

The use of ultrasonography in diagnosing ruptured Baker's cyst in the emergency department

在急症室使用超聲波造影術診斷貝克氏囊腫（膝部囊腫）破裂

MF Yeung 楊明晃, KL Chung 鍾健禮, CW Kam 甘澤華

Acute calf pain is a common cause of attendance to the emergency department. Deep vein thrombosis and other differential diagnoses can mimic each other. Emergency ultrasonography can help in making the correct diagnosis. We presented a case with initial clinical presentation suspicious of deep vein thrombosis. However, with the use of emergency ultrasonography, a final diagnosis of ruptured Baker's cyst was made in the emergency department. (*Hong Kong j.emerg.med.* 2006;13:172-174)

急性小腿疼痛是急症室常見求診的原因。深層靜脈血栓與其他鑑別診斷可以很相似，緊急超聲波造影有助作出正確的診斷。我們描述一個案初時臨床上懷疑是深層靜脈血栓的症狀，但其後在急症室使用緊急超聲波造影，最後診斷為貝克氏囊腫破裂。

Keywords: Calf pain, pseudothrombophlebitis, ultrasound

關鍵詞： 小腿疼痛、假血栓靜脈炎、超聲波

Case report

A 70-year-old woman presented to the general outpatient clinic in late September 2005 complaining of sudden onset of left calf pain and swelling for one week. She had a history of 'slip and fall' one month ago, resulting in knee pain and antibiotic therapy in Mainland China for eight days. Deep vein thrombosis (DVT) was suspected and she was referred to the Accident and Emergency Department for further management. Physical examination revealed mild left

calf swelling with tenderness over the left popliteal region. No skin discoloration was detected. Colour duplex sonography of the lower limb venous system was performed, which revealed no evidence of DVT in the left leg.

To further investigate the underlying pathology, musculoskeletal ultrasound examination of the left calf was performed with a high frequency (10 MHz) linear array transducer. A Baker's cyst was found over the left popliteal region. Evidence of rupture was indicated by the pointed configuration of the distal edge and fluid extension to the lower calf with swelling of the subcutaneous space. Tenderness was elicited when probe pressure was applied to the calf (Figures 1-3). Incidentally, a Baker's cyst was also detected on the right side. The right Baker's cyst had a usual round distal edge and showed no evidence of rupture. After further enquiry, the patient mentioned a history of chronic arthritis of both knees.

Correspondence to:

Chung Kin Lai, FRCSEd, FHKAM(Emergency Medicine), FFAEM
Tuen Mun Hospital, Accident & Emergency Medicine, Tsing
Chung Koon Road, Tuen Mun, N.T., Hong Kong
Email: dklchung@yahoo.com.hk

Yeung Ming Fong, MBChB(CUHK)
Kam Chak Wah, MRCP, FRCSEd, FHKAM(Emergency Medicine)



Figure 1. Transverse scan of the left popliteal region revealing a Baker's cyst. The neck (N) was situated between the semimembranosus tendon (SM) medially and the medial head of gastrocnemius (GASTROC) laterally. A septum (arrows) was identified within the superficial portion (S).

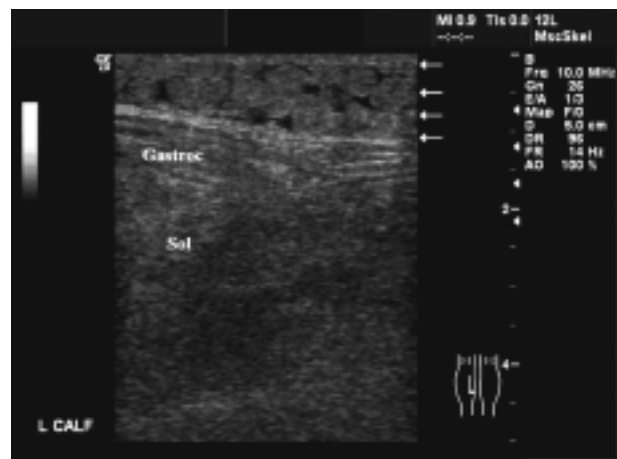


Figure 3. Longitudinal scan of the lower calf (distal to Figure 2). Subcutaneous swelling (arrows) is observed with fluid among the fat globules. The underlying gastrocnemius (Gastroc) and soleus (Sol) muscles are seen.

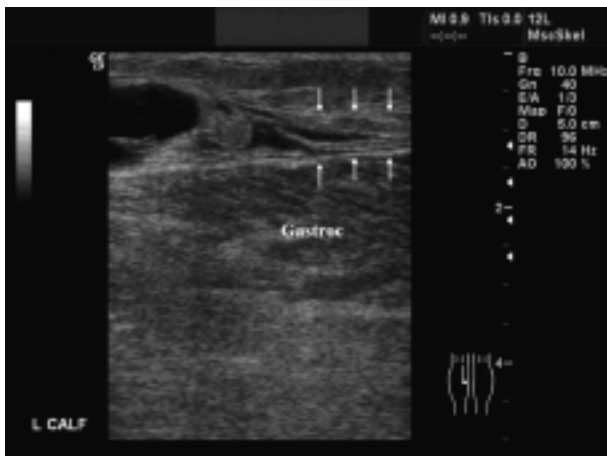


Figure 2. Longitudinal scan of the Baker's cyst. Rupture is evidenced by distal extension of fluid and pointed configuration of the distal edge (arrows). The gastrocnemius muscle (Gastroc) is seen beneath the Baker's cyst.

Discussion

The differential diagnoses of acute calf pain include DVT, Baker's cyst, muscular injury, tumour, infection, arterial aneurysm, and Achilles tendon pathology.¹ Emphasis is often placed on DVT owing to the risk of pulmonary embolism. As demonstrated by our case, the patient was initially suspected of DVT.

Baker's cyst was first described in 1840 by Adams as "popliteal cyst".² It was from Dr. William Marrant Baker's writing in 1877 that we derived the commonly used term "Baker's cyst". It is located in the popliteal fossa. It represents fluid distension of the gastrocnemius-semimembranosus bursa, which usually communicates with the knee joint in adults. The cyst volume can range from 1 to 40 ml.³

Baker's cysts are common. Fielding et al reported a 5% incidence in patients undergoing magnetic resonance imaging (MRI) of the knee for the investigation of internal derangement.⁴ Dual pathology of DVT and Baker's cyst has been reported. The compressive effect of the cyst may predispose to the development of DVT.⁵ Robertson reported a case of sciatic nerve compression due to proximal dissection of the cyst.⁶ Sansone et al demonstrated that Baker's cysts were associated with one or more disorders detected in MRI in 94%.⁷ Intra-articular disorders play an important role in the pathogenesis of Baker's cyst while it becomes symptomatic when complicated by rupture, dissection, haemorrhage or infection. Associated intra-articular pathologies include osteoarthritis, rheumatoid arthritis, psoriatic arthritis, non-specific synovitis, meniscal tears and excessive joint

effusion. A study demonstrated that 42% of patients with osteoarthritis had Baker's cysts detected by ultrasonography. Bilateral cysts were seen in 16% of the patients.⁸ In rheumatoid arthritis, up to 48% of patients have been shown to have Baker's cysts.⁹

Nowadays, ultrasonography has largely replaced arthrography for the initial assessment of Baker's cyst.¹⁰ In ultrasonography, Baker's cysts are demonstrated as consisting of three parts: the base, the superficial part, and the neck in between. The neck lies between the medial head of gastrocnemius and the semimembranosus tendon. Baker's cysts can be complicated by dissection, which usually occurs in a distal direction.¹¹ Cysts can rupture and their fluid content can track into the fascial planes between the soleus and gastrocnemius muscles. This can cause inflammatory changes within the subcutaneous fat and muscles. The clinical appearance of the leg can be very similar to those with acute thrombophlebitis. Therefore, ruptured Baker's cyst is also referred to as 'pseudothrombophlebitis'.

Acute calf pain and swelling bear differential diagnoses that can mimic each other. Clinical examination may not help in making a definite diagnosis or excluding the diagnosis of DVT with confidence. As illustrated by our case, ultrasonography can be an important tool for clarifying the diagnosis in the emergency department. Not only can Baker's cysts be identified, their complications can be demonstrated because of their characteristic sonographic appearances.

References

1. Kane D, Balint PV, Gibney R, Bresnihan B, Sturrock RD. Differential diagnosis of calf pain with musculoskeletal ultrasound imaging. *Ann Rheum Dis* 2004;63(1):11-4.
2. Curl WW. Popliteal cysts: historical background and current knowledge. *J Am Acad Orthop Surg* 1996;4(3):129-33.
3. Bui-Mansfield LT, Youngberg RA. Baker cyst. [cited 2006 June 15]. Available from: <http://www.emedicine.com/radio/topic72.htm>
4. Fielding JR, Franklin PD, Kustan J. Popliteal cysts: a reassessment using magnetic resonance imaging. *Skeletal Radiol* 1991;20(6):433-5.
5. Langsfeld M, Matteson B, Johnson W, Wascher D, Goodnough J, Weinstein E. Baker's cysts mimicking the symptoms of deep vein thrombosis: diagnosis with venous duplex scanning. *J Vasc Surg* 1997;25(4):658-62.
6. Robertson CM, Robertson RF, Strazzeri JC. Proximal dissection of a popliteal cyst with sciatic nerve compression. *Orthopedics* 2003;26(12):1231-2.
7. Sansone V, de Ponti A, Paluello GM, del Maschio A. Popliteal cysts and associated disorders of the knee. Critical review with MR imaging. *Int Orthop* 1995;19(5):275-9.
8. Fam AG, Wilson SR, Holmberg S. Ultrasound evaluation of popliteal cysts on osteoarthritis of the knee. *J Rheumatol* 1982;9(3):428-34.
9. Andonopoulos AP, Yarmenitis S, Sfountouris H, Siamplis D, Zervas C, Bounas A. Baker's cyst in rheumatoid arthritis: an ultrasonographic study with a high resolution technique. *Clin Exp Rheumatol* 1995;13(5):633-6.
10. Gompels BM, Darlington LG. Evaluation of popliteal cysts and painful calves with ultrasonography: comparison with arthrography. *Ann Rheum Dis* 1982;41(4):355-9.
11. Torreggiani WC, Al-Ismaïl K, Munk PL, Roche C, Keogh C, Nicolaou S, et al. The imaging spectrum of Baker's (popliteal) cysts. *Clin Radiol* 2002;57(8):681-91.