Case Report

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Deep Infrapatellar Bursitis: An Unusual Cause of Chronic Anterior Knee Pain

Radiology Section

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ABSTRACT

Knee pain is frequently reported in everyday orthopaedic practice. Inflammation of the bursa is a common and significant cause of knee pain, although the involvement of the Deep Infrapatellar Bursa (DIPB) is comparatively less prevalent. DIPB commonly occurs due to either direct trauma or overuse, but other rare causes have also been reported in the literature, including infection, juvenile idiopathic arthritis, gout, and juvenile ankylosing spondylitis. We present a case of a 25-year-old woman, a homemaker, who presented with complaints of chronic left knee pain on the anterior aspect, persisting for the past 10 months, which was attributed to minor trauma experienced while working at home. Upon clinical examination, mild swelling measuring approximately 5×5 cm was observed on the lower lateral side of the patella, accompanied by mild redness. Further radiological investigations were advised. On a standing X-ray of the knee, soft-tissue swelling in the inferolateral aspect of the patella was observed. On Magnetic Resonance Imaging (MRI), the lesion appeared hypointense on T1-weighted images (T1WI) and hyperintense on T2-weighted images (T2WI), showing no suppression on fat saturation sequences, indicating that it contained clear fluid and no evidence of fat. The patient was initially managed conservatively, but due to a failure to resolve symptoms, a local intrabursal injection of steroids was administered, and she was followed up for three months. The patient improved post-treatment and reported a complete resolution of symptoms. Early diagnosis and management of this condition can potentially prevent chronic knee pain and improve function and quality of life.

Keywords: Anterior knee pain, Inflammation, Joint effusion, Magnetic resonance imaging in knee, Synovitis, Ultrasound

CASE REPORT

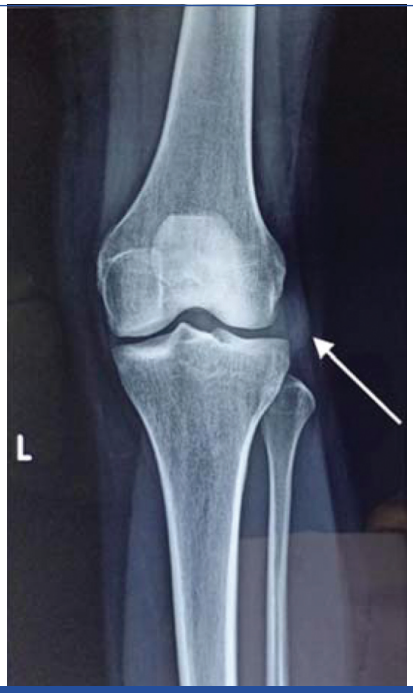
A 25-year-old homemaker presented at the Department of Orthopaedics with complaints of chronic left knee pain and swelling (Visual Analogue Score of 4/10) on the anterior aspect. The knee pain had been intermittent, characterised as a mild to moderate dull-aching sensation, persisting for the past 10 months, and was attributed to minor trauma experienced while working at home. She denied having any chronic medical conditions but engaged in activities requiring frequent kneeling and jumping. However, the discomfort over the front of her knee progressively worsened, especially with heavy activities, kneeling, and extreme knee extension and flexion.

Upon careful examination, mild swelling measuring approximately 5×5 cm was observed on the lower lateral side of the patella, accompanied by mild redness in that region [Table/Fig-1].

[Table/Fig-1]: Clinical photograph showing a single swelling with slight discolouration, measuring approximately 5×5 cm (white arrow).

Assessing the extent of movement of the knee, pain was experienced at the extreme positions of knee extension and flexion. No significant other findings were observed during the rest of the knee examination. For further evaluation, radiological investigations were advised.

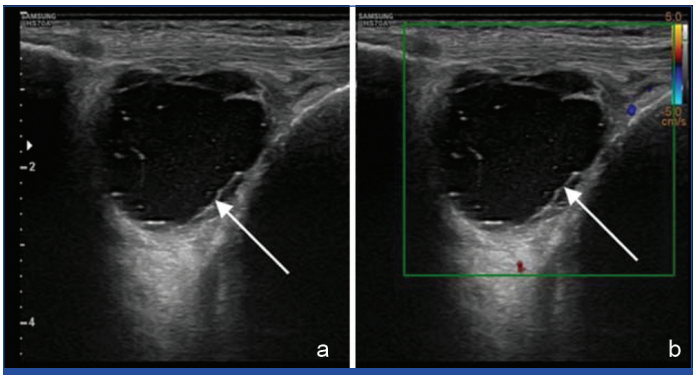
A standing X-ray of the knee revealed soft-tissue swelling in the inferolateral aspect of the patella. No bony abnormality or calcification was seen [Table/Fig-2].



[Table/Fig-2]: Antero-posterior radiograph of the left knee showing soft-tissue swelling on the inferolateral aspect of the patella (white arrow).

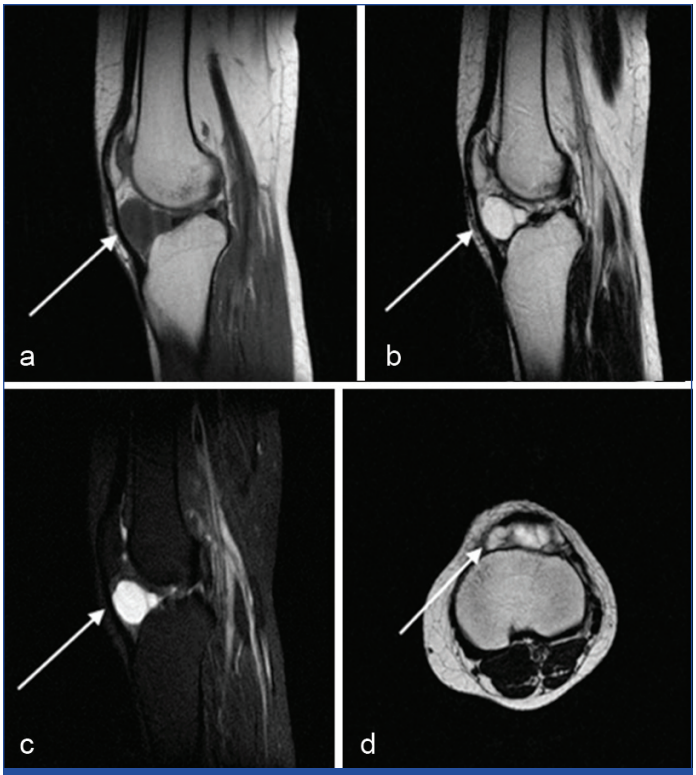
Subsequently, an ultrasound evaluation using a high-frequency linear probe was performed. The ultrasound showed a fluid-filled, cystic lesion with an irregular wall and internal echoes, debris, and septae, located posterior to the distal aspect of the patellar tendon and anterior to the tibia, indicating a DIPB [Table/Fig-3a]. Beneath

the transducer, the distended bursa could be compressed, and tenderness was elicited upon probing. No increase in vascularity was observed on colour Doppler imaging [Table/Fig-3b].



[Table/Fig-3]: a) Well-defined cystic lesion measuring 2.3×2.3×2.5 cm (7 cc) in the infrapatellar bursa, showing an irregular wall and internal echoes, debris, and septae (white arrow); b) Colour doppler reveals no vascularity within the lesion.

The lesion on MRI was hypointense on T1-weighted images (T1WI) and hyperintense on T2-weighted images (T2WI) and was not suppressed on fat saturation sequences, indicating that it contained clear fluid and no evidence of fat [Table/Fig-4a-d].



[Table/Fig-4]: a) On MRI sag T1 weighted image, the lesion is hypointense; b) On MRI sag T2 weighted image, the lesion is hyperintense; c) On MRI STIR weighted image, the lesion is not supressed on fat saturation sequences indicating that it contains clear fluid and no fat; d) On MRI axial T2 weighted image, the lesion is hyperintense.

Based on the findings, a diagnosis of bursitis of the DIPB was suggested.

The patient was initially managed conservatively with Non-steroidal Anti-inflammatory Drugs (NSAIDs), specifically tab Diclofenac 50 mg BD for two weeks, and she was advised to apply an ice pack locally for 15 min, three times a day, for one week, with modifications to her activities. Due to the non-resolution of symptoms, the patient was given a local intrabursal steroid injection of 20 mg triamcinolone hexacetonide combined with 2 mL lignocaine hydrochloride (total of 2.5 mL). No complications were noted during the procedure.

The patient was then followed up in the orthopaedic department for three months and reported a complete resolution of symptoms. She was advised to continue eccentric strengthening exercises of the quadriceps and to modify her activities.

DISCUSSION

Bursitis is the inflammation of a fluid-filled sac, or bursa, lined with synovium. These sacs are located near major joints like the hips, knees, shoulders, and elbows, and they reduce friction between bones, tendons, and skin [1]. The DIPB is usually affected by trauma or excessive use, often seen in people with jobs requiring frequent kneeling or crawling. It can also develop from causes such as infection, bleeding, juvenile arthritis, gout changes, and paediatric ankylosing spondylitis [2]. Despite the commonness of bursitis, the involvement of the DIPB is relatively uncommon. It is positioned posteriorly to the distal end of the patellar tendon and anteriorly to the tibial tuberosity [3].

Knee pain is a common issue that often goes undiagnosed for extended periods. Bursitis of the DIPB is an unusual cause of pain in the knee compared to other more prevalent bursae, such as the suprapatellar, prepatellar, and superficial infrapatellar bursae. Detecting inflammatory changes in the DIPB is challenging due to its deep location within the tendon of the patella. However, swelling and tenderness upon palpation are observed. This condition is commonly seen in individuals who engage in activities like running and jumping, which involve repetitive use of the knee's extensor mechanism [4].

There is a substantial amount of literature related to the association of DIPB with several other conditions, including infection, Osgood-Schlatter disease, gout, spondyloarthropathies, and juvenile idiopathic arthritis [4-8].

Various clinical and radiological differentials for anterior knee pain include septic bursitis, an infection of the bursa commonly caused by bacteria such as Staphylococcus aureus. Increased redness, warmth, and tenderness over the affected area, along with systemic symptoms like fever and chills, distinguish septic arthritis from bursitis. Joint aspiration aids in this distinction by revealing different fluid characteristics [9]. Superficial infrapatellar bursitis refers to an infection of the fluid-filled sac between the tibial tubercle and the skin above it. Direct trauma can cause inflammation and haemorrhage. MRI shows a localised accumulation of fluid in front of the tibial tubercle [10]. Furthermore, other differential diagnoses include infectious and tumourous conditions such as tenosynovitis, giant cell tumours, or malignant conditions like synovial sarcomas, particularly in the presence of speckled calcification [11].

Recent medical literature has reported a case of a ruptured infrapatellar bursal sac with a Baker's cyst [12] and another case of inflammation of the DIPB caused by direct trauma, associated with patellar tendinopathy [13]. In our case, there is chronic inflammation of the DIPB caused by minor trauma without any underlying clinical pathological condition.

MRI is preferred for the diagnosis of this condition. An inflamed DIPB shows a fluid collection of triangular shape, located just posterior to the distal part of the patellar tendon. Due to cost and availability issues, MRI may not always be possible. In these cases, ultrasound plays a crucial role as it is quick, readily available, and inexpensive [14].

Initial management of DIPB should include relative rest, ice application, and anti-inflammatory medications. Modifying activities may involve avoiding specific activities like jumping, running, and frequent kneeling. In cases of significant bursal distension, aspiration may be performed. Routine microscopy and culture can be conducted in suspected cases of infection or crystal deposition disease. In cases of recurrent or resistant inflamed DIPB, an appropriate steroid injection is recommended. Ultrasound guidance, whether using an in-plane or out-of-plane approach, enhances the accuracy of the procedure and reduces the risk of intra-tendinous injection [15].

Besides the inherent limitations of a case report, our report involved all relevant investigations to confirm the diagnosis and clearly

delineated the inflamed bursa without any underlying pathology. Furthermore, establishing chronic deep infrapatellar bursitis, with or without underlying pathology, requires a comprehensive review of multiple cases, as a single case report cannot provide sufficient evidence.

CONCLUSION(S)

Bursitis of the DIPB is a significant contributor to pain on the anterior aspect of the knee. Excessive use and trauma are primary causes of this condition. Because the bursa is located deep beneath the patellar tendon, mild joint effusion may not be readily apparent during a clinical examination. Musculoskeletal ultrasound is an important tool for early diagnosis and can assist in the injection and aspiration of the affected bursa. MRI is excellent in musculoskeletal imaging due to its superior soft-tissue contrast. Accurate MRI diagnosis is necessary to avoid unnecessary arthroscopy and to guide specific therapy. Early diagnosis and management of this condition have the potential to prevent chronic knee pain, enhance function, and improve overall quality of life.

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