

Anatomical description and short term follow-up clinical results for ultrasound-guided injection of MCL bursa - New conservative treatment option for symptomatic degenerative medial meniscus tear-

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INTRODUCTION:

In 2020, an expert consensus statement was reported in the *Arthroscopy* journal, asserting that degenerative meniscal lesions (DML) are a normal part of aging, and not all tears cause symptoms. Symptomatic patients should initially be treated nonoperatively, and repairable tears should be repaired. In general, surgery should not be proposed as a first-line treatment for DML. This does not exclude the use of arthroscopic partial meniscectomy in selected cases. This debate is probably due to the fact that the reason why DML becomes symptomatic is not known, and appropriate conservative treatment has not been proposed. It is important to identify the cause of pain and establish appropriate conservative therapy for DMLs.

Based on the ultrasonographic findings and the anatomical location of the tenderness point in patients with symptomatic DMLs (**Fig. 1**), we believe that one of the causes of pain in degenerative medial meniscal (MM) tears might be MCL bursitis. Therefore, we have performed ultrasound (US)-guided injection of the MCL bursa for symptomatic DMLs. This injection shows promise as a new conservative treatment option for degenerative tears of the MM. The MCL bursa is located between the deep (knee joint capsule) and the superficial MCL. (**Fig. 2**). The MCL bursa is very thin and cannot be injected without image guidance, such as ultrasound. The purpose of the present study was to describe the anatomical target and precise technique of US-guided injection of the MCL bursa with confirmation of accuracy using fresh cadaveric knees, and then to evaluate the preliminary clinical outcomes of this injection technique for medial knee pain. We hypothesized that US-guided MCL bursa injection will be highly reproducible and will reduce pain in symptomatic DMLs.

METHODS:

Anatomical study in cadavers

We investigated three fresh-frozen cadaver knees and US-guided injection of the MCL bursa in these knees confirmed the accuracy of the injection. We injected 1 mL of green ink into the MCL bursa under US guidance. After dissection, we checked where the green ink was injected.

Patient selection and clinical study

Patients included those with a chief complaint of medial knee joint pain, tenderness just below the MCL bursa, and a Kellgren–Lawrence grade of 0 or 1 on a standing frontal radiograph without knee osteoarthritis. A total of 50 patients were included in this clinical study (22 men, 28 women; mean age, 51.2 years; age range, 18–73 years). In every patient, the severity of pain was assessed pre-injection, and 1 week and 4 weeks after the procedure using a 0–10 numerical rating scale (NRS). Clinical success was defined as a full return to daily activities and no need for non-steroidal anti-inflammatory drugs. All patients underwent MRI within 1 week of the first injection. Patients who underwent surgery within 6 months of the first injection were determined as clinically unsuccessful cases. MRI and arthroscopic findings were examined to identify the characteristics of meniscal tears that were lead to surgical treatment. Indications for surgery were determined on the basis of the patient's wishes, level of pain, and mechanical stimulation of the meniscus. Injections were allowed up to four times per week if the patient desired.

RESULTS:

Anatomical study in cadavers

The dissection was performed layer by layer and the sartorius muscle, superficial MCL, and joint capsule were observed to identify which area had green ink. In all three knees, the green ink was injected between the superficial MCL and the deep MCL in the MCL bursa, and the accuracy was 100%. No anatomical specimens exhibited intrameniscal injection or demonstrated evidence of iatrogenic injury to the regional structures (**Fig. 3**).

Clinical study

The average NRS score was 6.8 ± 1.2 at pre-injection, 1.8 ± 2.0 at 1 week, and 1.5 ± 1.7 at 4 weeks after injection. There was a significant decrease in NRS score at 1 week post-injection and 4 weeks post-injection compared to pre-injection ($P < 0.01$). The primary clinical success rate was 76.0% with 38 patients reporting full return to daily activities. The average number of injections was 1.6 ± 0.7 and no injection-related adverse events were observed. Nine patients underwent surgery. Seven patients underwent arthroscopic partial meniscectomy and/or meniscal repair. Two patients had an MM with a flap subluxated in the tibial gutter, four patients had a flap tear, and one patient had an MM cyst. Two patients underwent high tibial osteotomy due to an MM posterior root tear and proximal tibial malalignment.

DISCUSSION AND CONCLUSION:

US-guided injection of the MCL bursa is a safe, reproducible, and effective treatment for symptomatic MM degenerative tears. The primary clinical success rate was 76.0%. US-guided injections for the MCL bursa were ineffective for flap tears and posterior root tears.

Figure 1

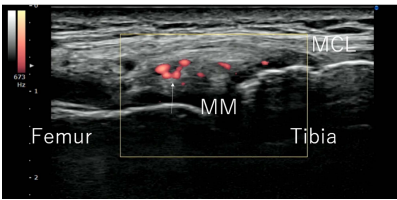


Figure 2

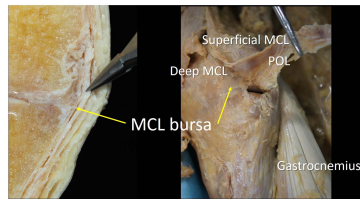


Figure 3

