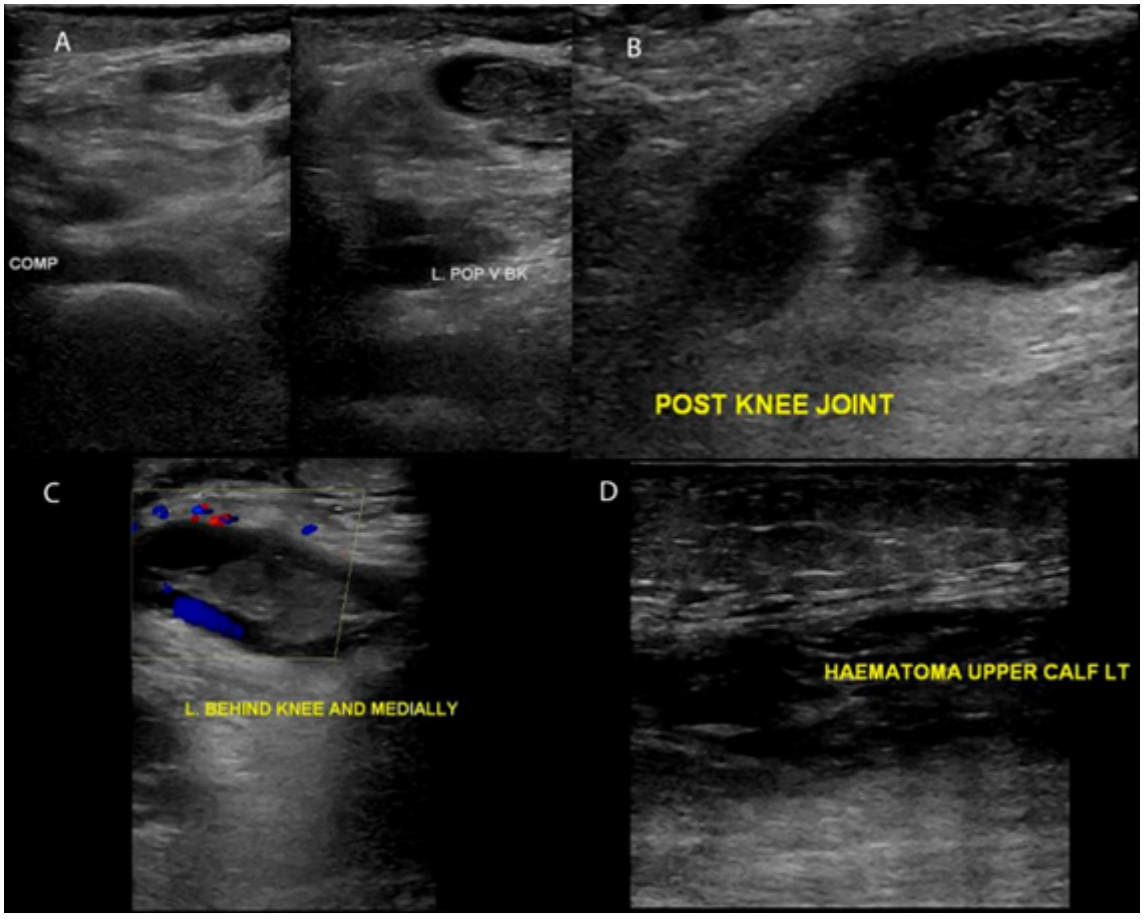


**Figure 2** POCUS showing (A) compressible femoral and popliteal veins without signs of DVT; (B & C) musculoskeletal POCUS shows an anechoid well limited cystic in the popliteal fossa; (D) musculoskeletal POCUS of the left calf showed a large haematoma in the left leg (D)

pulses, sensory changes). POCUS excluded a DVT and revealed the cause to be a ruptured Baker's cyst with calf haematoma.

During admission in the medical ward, subsequent blood tests found iron deficiency anaemia, Iron 4.0, TIBC 65, Transferrin sats 6. She had an iron infusion on day three of admission, and on discharge, the Hb was 9.0. The patient continued to have leg pain, so went on to have a repeat Doppler ultrasound. This demonstrated no evidence of DVT or haematoma progression. The patient had a negative COVID swab. She was seen by the Orthopedic team and was managed conservatively. She was discharged after 7 days in the medical ward with a package of care in place.

## DISCUSSION

In a patient presenting with non-traumatic unilateral calf swelling and tenderness, DVT is often the first consideration. In the UK, these patients are often managed empirically with anticoagulation. This decision-making process is based on a protocol that includes the use of a two-level DVT Wells score and a D-dimer test.

NICE Guidelines recommend that if ultrasound is not available within 4 hours of being requested, then the patient should be administered an interim 24-hour dose of parenteral anticoagulant until the scan is available.[2] This guideline also now supports the use of DOACs as interim anticoagulation pending diagnosis.

As highlighted in the case above, it is important to discriminate between DVT and conditions that can mimic it before empiric anticoagulant.

Over the last decade, there has been increasing interest and enthusiasm in POCUS as an adjunct to traditional examination techniques. However, it currently remains the domain of a relatively small handful of physicians within the UK. There are several reasons for this, notably a lack of training pathways and supervisors. There is also a lack of understanding of the evidence base behind this imaging modality. It is also likely that clinicians' still have confidence in traditional clinical examination, which evidence suggests is often not as robust as once thought.[3,4]

There is a solid and rapidly expanding evidence base for POCUS improving traditional examination techniques in the diagnosis and management of the acutely unwell patient. The increasing availability of ultrasound machines, coupled with an enthusiasm from trainees to learn bedside ultrasound, means that national training committees need to start considering how it can be routinely integrated into medical curricula.

In addition, there needs to be a commitment to support the development of trainers with both time and resources, to ensure adequate training can actually occur. This is as opposed to the ad hoc approach that currently exists, which relies primarily on the goodwill of trainers to deliver training to a select few.

There is excellent evidence that POCUS has high specificity and sensitivity for the examination of the popliteal and femoral veins, by an emergency physician to evaluate patients, with a preliminary diagnosis of DVT. A recent meta-analysis demonstrated that both 2-point and 3-point POCUS techniques showed excellent performance for the diagnosis of DVT. The study recommends that POCUS-trained attending emergency physicians perform the initial 2-point POCUS to effectively and accurately diagnose DVT.[5]

DVT remains a major concern for emergency physicians. Delayed diagnosis and treatment may lead to serious consequences. On the other hand, over-aggressive treatment with empirical anticoagulants can be disastrous to patients with ruptured Baker's cyst or muscle injury. Many Emergency Departments do not have access to formal ultrasound 24 hours a day. This is a void that can and should be filled by emergency physicians who are competent in venous sonography.

This case highlights that the strategy of good clinical risk stratification and the appropriate use of the D-dimer assay are effective in excluding the diagnosis in approximately 40% of patients presenting with possible DVT.

The only way to definitively confirm the diagnosis of DVT is with further investigation in the form of imaging. Starting anticoagulation, without confirmatory imaging, is poor clinical practice.

## CONCLUSION

This case report emphasises the importance of using POCUS, before starting anticoagulation therapy, in patients suspected of having DVT. The use of POCUS can avoid the consequences of both unnecessary treatment and missed diagnosis of venous thromboembolic disease.

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