Endoscopic Resection of Recalcitrant Tuberculous Bursitis of the Popliteal Fossa

Yi Lok Charis Chan, M.B.B.S (H.K.), and Tun Hing Lui, M.B.B.S. (H.K.), F.R.C.S. (Edin.), F.H.K.A.M., F.H.K.C.O.S.

Abstract: Tuberculosis of the musculoskeletal system is uncommon and constitutes 1% to 5% of all forms of tuberculosis. In total, 30% of skeletal tuberculosis involves the joints, the knee being the third most commonly affected after the spine and the hip. Knee tuberculosis commonly presents as synovitis or arthritis, and infected Baker’s cyst is a rather rare presentation. It is believed to result from the propagation of tuberculosis of the knee joint into the cyst, as approximately one half of the Baker’s cyst communicates with the knee joint and it appears as swelling in the medial aspect of the popliteal fossa. For tuberculous popliteal bursitis at the lateral aspect of the popliteal fossa, it may be an extra-articular extension of tuberculosis of the knee joint via the popliteal hiatus. Chemotherapy remains the cornerstone of treatment; surgery is indicated in recalcitrant cases. In this Technical Note, the technical details of endoscopic resection of recalcitrant tuberculous bursitis at the lateral aspect of the popliteal fossa are described. This minimally invasive technique has the advantage of better cosmetic results and fewer wound complications and reduces the extent of surgical dissection as compared with open surgery.
resection of the popliteal cysts at the lateral aspect of the popliteal fossa. The purpose of this Technical Note is to describe the details of endoscopic resection of recalcitrant tuberculous bursitis at the lateral aspect of the popliteal fossa. It is indicated for tuberculous bursitis at the lateral aspect of the popliteal fossa that is recalcitrant to chemotherapy. It is contraindicated for cyst at the medial side of the popliteal fossa or the lesion is a solid tumor rather than a cystic lesion (Table 1).

## Technique

### Preoperative Planning and Patient Positioning

Diagnosis is often based on high suspicion index. Magnetic resonance imaging is an important preoperative investigation to support the diagnosis and study the relationship between the bursa and the surrounding important structures, e.g., tibial nerve and popliteal artery and vein (Fig 1).

On clinical examination, the surgeon should check for complications due to subjacent mass effect of the bursa, e.g., coexisting deep vein thrombosis or tibial nerve palsy. A radiograph of the chest should be checked for any lesions suggestive of pulmonary TB.

The patient is in a floppy lateral position. An ipsilateral thigh tourniquet is used to provide a bloodless surgical field. Fluid inflow is driven by gravity, an arthro-pump is not used, and a 4.0-mm, 30° arthroscope (DYONICS; Smith & Nephew, Andover, MA) is used.

### Portal Placement

The procedure is performed via the proximal and distal portals at the proximal and distal ends of the lateral edge of the bursa respectively (Fig 2). A 2- to 3-mm transverse skin incision is made at the proximal portal site. The skin incision is retracted laterally to expose the common peroneal nerve and the nerve is released and marked with a vascular loop. The posterior compartment muscle is retracted posteriorly and medially to expose the underlying bursa. This is the proximal portal, which is just posterior and medial to the common peroneal nerve (Fig 3).

A 2- to 3-mm transverse skin incision is made at the distal portal site. The subcutaneous tissue is bluntly dissected down to the deep fascia. The deep fascia is transversely incised, and the intermuscular septum between the peroneal and posterior compartment is identified. The posterior compartment muscle is retracted posteriorly and medially to expose the bursa. The distal portal is just posterior to the intermuscular septum and toward the bursa (Fig 4). The whole procedure should be performed under strict endoscopic visualization.

## Resection of Lateral Part of the Bursa

The proximal and distal portals are interchangeable as the viewing and working portals. The arthroscope and an arthroscopic shaver (DYONICS; Smith & Nephew) are used to perform the resection.

### Table 1. Indications and Contraindications of Endoscopic Resection of Recalcitrant Tuberculous Bursitis of the Popliteal Fossa

| Indications                                                   | Contraindications                          |
|--------------------------------------------------------------|--------------------------------------------|
| Tuberculous bursitis at the lateral aspect of the popliteal fossa that is recalcitrant to chemotherapy. | Cyst at the medial side of the popliteal fossa. |
|                                                             | The lesion is a solid tumor rather than a cystic lesion. |
Fig 3. Endoscopic resection of recalcitrant tuberculous bursitis of the left popliteal fossa. The patient is in floppy lateral position. Establishment of the proximal portal. (A) The common peroneal nerve is identified and marked with a vascular loop. The posterior compartment muscle is retracted posteriorly and medially to expose the underlying bursa. (B) The proximal portal is just posterior and medial to the common peroneal nerve. (CPN, common peroneal nerve; PB, popliteal bursa; PP, proximal portal.)

Fig. 4. Endoscopic resection of recalcitrant tuberculous bursitis of the left popliteal fossa. The patient is in floppy lateral position. Establishment of the distal portal. (A) The subcutaneous tissue is bluntly dissected and the deep fascia is exposed. (B) The deep fascia is transversely incised and muscle of the posterior compartment is exposed. (C) The posterior compartment muscle is retracted posteriorly and medially to expose the bursa. (DF, deep fascia; M, muscle of the posterior compartment; PB, popliteal bursa.)

Fig. 5. Endoscopic resection of recalcitrant tuberculous bursitis of the left popliteal fossa. The patient is in floppy lateral position. (A) Intraoperative photo shows that endoscopy of the lateral part of the bursa is performed with the distal portal as the viewing portal and the proximal portal as the working portal. (B) With the distal portal as the viewing portal and the proximal portal as the working portal, the lateral part of the tuberculous popliteal bursitis is resected. (CPN, common peroneal nerve; DP, distal portal; PB, popliteal bursa; PP, proximal portal; PT, popliteus tendon; TPB, tuberculous popliteal bursitis.)
inserted into the bursa. The shaver is put into the center of the cyst cavity and the suction is turned on. The loose diseased tissue is sucked toward the shaver blade and is resected. The shaver can be used as a rounded tip dissector to dissect out the lateral wall of the bursa and the wall is resected with the shaver and an arthroscopic punch forceps (Arthrex, Naples, FL). The popliteus tendon is then exposed. With the distal portal as the viewing portal and the proximal portal as the working portal, the diseased tissue deep to the tendon is resected with the shaver at the lateral side of the tendon. The tendon can prevent the shaver to go too medially and injure the popliteal artery and vein (Fig 5).

Resection of Medial Part of the Bursa

The proximal and distal portals are interchangeable as the viewing and working portals. The shaver can be used as a rounded tip dissector to peel off the diseased tissue and the loosened tissue can then be resected with the shaver. This maneuver can reduce the risk of injury of the tibial nerve. Dissection deep to the tibial nerve should be avoided to minimize the risk of injury to the popliteal artery and vein (Fig 6, Video 1, Table 2).

After this procedure, the hip is externally rotated and knee arthroscopy is performed via the standard anteromedial and anterolateral portals to debride the knee joint.

After the operation, a drain is put into the popliteal fossa. Compression dressing is applied for 2 weeks to facilitate seal off of the cavity. Full weight-bearing is allowed after the drain is taken off. The patient can start free mobilization of the knee after the compression dressing is taken off.

Discussion

Tuberculous popliteal bursitis is a rare disease entity. To achieve a definitive diagnosis, it is essential to identify Mycobacterium TB. Bone and joint TB are, however, paucibacillar. Many times, the Ziehl–Nielsen test is negative, and it becomes necessary to wait for the Lowenstein culture results. Synovial biopsy is also an important and diagnostic method to ascertain the causative pathogen. Moreover, the synovial biopsy is mandatory to establish the diagnosis histopathologically, and one does not need to wait for a culture result. Synovial biopsy can be performed via the knee arthroscopy, which is a safer procedure. Endoscopic resection of

Table 2. Pearls and Pitfalls of Endoscopic Resection of Recalcitrant Tuberculous Bursitis of the Popliteal Fossa

| Pearls | Pitfalls |
|--------|----------|
| The knee is flexed to relax the common peroneal nerve. | Debridement medial to the popliteus tendon and just superficial to the posterior knee capsule may damage the popliteal artery and vein. |
| To minimize extravasation and spreading of infection, fluid inflow is by gravity and no arthro-pump is used. | Debridement deep to the tibial nerve may injure the popliteal artery and vein. |
| The shaver is used as a rounded tip dissector to peel off the diseased tissue before removal of the tissue. | |

Table 3. Advantages and Risks of Endoscopic Resection of Recalcitrant Tuberculous Bursitis of the Popliteal Fossa

| Advantages | Risks |
|------------|-------|
| Less soft-tissue trauma | Recurrence of the lesion |
| Better cosmetic results | Nerve injury |
| Fewer wound complications | Vascular injury |
| Hematoma collection | Spreading of infection |

Fig. 6. Endoscopic resection of recalcitrant tuberculous bursitis of the left popliteal fossa. The patient is in floppy lateral position. (A) Intraoperative photo shows that endoscopy of the medial part of the bursa is performed with the proximal portal as the viewing portal and the distal portal as the working portal. (B) With the distal portal as the viewing portal and the proximal portal as the working portal, the medial part of the tuberculous popliteal bursitis is resected. (CPN, common peroneal nerve; DP, distal portal; PP, proximal portal; PT: popliteus tendon; TN, tibial nerve; TPB, tuberculous popliteal bursitis.)
the tuberculous popliteal bursitis is only indicated if the disease does not respond to chemotherapy. The important structures that are at risk include the common peroneal nerve, the tibial nerve, and the popliteal artery and vein. In this described technique, the common peroneal nerve is already identified and protected during establishment of the proximal portal. The risk of injury to the tibial nerve and the popliteal artery and vein can be minimized when the safety measures of the technique are followed strictly.

This minimally invasive technique has the advantage of less soft-tissue trauma, better cosmetic results, and fewer wound complications. The potential risks of this technique include recurrence of the lesion, nerve injury, vascular injury, hematoma collection, and spreading of infection (Table 3). This is technically demanding and should be performed by experienced knee arthroscopists.

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