An approach to the painful knee

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A painful knee is a common musculoskeletal complaint in general practice.

Dr Needs presents a practical approach to diagnosis and management.

A painful knee is one of the most common musculoskeletal complaints. Given that the pathology causing the pain may not always reside within the knee, it is vital to have knowledge of the anatomy of the joint as well as its surrounding structures. Sources of pain include:

- the prepatellar and infrapatellar bursae, anterior to the knee
- the anserine bursa, medial to the knee
- the semimembranosus bursa, posteromedial to the knee.

Understanding of the sources of referred knee pain is also important. For example, pain from the hip or lumbar spine, especially the L3/4 segments, may refer to the knee. Therefore, examination of the movements of these structures should be an integral part of the assessment for a patient with a painful knee.

Age, a history of trauma and examination findings will narrow the differential diagnosis. Trauma would lead to consideration of fractures and ligamentous and meniscal pathology, but in middle aged and elderly patients inflammatory and traumatic causes may coexist.

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Case study: knee pain in a returned traveller

Presentation

Thomas, a 57-year-old accountant, presented to the clinic with a one-week history of a painful left knee (Figure). Three days earlier, he had returned from a two-week hiking holiday in Nepal. In the first week of his holiday he had fallen, lacerating his right leg. The wound had healed, with the sutures *in situ*, after treatment in Kathmandu. He had also experienced several days of watery diarrhoea while in Nepal.

The patient had a history of hypertension, which was currently treated with irbesartan/hydrochlorothiazide 300/12.5 (mg/mg). Following a sporting injury, he had had a medial meniscectomy of the left knee at the age of 18 years, subsequently developing secondary osteoarthritis. It emerged that he had experienced intermittent left knee pain in the past, especially after long periods of sitting. There was no other history of joint symptoms.

During his trip, Thomas had not developed any mouth ulcers, conjunctivitis, bloody diarrhoea or rash. Other members of his travel group had developed a self-limiting diarrhoea.

Thomas looked systemically well. His temperature was 37.2°C and his urine contained no blood or protein. Examination of the left leg revealed a knee effusion without erythema; quadriceps muscle wasting was noted. The left knee could not be extended fully, and attempts to do so intensified his knee pain. An abdominal examination was normal. His BMI was 28.3 kg/m^2.

Figure. The patient's swollen left knee, with visible scar from a previous meniscectomy.

Investigations

Laboratory tests were arranged for Thomas, which showed haemoglobin 129 g/L (normal range, 120 to 160 g/L), white cell count 4.2x10^9/L (3.5 to 10.0x10^9/L), and C-reactive protein (CRP) 6 mg/L (<5 mg/L). Liver function tests, creati-nine and urea were within the normal ranges; serum urate was 0.49 mmol/L (<0.45 mmol/L). Negative results were obtained for hepatitis B studies, rheumatoid factor and antinuclear antibody (ANA) tests, and blood and stool cultures.

Anteroposterior weightbearing x-rays of the left knee, along with lateral and retropatellar views, showed narrowing of the medial compartment and retropatellar space.

A sample of synovial fluid (25 mL) aspirated from the left knee joint was clear, straw-coloured and viscous. Analysis of the fluid revealed a white cell count of 600x10^6/L, mostly lymphocytes. A Gram stain was negative, and no growth was reported after 48 hours of culture. No crystals were seen using polarised light microscopy. These results are consistent with noninflammatory fluid without

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continued

Table. Monoarthritis: important features in the history

- Systemic features, such as fever, sweats, weight loss
- Recent sources of infections, such as Epstein–Barr virus, hepatitis B and C, parvovirus; consider also
  - sexual history (e.g. *Neisseria gonorrhoeae, Chlamydia trachomatis*)
  - travel history (e.g. enteric infections, Ross River virus, Barmah Forest virus)
  - risk factors for infection (e.g. intravenous drug use, recent skin trauma, immunosuppression)
- Intercurrent symptoms, such as rash, dysuria, urethral discharge, sore throat, sinusitis, cough, diarrhoea, inflammatory eye symptoms, sicca, hair loss, Raynaud's phenomenon
- Medication history (e.g. aspirin, thiazide diuretics, minocycline, hydralazine)
- Other joint symptoms
- Family history of inflammatory joint disease, psoriasis or inflammatory bowel disease
- Past history of inflammatory bowel disease, psoriasis or previous joint pain

evidence of infection or gout, and excluded calcium pyrophosphate arthritis.

Diagnosis

Thomas was diagnosed with a severe exacerbation of osteoarthritis in his left knee. A sudden increase in load on an osteoarthritic joint will usually render it symptomatic. The mechanisms by which such exacerbations occur are unclear. However, a short period of rest from weightbearing on the knee followed by a physical therapy program to strengthen the quadriceps muscles, together with use of paracetamol, will usually allow these events to settle.

Thomas's history of diarrhoea in Nepal raised the possibility of a reactive arthritis. Enteric infections such as *Shigella, Salmonella, Yersinia* and *Campylobacter* have been associated with reactive arthritis; *Chlamydia* infections are also common causes. The usual timeframe for onset is up to two weeks after exposure. In Thomas's case, reactive arthritis was ruled out by the absence of conjunctivitis, skin lesions, urethral discharge, urogenital lesions (balanitis) or enthesitis, plus the presence of a low white cell count in the synovial fluid and a low CRP.

If Thomas had any systemic features then it would have been necessary to consider infection via possible haematogenous spread from his leg laceration to the osteoarthritic knee. Septic arthritis may occur by direct joint puncture or seeding from haematogenous spread; a joint with pre-existing arthritis is more vulnerable to infection by the latter mechanism. A patient with joint sepsis generally appears to be systemically unwell, with a high temperature and a marked elevation of CRP. A negative Gram stain alone does not exclude sepsis, but the lack of growth on culture in the absence of antibiotic therapy does diminish its likelihood. Joint arthroscopy and synovial biopsy may be needed to pursue the diagnosis when the index of suspicion is high. Thomas did not have other risk factors for infection.

Other considered diagnoses included hepatitis B, perhaps from poorly sterilised suturing material. Hepatitis B may present as an acute arthritis – usually polyarticular – before jaundice has occurred. Cryoglobulinaemia with rash and arthritis may also occur in the prodromal stages of hepatitis B.

Another consideration was urate arthropathy. The combination of excess body weight and use of a thiazide diuretic will account for a raised serum uric acid level – as in Thomas's case. For this reason, it is necessary to identify urate crystals within the synovial fluid before making a diagnosis of gout.

The possibility of a chronic inflammatory arthropathy such as rheumatoid arthritis deserved consideration. However, the onset of rheumatoid arthritis or systemic lupus erythematosus was unlikely in this case, particularly given the mono-articular presentation, the low CRP and low white cell count in the synovial fluid. The absence of rash or Raynaud's phenomenon and the negative ANA result also made systemic lupus erythematosus unlikely.

Outcome

Two weeks later, Thomas indicated that his symptoms had improved. At a three-month review visit, he had lost weight and was exercising regularly, with minor residual post-exercise knee stiffness.

Discussion

Features in the history that should be considered in a patient presenting with a monoarthritis are listed in the Table. A systemic examination is needed, checking temperature and urine and performing an abdominal and skin examination.

Careful observation of the knee will distinguish between swelling of the prepatellar bursa (which does not communicate with the joint) and a joint effusion. Swelling from a large joint effusion is best appreciated as distension of the suprapatellar space. The range of knee movement should be tested, with the medial, lateral and patellofemoral compartments being stressed during the movements. However, a full knee examination is not always possible for an acutely swollen knee.

Hip movement should be checked at this point. Signs of psoriasis may be noted over the knee or elbow. Examination of

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other joints may be indicated, depending on the history.

Synovial fluid aspiration, performed under sterile conditions with preadministration of local anaesthetic, is a low risk procedure with a high yield of diagnostic information. It is best to collect the fluid in three tubes: one sterile tube for Gram stain and culture; one EDTA tube for the white cell count and differential white cell count; and a plain tube for crystal analysis. High synovial joint fluid viscosity is usually associated with noninflammatory joint disease. Advisable aftercare includes minimising weightbearing and keeping the aspiration site dry for 24 hours.

Osteoarthritis of the knee requires a long term management strategy. Educating the patient about the nature of the disease and the aims of therapy is the starting point. Emphasis should be placed on managing pain and maintaining function. As such, advice about avoiding possible exacerbating factors and reducing force through the joint is helpful – reducing weight and strengthening the knee extensor mechanism will address this. A hydrotherapy program is helpful when weightbearing exercise is not tolerated. Assessing and treating any foot biomechanical abnormalities that excessively load one knee compartment will add therapeutic efficacy.

Glucosamine (1500 mg/day, in sulfate or hydrochloride form) may influence cartilage repair and, in some individuals, may also provide a degree of pain relief. Regular paracetamol is the backbone of analgesic therapy; omega-3 fatty acids (e.g. fish, evening primrose and flaxseed oils) may add to the analgesic effect. Long term unsupervised use of NSAIDs is best avoided but, given that osteoarthritis is characterised by periods of more severe pain, short term use of NSAIDs (in conjunction with ongoing paracetamol) may be required. Such a therapeutic approach must only be undertaken with current knowledge of the patient's renal and cardiac status. Regular monitoring for potential weight gain and change in blood pressure is also required, along with checking of the estimated glomerular filtration rate (eGFR).

In patients who are not taking NSAIDs, a review three months after commencing therapy is ideal. The follow up appointment provides an opportunity for adjusting exercise and analgesia, if necessary, as well as monitoring weight. MT

DECLARATION OF INTEREST: None.

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