Lesson of the Week

Popliteal cyst rupture in normal knee joints

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Rupture of popliteal cysts is a well-recognised cause of pain and swelling in the calf. Confusion may arise because the symptoms and signs resemble those produced by a deep venous thrombosis.^{1 2 3} The important differentiating factor is evidence of joint disease, so that a diagnosis of popliteal cyst rupture is unlikely to be considered in patients with healthy knee joints. We report on six patients in whom rupture of a popliteal cyst appears to have caused pain and swelling in the calf in the absence of underlying disease of the knee joint. Because this was thought not to occur, deep venous thrombosis of the calf was erroneously diagnosed.

Case reports

Case 1—A fit 26-year-old man on holiday from Ireland developed pain in the back of the left calf while sightseeing on foot. There was no history of symptoms from the knee, and he denied having injured it, although he played gaelic football regularly. On examination there was slight periarticular swelling but no joint effusion. The calf was warm, swollen, and tender, and Homans' sign was positive. He was given anticoagulants, but because of the atypical history the diagnosis was reconsidered. A venogram of the left leg was normal. An arthrogram of the left knee showed a popliteal cyst connected by a thin

Popliteal cyst rupture may occur in normal knee joints

neck to contrast medium lying in the calf muscles (fig 1). The knee was bandaged and the patient rested in bed for 48 hours. He then returned to Ireland and was not followed up.

Case 2—A 50-year-old housewife had had deep venous thrombosis diagnosed on two previous admissions. When she complained of pain in the left calf, a recurrence was suspected. There was no history of pain or swelling in the knee. The calf was warm and swollen, but not red. There was tenderness in the popliteal fossa and along the posteromedial side of the calf. Anticoagulants were started but were stopped after a normal venogram was taken. An arthrogram showed a popliteal cyst with a small inferior rupture after exercise (fig 2). The patient rested for three days and then resumed full activity with no recurrence.

Case 3—A 46-year-old housewife presented with pain of increasing severity in the left calf. There was no history of a disorder of the knee joint. The calf was not warm or red, but there was tenderness and swelling extending from the popliteal fossa midway down the calf. A deep venous thrombosis was suspected, and she was given anticoagulants, but venography showed patent veins. Arthrography showed a left popliteal cyst with extravasation of contrast into the calf muscles (fig 3). The pain and swelling settled with rest and simple analgesics. She was able to bear weight on it after three days. At follow-up the knee was normal, and there has been no recurrence.

Case 4—A fit 57-year-old woman was a keen cyclist. For six

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Knee arthrograms showing ruptured popliteal cysts in five patients.

months before admission she had had discomfort in the left calf, which became worse as she cycled, but it had not been severe enough for her to abandon the bicycle or seek medical advice. She had had an intra-articular injection of steroid for a frozen shoulder 15 years earlier, but there was no other history of joint disease. On examination the left knee was slightly swollen and contained a small effusion. The calf was swollen and acutely tender. Initially she was given anticoagulants, after which the effusion increased in size and was aspirated. The aspirate was heavily bloodstained. Arthrography showed a popliteal cyst with contrast medium in the calf muscles after exercise (fig 4). X-ray films of the hands, feet, and knees showed minor degenerative changes only. The latex test on serum and synovial fluid was negative, and plasma viscosity was 1.61.

The knee was aspirated again to remove the bloody effusion and injected with prednisolone pivate. The pain and swelling in the calf settled with rest. At follow-up the patient had resumed all normal activities, including cycling. The knee was normal on examination, and there has been no recurrence.

Case 5—A 35-year-old woman was admitted with acute pain and swelling in the right calf of several hour's duration. The pain was worse on weight-bearing and on flexion of the knee. There was no history of joint disease. She had had a hysterectomy two months earlier. On examination she was obese; the right calf was 1 cm bigger than the left and was tender but not hot; and Homans' sign was negative. A venogram showed clear calf and thigh veins. Arthrography showed a small popliteal cyst but no rupture. She was discharged after 24 hours' rest and was not followed up.

Case 6—A 25-year-old man was admitted three hours after playing rugby. During the second half he had pain of increasing severity in the back of the left calf. He was very fit and played rugby regularly. He denied earlier symptoms from the left knee and had never injured it. On examination there was pronounced tenderness in the popliteal fossa extending into the calf, which was swollen but not hot or red. The knee was slightly puffy, but no effusion could be shown. An arthrogram showed a popliteal cyst with a rupture posteriorly. X-ray films of the knee joint were otherwise normal (fig 5). The knee was bandaged and rested for 48 hours, after which he resumed normal activity. He was advised not to play sports for two months. At follow-up the knee was normal, and there has been no recurrence.

Discussion

Baker originally described rupture of a popliteal cyst in patients thought to have had rheumatoid arthritis.⁴ It has since been recognised to occur in many inflammatory degenerative and traumatic conditions of the knee joint that produce an increase in intra-articular pressure.⁵ Cysts are formed either by herniation of the distended knee capsule into areas of weakness around the knee or by distension of the bursae which communicate with the knee joint.^{6,7} For these reasons the rupture of a popliteal cyst is usually preceded by a history of pain and swelling of the knee joint. The calf symptoms after rupture are due in part to mechanical distension of the calf tissues by the joint fluid that is released and in part to the inflammatory enzymes in the fluid.⁸

Our six patients had no relevant history of pain or swelling of the knee joint. One (case 4) had recurrent calf pain associated with cycling, but no symptoms from the knee itself. In two cases only there was periarticular swelling, and in one case a small effusion, which was blood stained. Three out of six patients had tenderness in the popliteal fossa. Knee arthrography showed a popliteal cyst in all, and in five out of six a rupture was evident. Four out of the six received anti-coagulants before the correct diagnosis was made. A deep venous thrombosis was definitely excluded in four out of the six—an important point since the two conditions may co-exist.⁹

All the cysts were probably communicating gastrocnemius bursae, which may have become acutely distended by a sudden

increase in joint pressure most likely owing to a synovial effusion. An effusion could have been caused by internal trauma, such as pinching of the synovial membrane or contusion of the intra-patellar fat pad.¹⁰ Three of the six patients gave a history of strenuous activity before rupture. It has been shown experimentally that normal knees can be ruptured more easily by artificial distension than diseased knees, probably because the diseased knee joint capsule becomes lax from chronic distension and better able to accommodate greater amounts of fluid without a rise in pressure.¹¹ There is therefore theoretical support for sudden distension causing rupture of a healthy knee. The effusion may have passed unnoticed because it occurred only shortly before the much more dramatic rupture of the cyst and ensuing calf pain. The calf symptoms may be accounted for by the presence of blood tracking down from the edge of the torn joint capsule. Extravascular blood is well recognised as a potent irritant. There is no hard evidence for this since the calf fluid was not aspirated, but the bloody effusion found in one patient after anticoagulation treatment tends to support this.

Whatever the true explanation, our experience suggests that a syndrome of calf pain and swelling associated with rupture of a popliteal cyst may occur in fit, active people in the absence of pre-existing knee joint disease. This diagnosis should be considered in a wider group of patients than has previously been the practice to avoid misdiagnosis and inappropriate treatment.

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WORDS THE DRINK PROBLEM.

- Q Have you a drink problem?
 A I have no difficulty in swallowing liquids.
 Q I mean, have you a problem with alcohol?
 A No, I can get all the booze I want.
 Q I mean, do you drink more alcohol than you should?
 A Why? How much should I drink?
 Q What I mean is, do you drink more alcohol than is good for you?
 A That depends on how much is good for me. What quantity do you recommend?
 Q (Sighs) Is alcohol affecting your behaviour for the worse?
 A My friends don't think so, but my wife is inclined to fuss about it.
 Q So your wife has a problem with your drinking.
 A No problem at all. She is quite clear in her mind what is wrong.
 Q Thank you! I will see you again next Thursday. (Slips off his elastic-sided shoes which have begun to feel uncomfortably tight).*—B J FREEDMAN.

*With apologies to Jaroslav Hašek, author of *The Good Soldier Švejk*, and his *Fortunes in the World War*. London: William Heinemann, 1922. Translated from the Czech by Cecil Parrot. 1973.