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A new anterior inferior coronal patellar plica

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ABSTRACT

Purpose: To date, four synovial plicae are classically described in the knee. We report a previously undescribed new inferior patellar plica, named "bib-like plica" (BLP, referring to its morphology) related to specific symptoms of atypical recurrent anterior knee pain in the presence of a locked or pseudo-locked knee. We describe this anatomical structure, and assess its clinical relevance in daily practice in terms of clinical pattern and long-term follow-up outcome after arthroscopic excision.

Methods: We retrospectively reviewed prospectively collected data on 1033 arthroscopic procedures, selecting patients in whom a knee arthroscopy was indicated following recurrent painful episodes of locking or pseudo-locking not explained by traditional imaging or helped by conservative treatment. Visual Analog Scale (VAS), Lysholm knee score, a physical exam and a satisfaction interview were used to evaluate the clinical status at the latest follow-up.

Results: We report 12 patients (8 males, 4 females; mean age 34.2 years) in whom a BLP had been identified at arthroscopy. At a mean follow-up of 13.4 years from its excision, the mean VAS and Lysholm knee score were 9.8 and 100 respectively. In all instances, selective removal of the BLP restored a complete painless functional range of motion documented within 2 months, and confirmed at the latest follow-up. No patient reported locking recurrence or pain, or underwent further surgery, and all were satisfied.

Conclusions: The BLP, detected in about 1% of knee arthroscopies in our setting, is strongly associated with a recurrent painful locking knee. Arthroscopic removal produces resolution of symptoms.

Introduction

Four synovial plicae are classically described in the knee.[1] Each has been studied independently of one another in relation to their location relative to the patella, but not in relation to their specific location, although a plica may lie in different planes.

Thabit and Micheli estimated a plica remnant to be present in about 20% of the normal adult population,[2] Christoforakis et al. found shelves in about 32% of knees undergoing arthroscopic procedures.[3] In many instances, a plica is only

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discovered "*a posteriori*", as there was not necessarily a relationship between symptoms and plica type.[3] To date, no strict correlation has been documented between a particular type of plica, its location, and pain in a locked or pseudo-locked knee. Arthroscopic plica removal is justified only after the occurrence, with no history of trauma, of: 1) chronic knee pain; 2) anterior or meniscal-like pain; 3) a snapping knee; 4) impaired extension or flexion mimicking a bucket handle lesion of the menisci.

Over the last two decades, during arthroscopic procedures, in patients with recurrent anterior knee pain and locked or pseudo-locked knees, we identified in some instances a plica lying in a location not previously described. The present study describes this anatomical structure, which we named bib like plica (BLP, from its shape). We also tried and define the relationship of the plica with clinical symptoms, imaging and patient outcome at more than 10 years after its arthroscopic removal.

Materials and methods

The local Ethics Committee approved the study, and written informed consent was obtained from all the patients. In this retrospective single center study, we report prospectively collected data on 12 patients, who were operated in our department in the period 1995–2011. All presented with recurrent episodes of locking or pseudo-locking of the knee, associated to pain and functional impairment. In all patients imaging (plain radiographs, MRI or CT scans) did not identify any evident pathology. After the first locking episode, patients were usually prescribed NSAID drugs and/or physiotherapy and lower limb proprioception, strengthening and stretching exercises. After 2 or more repeated episodes of painful locking or pseudo-locking in the previous 6 months, failure of conservative treatment indicated an arthroscopy. All arthroscopies were performed by the senior knee surgeon (FS) and were usually performed through the superolateral portal, popularized by Patel,[4] together with the traditional anteromedial one. The patient was usually discharged the day of the procedure or the day after, with crutches allowing partial progressive weight bearing and without physiotherapy. Thereafter, patients were examined at 1 month and at 4–6 months.

For this study, data were extracted from medical records including demographics (sex, age, work and sport activity), clinical details (side, history of previous surgery on the knee affected, types of pain, location of pain, presence of swelling, feeling of instability, postoperative evolution), surgical (date of arthroscopy and findings) and imaging findings (plain knee radiographs, MRI and CT scans). In September 2016, all patients were contacted and examined. The Visual Analog Scale (VAS: from 0 (i.e. no pain) to 10 (i.e. the worst possible pain)) and Lysholm knee score (excellent for >95, good 84–94, fair 65–83, poor <63) were used to evaluate the clinical status at the latest follow-up. Patients were also asked about their satisfaction, and about their willingness to suggest the procedure to other patients with the same symptoms.

Description of BLP

Anatomically, this anterior inferior plica lies in the coronal plane, and appears as a crescent, its free concave portions facing the condyles. Instead, the convex portion is firmly attached to the synovial membrane at any level of the inferior polar region of the patella, extending its synovial insertion strings from the lateral to the medial aspect of the knee. This structure resembles a child bib, the condyles serving as the head-neck of the child, surrounded by two strings, whilst patella does as the hand of the mother stretching the bib (Fig. 1). The insertion of the bib like plica (BLP) to the inferior pole of the patella corresponds approximately to the upper portion of the insertion of the ligamentum mucosum (LM), but in a different plane from the latter (coronal for the BLP and sagittal for the LM) and perpendicular to it.

At arthroscopy, in the first 6 patients the plica was torn or lacerated and it differed in shape and location from previously described plicae. Initially, images were reported in the surgical records and stored in database as "atypical or anomalous inferior plica" (AIP). Later (Fig. 2A–C) this newly described plica was named "bib like plica" (BLP). If a BLP is present, the femoral tibial region will not be visible (Fig. 1) through the Patel portal, unless the plica is removed (Fig. 2D). With the arthroscope in the high anterior lateral Patel portal, one can identify the medial insertion of the BLP, beginning just at the medial collateral ligament (MCL) posterior margin. The probe may help to hook its free border to better visualize the medial femoral condyle. The anterior upper surface of the BLP can be followed from this portal (Fig. 3), while switching portals allows to appreciate the lateral portion of the BLP and its insertion in the lateral synovium (Fig. 4). The BLP hides the lateral femoral condyle (LFC), which may be fully visualized after pushing the BLP anteriorly and inferiorly with a probe (Fig. 4). Because of anatomical variations, present in all the folds, the distal BLP insertion site may vary, being just at the inferior pole of the patella (Fig. 2C) or a few centimeters lower than it (Fig. 3). Depending on this, with a flexed knee the inclination of the BLP is not constant in all patients, as the fold may descend (Fig. 2C) or ascend (Fig. 3) with its concavity facing the anterior surface of the two condyles. In both cases, with the knee extended and until almost 30°–40° of flexion, both condyles are hidden, and the BLP works in a windshield wiper fashion, being in constant contact with the femoral condyles.

Results

Of 1033 consecutive arthroscopies, we observed 12 cases of BLP, for a final prevalence rate of 1.2%. There were 8 males and 4 females, with eight plicae in the right knee and 4 in the left; the mean age of our patients at the time of surgery was 34.2 years (range 15–51 years) (Table 1). All patients had unilateral knee involvement. No one reported any prior knee condition or systemic chronic disease. In 7 patients, a blunt trauma had triggered the first episode of knee locking.

Clinically, 8 and 4 patients presented three and two episodes of locking, respectively. All patients referred that, between one episode of frank pain and the next, discomfort had never completely resolved, as at times they felt sporadically stabs of knee pain or described dull continuous pain, but without limitation in daily activities. All 12 patients had taken anti-inflammatory drugs, and 10 had undergone supervised

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