Technical Note

Sequential Treatment of Iliopsoas Tendon Cysts Combined With Medial Hip Snapping by Hip Arthroscopy

Yanlin Li, M.D., Hong Yv, M.M., Rongqian Ni, M.M., Yatong Liao, M.M., Zhen Qin, Ph.D., and Di Jia, M.D.

Abstract: Tendon cysts of the iliopsoas muscle cause pain and snapping of the hip. These cysts are close to the femoral nerve and blood vessels, and the risk of open surgery is high, with cyst recurrence occurring frequently. We describe a method of hip arthroscopy for the orderly excision of iliopsoas cysts. During the operation, the iliopsoas tendon is identified and released, the cyst is excised, and peritendinous osteophytes are formed successively. This technique is a minimally invasive, safe, and highly effective hip arthroscopy technique that addresses both intra- and extra-articular lesions.

The iliopsoas bursa is connected to the adjacent hip joint cavity, and the junction is located between the pubofemoral ligament and the iliofemoral ligament.[1] Tension of the iliopsoas tendon, pincer deformity, and glenoid labral injury may result in iliopsoas bursae penetrating into the joint cavity, resulting in fluid accumulation into the medial iliopsoas tendon, forming cysts.[2] Cysts in the iliopsoas muscle indicate abnormalities in the iliopsoas muscle or its adjacent structures.[3] After hip replacement, the prosthesis often causes the tendon of iliopsoas muscle to wear down and form cysts,[4] whereas the simple appearance of iliopsoas cysts is relatively rare. Further expansion of such cysts may present with symptoms such as pain in the inguinal region, snapping of the hip joints, and swelling of the lower extremities, which can be confused with femoroacetabular impingement and abdominal cysts.[5,6] Given the high surgical risks associated with the iliopsoas tendon's proximity to vital vascular nerves in the hip, surgeons often hesitate to perform surgical treatment.[7] With the development and application of hip arthroscopy technology, this article presents a technique for hip arthroscopy treatment of iliopsoas cysts.

From the Department of Sports Medicine, The First Affiliated Hospital of Kunming Medical University, Kunming, China (Y. Li, H.Y., Y. Liao, D.J.); Department of Reproduction and Genetics, The First Affiliated Hospital of Kunming Medical University, Kunming, China (R.N.); and School of Sociological and Anthropological Studies, Faculty of Social Sciences, University of Ottawa, Ottawa, Canada (Z.Q.).

Y. Li and H.Yv contributed equally to this work and share first authorship.

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Address correspondence to Di Jia, M.D., Department of Sports Medicine, The First Affiliated Hospital of Kunming Medical University, 295 Xichang Road, Wuhua District, Kunming 650032, People's Republic of China. E-mail: 514697915@qq.com

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Surgical Technique

Typical Clinical Manifestation and Imaging Evaluation

The patient may present with lameness of the lower limb after walking, accompanied by tenderness in the medial groin area and hip snapping. The shape of the joint and the glenoid labral injury are evaluated by magnetic resonance imaging, computed tomography, and anteroposterior radiography of the hip joint. In particular, the location and size of the iliopsoas cyst can be determined by magnetic resonance imaging scanning (Fig 1, Video 1).

Body Position and Anesthesia

Perineal column traction and C-arm fluoroscopy are not used throughout the operation to avoid perineal injury and operating room radiation. After the administration of general anesthesia, the patient is placed in the supine position with silicone pads under the buttocks to increase the friction between the patient's body

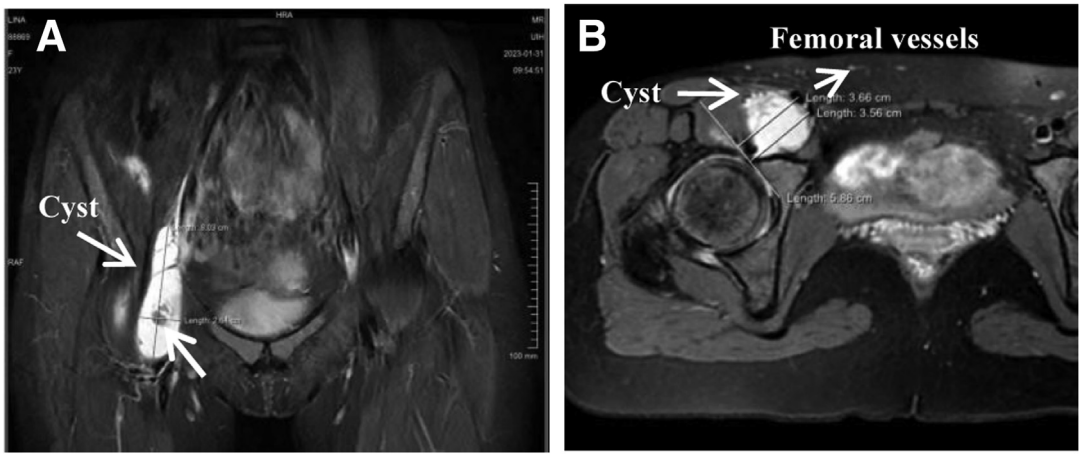

Fig 1. Preoperative magnetic resonance imaging of right hip joint. (A) The presurgical cyst's long axis is 8.03 cm and its transverse axis is 2.64 cm in the coronal view. (B) The distances of the articular cavity from the femoral artery and femoral vein are 3.66 cm and 3.56 cm, respectively, in the transverse view.

and the operating table. The healthy lower limb is applied in a cephalic direction to counter the distal traction of the affected lower limb, and the affected lower limb is straightened and internally rotated by 15°. After traction, the surgical accesses are labeled, including the anterolateral portal, middle anterior (MA) portal, and distal anterolateral accessory portal (Fig 2A), as well as the location of the tender point (Fig 2B, Video 1).

Approach Establishment and Transverse Capsulotomy

A puncture needle is inserted from the anterolateral portal; after confirmation that the puncture needle has entered the intercentral compartment, a long guidewire, a hollow exchange rod, and finally, an arthroscope camera (Synergy; Arthrex, Naples, FL) are inserted sequentially with the use of the Seldinger technique. Then, the arthroscope is slowly withdrawn outside the joint capsule, a radiofrequency device (Smith & Nephew, London, England) is placed from the MA portal and intersects with the arthroscopic lens outside the joint capsule, and the joint capsule is incised transversely from lateral to medial until the position of the iliopsoas tendon is exposed (Fig 3, Video 1).

Pincer Arthroplasty and Tenolysis

Arthroscopic exploration reveals a pincer deformity at the acetabular margin and injury to the labrum. Special attention should be paid to the pincer deformity and synovial congestion around the iliopsoas tendon (Fig 4A). Pincer arthroplasty is undertaken by placing a grinding drill (Arthrex) from the MA portal, with particular focus on the osteophytes around the iliopsoas tendon (Fig 4B). After pincer arthroplasty, the iliopsoas tendon is further explored within the joint. If tendon tension is found, arthroscopic scissors (DePuy Synthes, Warsaw, IN) and radiofrequency should be used sequentially to release the tendon (Fig 4C). During tendon release, special attention should be paid to bloody or yellow fluid leaking from the medial side of

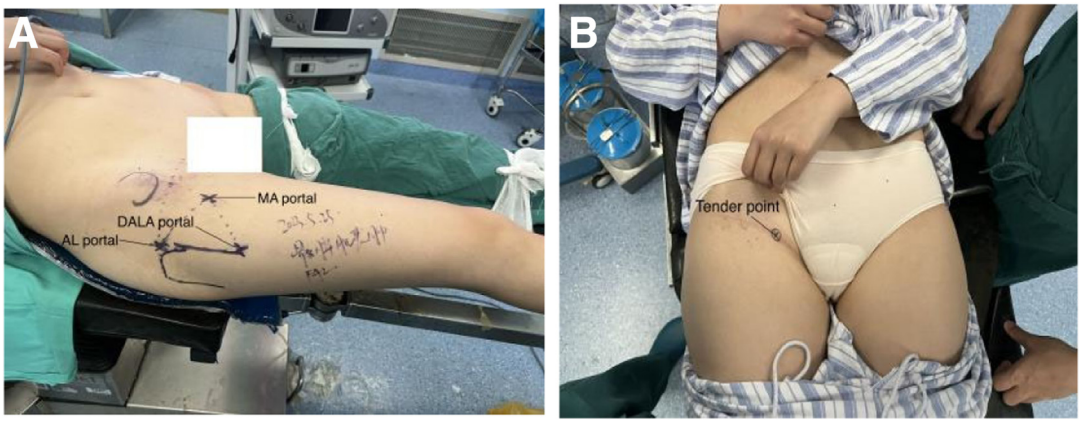

Fig 2. Surgical approach and marking of tender point in right hip. (A) Anterolateral (AL), middle anterior (MA), and distal anterolateral accessory (DALA) portals are used for the surgical approach. (B) The body surface location of the tender point is marked.

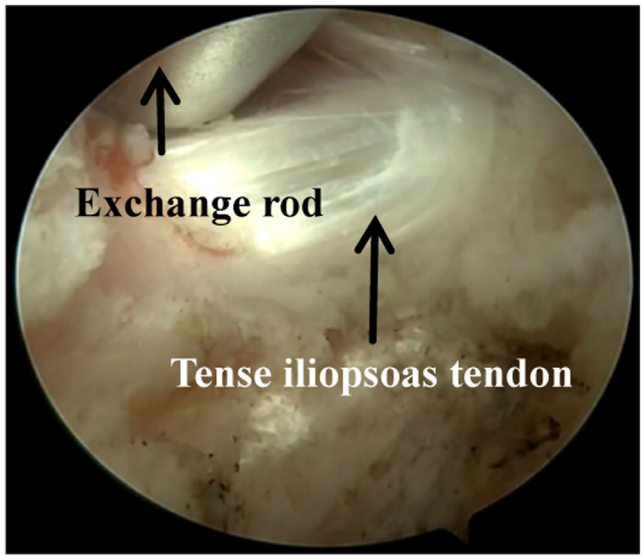

Fig 3. Right hip with patient in supine position. Arthroscopic identification of tense iliopsoas tendon from anterolateral portal.

the tendon, which often indicates the release of cystic fluid (Fig 4D). To reduce the cyst recurrence rate, the arthroscope is inserted into the medial area of the iliopsoas tendon to treat the congested bursal tissue in the cyst wall (Fig 4 E and F, Video 1).

Cam Arthroplasty and Capsule Closure

After the lower extremity traction is released, the hip on the operative side is flexed from 30° to 45° and a distal anterolateral accessory (DALA) access is established, from which a radiofrequency device is inserted to make a longitudinal incision in the joint capsule distal to the base of the femoral neck, exposing the cam deformity on the surface of the femoral neck. After cam reshaping with a spherical grinding drill until dynamic flexion and extension show no impingement, the joint capsule is sequentially sutured in longitudinal and transverse rows (Fig 5). The effectiveness of the operation can be judged by evaluating the cyst excision and whether the femoral artery and femoral vein can be restored to the normal position (Fig 6, Video 1).

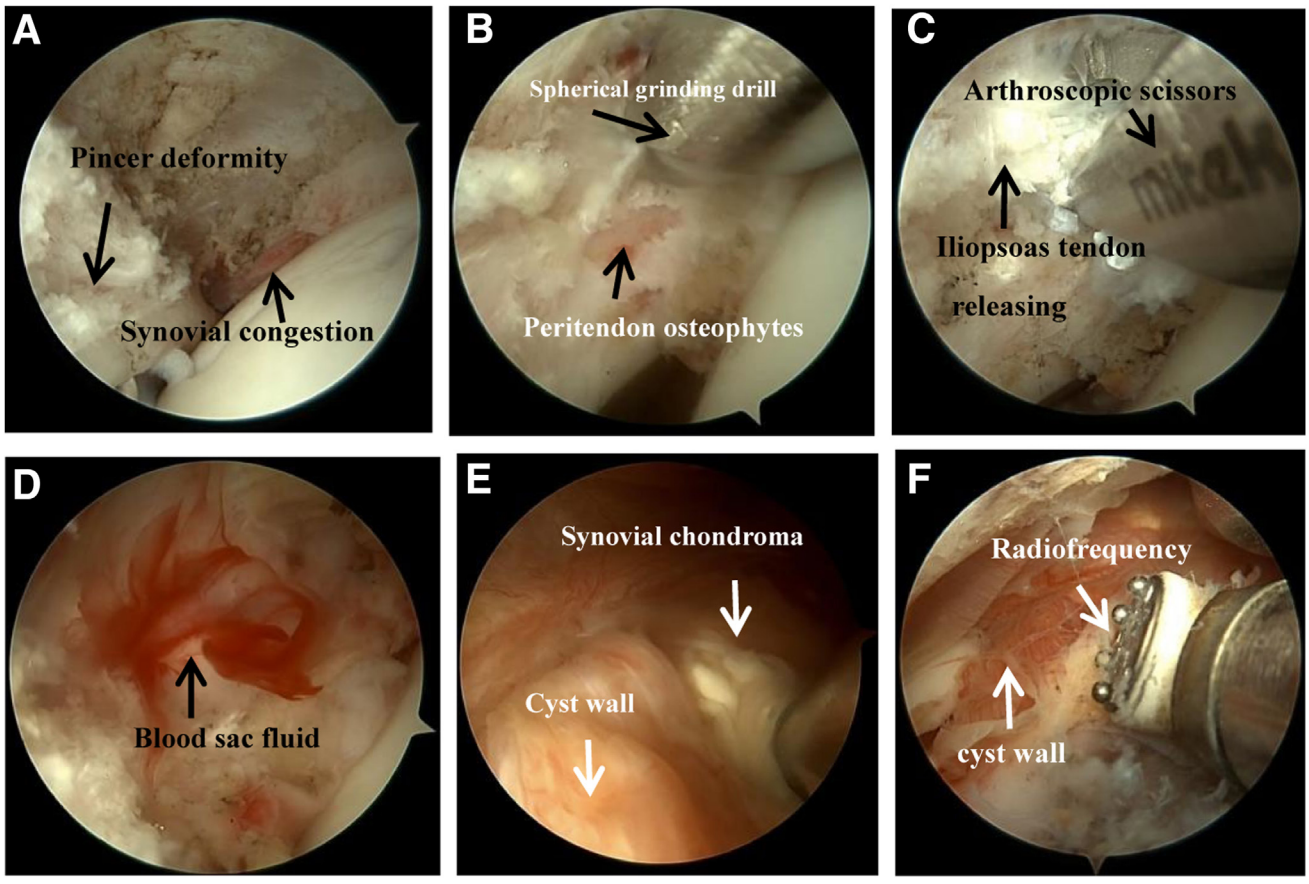

Fig 4. Arthroscopic view from anterolateral portal of right hip with patient in supine position. (A) Pincer deformity and synovial congestion are seen around the iliopsoas tendon. (B) A spherical grinding drill is used to polish the peritendon osteophytes. (C) The iliopsoas tendon is released. (D) Blood sac fluid can be seen flowing from the medial area of the tendon after release. (E) When the camera enters the medial area of the tendon, a synovial chondroma forms inside the cyst wall. (F) A radiofrequency device is used to clean the cyst wall.

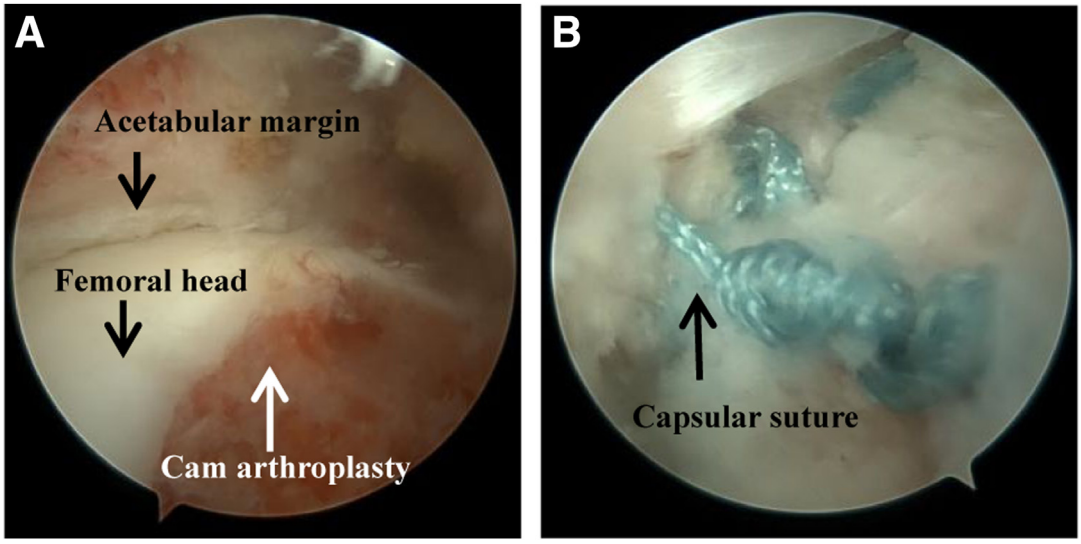

Fig 5. (A) Cam arthroplasty is performed after the joint capsule is dissected longitudinally. (B) The joint capsule is sutured to protect joint stability.

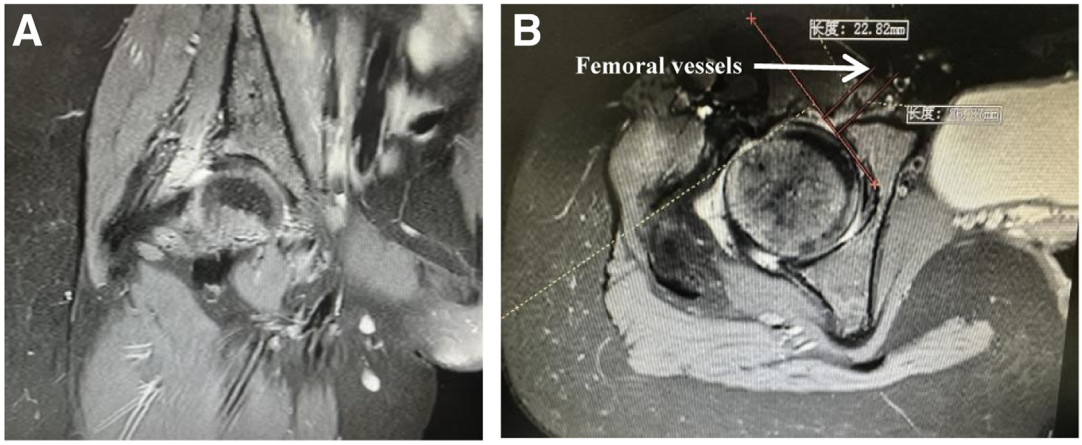

Fig 6. Postoperative magnetic resonance imaging of the right hip joint shows that the cyst is cleanly resected. (A) The cyst completely disappears in the coronal view. (B) The distances of the articular cavity from the femoral artery and femoral vein are 22.82 mm and 26.87 mm, respectively, in the transverse view.

Discussion

Owing to the deep location of the iliopsoas cyst and its medial region adjacent successively to the femoral nerve, femoral artery, and femoral vein, open surgery is characterized by high risk, and the slightest inadvertence may lead to damage to important vascular nerves in the lower limbs. Growing cysts can press on peripheral blood vessels and nerves, causing lower-limb backflow disorders such as lower-limb swelling, deep vein thrombosis, or quadriceps atrophy and weakness.[8] The formation of iliopsoas cysts may be caused by injury to the medial glenoid labrum, pincer deformity, and extravasation of joint fluid after repeated wear and tear of the iliopsoas tendon resulting in the opening of the bursal channel. Therefore, many patients with iliopsoas cysts have iliopsoas tendon tension combined with internal snapping during hip joint movement.[7] Traditional open surgery cannot solve the root cause of cyst formation following vascular and nerve injury. Open surgery cannot reduce the postoperative recurrence rate or resolve the symptoms of intra-articular bounce.[9] Determining how to safely and fundamentally remove cysts and avoid recurrence has been a difficult task for hip surgeons.

With the mature development of hip arthroscopy technology, arthroscopy has been well used in the

Table 1. Pearls and Pitfalls of Technique

Pearls	Pitfalls
Physical examination and imaging are used to determine the causes of cysts and snapping.	Improper preoperative evaluation may lead to surgical failure.
The surgeon should identify the specific location of the iliopsoas tendon release.	If the wrong release site is used, the symptoms will not resolve.
The transverse incision of the joint capsule should be wide enough to expose the iliopsoas tendon.	The thickened joint capsule may easily be mistaken for the iliopsoas tendon.
The pincer around the iliopsoas tendon should be fully formed.	Inadequate molding may lead to recurrence of cysts and joint reverberation.
Tendon release is performed sequentially using scissors and a radiofrequency device.	The direct use of radiofrequency to release the tendon may damage the medial vasculature and nerves of the tendon.
The surgeon should fully clear the capsule wall and congested synovium.	Postoperative recurrence is possible.

treatment of femoroacetabular impingement, ischiofemoral impingement, and gluteus medius tendon injury. Blackman[10] suggested that once isolated pain in the hip originates from iliopsoas tendon tightness, arthroscopic severance of the tendon is a very safe and effective treatment modality. The theory provides a theoretical basis for the choice of tendon dissection in this operation. Because the iliopsoas and psoas major tendons terminate together distally at the lesser trochanter, some surgeons advocate release in the area of the lesser trochanter. Ilizaliturri et al.[11] performed iliopsoas tendon release within the intercentral compartment and at the level of the lesser trochanter in 20 patients with medial snapping hips, and their comparative analysis showed that both methods achieved positive results. For iliopsoas cysts adjacent to the joint, arthroscopy should be given priority to explore and release the tendon in the central compartment of the hip joint, which can achieve good results (Table 1).

Conventional open surgery makes it difficult to clearly expose the capsular cavity and effectively reshape the pincer deformity. In addition, if a cyst is found to be adherent to blood vessels and nerves during the operation, there is a high risk of injury to the blood vessels and nerves when removing the cyst. Arthroscopic surgery is safer and more effective when the pincer resection, tendon release, and synovial membrane cleaning are performed in an orderly manner with clear visualization and almost no bleeding throughout the procedure. As a result, the described minimally invasive hip arthroscopy technique has the advantages of high safety, thorough cleaning, and removal of predisposing factors, which is worth popularizing and applying (Table 2).

Table 2. Advantages and Limitations of Technique

Advantages	Limitations
Medial hip snapping is resolved minimally invasively and effectively.	The surgeon should identify the tense location of the iliopsoas tendon before the operation.
One can accurately explore the cystic cavity and clean the cyst, and the risk of vascular and nerve damage is low with the use of saline solution augmentation.	Unskilled manipulation and lack of proficiency in anatomy may increase the risk of catastrophic iatrogenic injury.
Owing to the small amount of trauma and quick recovery after surgery, patients can return to normal life as soon as possible.	The strained part of the tendon should be carefully identified during the operation. Excessive release may lead to weak hip flexion, which may affect postoperative rehabilitation.

Disclosures

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