Iliopsoas Bursa-Hip Capsule Connection Leading to Intra-abdominal Fluid Extravasation

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abstract

Intra-abdominal fluid extravasation is a rare complication of hip arthroscopy, with a reported incidence of 0.16%. Associated risk factors include recent acetabular fracture, extra-articular procedures, iliopsoas tenotomy, and high fluid pump pressure. These previously reported risk factors were not present in the 48-year-old woman reported in this article. The patient elected to undergo hip arthroscopy for mechanical hip pain that persisted for 18 months. Preoperative magnetic resonance imaging scan showed a “normal variant communication [between] the iliopsoas bursa” and the hip capsule. Postoperative examination showed a tense, distended abdomen. After extubation, the patient had severe abdominal and pleuritic chest pain. Postoperative imaging showed significant retro- and intraperitoneal fluid extravasation. Ultrasound-guided paracentesis was used to drain the intraperitoneal fluid collection, with a significant decrease in pain. The patient returned home less than 24 hours later, with no further complications. The authors believe that the preexisting connection between the hip capsule and the iliopsoas bursa allowed the arthroscopy fluid to easily track proximally within the tendon sheath, despite relatively low fluid pump pressure. Surgeons should be aware of this possible “normal variant communication,” which may be considered a relative contraindication to hip arthroscopy, especially in patients with arthritic changes on preoperative imaging. This must be addressed with the patient preoperatively, with proper counseling and patient selection. If arthroscopy is pursued, the surgical and anesthesia teams must be vigilant for signs of intra-abdominal fluid extravasation and must be prepared to treat this potentially serious complication. [Orthopedics. 2015; 38(11):e1055-e1058.]

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Hip arthroscopy has increased in popularity as a means of performing joint-preserving procedures in relatively young patients. Published reports have shown this to be a safe procedure, with an overall complication rate of 1% to 13%. The most common complications are peripheral neurapraxia, portal hematoma, trochanteric bursitis, and instrument breakage.

Intra-abdominal fluid extravasation is a rare complication described in a report from the Multicenter Arthroscopy of the Hip Outcomes Research Network (MAHORN). It can lead to the more worrisome complication of abdominal compartment syndrome. In the MAHORN report, the prevalence of symptomatic intra-abdominal fluid extravasation was 0.16% (40 cases in 25,648 arthroscopies). Associated risk factors included elevated pump pressure and iliopsoas tenotomy. However, in 13 of the 40 cases, no identifiable risk factor was found. Herein, the authors report a case of symptomatic intra-abdominal fluid extravasation without iliopsoas tenotomy and its previously unreported cause.

Case Report
A 48-year-old woman had an 18-month history of right hip pain and mechanical symptoms consistent with radiologic findings of cam-type femoroacetabular impingement and Tönnis I degenerative changes (Figures 1A-B). Preoperative magnetic resonance imaging scan showed a focal tear in the superior labrum, with adjacent paralabral cysts and segmental areas of chondromalacia in the acetabular roof. Also noted in the radiology report was the “normal variant communication [between] the iliopsoas bursa” and the hip capsule, with intra-articular contrast tracking proximally within the bursa (Figures 1C-E). Despite the degenerative changes seen on imaging, the patient chose to undergo hip arthroscopy with the goal of treating the mechanical symptoms.

The patient underwent routine hip arthroscopy, with debridement of the torn labrum and delaminated acetabular cartilage, in addition to osteochondroplasty of the cam lesion. No iliopsoas tenotomy was performed. The patient was hemodynamically stable throughout the procedure, which lasted approximately 90 minutes, with total traction time of 40 minutes. Fluid pump pressure oscillated between 40 and 50 mm Hg, and the flow rate ranged from 0.75 to 1 L/min. Removal of the surgical drapes showed significant abdominal distention and cool, mottled lower extremities. At the time of incision, the patient’s temperature was 36.6°C. It dropped to a low of 34.7°C approximately 40 minutes later. Urine output during the
case was 300 mL. After extubation, the patient reported diffuse abdominal and pleuritic chest pain. The patient was given 20 mg furosemide intravenously for suspected intra-abdominal fluid extravasation and possible abdominal compartment syndrome.

The patient was transferred to the postanesthesia care unit for monitoring before transport to radiology. Postoperative abdominal computed tomography scan showed diffuse retroperitoneal fluid extravasation that greatly displaced retroperitoneal and intraperitoneal structures, in addition to a significant amount of intraperitoneal fluid. Multiple air pockets tracking up the iliopsoas were seen, indicating the path of fluid extravasation (Figure 2). Ultrasound-guided paracentesis of the intraperitoneal fluid was performed, yielding approximately 750 mL clear fluid from the left paracolic gutter. The patient had significant relief of pleuritic chest pain almost immediately after paracentesis. She was admitted for overnight observation and received an additional 20 mg intravenous furosemide. Less than 24 hours after paracentesis, she was discharged home, with complete resolution of abdominal and pleuritic chest pain.

**DISCUSSION**

An infrequent but potentially serious complication of hip arthroscopy, intra-abdominal fluid extravasation has been associated with recent acetabular fractures, extra-articular procedures, and prolonged surgical times. Verma and Sekiya described 5 warning signs of extravasation: inability to distend the joint, increased fluid requirement to maintain distention, frequent cut-off of pump irrigation systems, abdominal and thigh distention, and acute hypothermia.

It is believed that irrigation fluid most frequently courses retroperitoneally along the iliopsoas muscle and iliac vessels until entering the abdomen. With iliopsoas tenotomy, the tendon sheath is opened, allowing irrigation fluid to travel freely along this path. Previous reports discussed elevated pump pressure as a risk factor for intra-abdominal fluid extravasation, with increased pressure driving the fluid within the tendon sheath. In this case, no tenotomy was performed, and it is believed that the preexisting connection between the iliopsoas bursa and the hip capsule allowed the fluid to track easily into the retropitoneum, despite relatively low pump pressure. Therefore, the presence of this normal variant connection should be noted on magnetic resonance imaging.

This may be considered a relative contraindication to hip arthroscopy and should be discussed with the patient preoperatively. In patients with mild arthritic changes on preoperative imaging, the risk of intra-abdominal fluid extravasation with this variant may outweigh the potentially unpredictable benefits of hip arthroscopy. However, for other patients, especially younger patients, with no signs of degeneration, the potential for significant long-term benefits from hip arthroscopy may outweigh the risk of intra-abdominal fluid extravasation, even in the face of this variant.

If the decision is made to proceed with surgery in these cases, the surgical and anesthesiology teams must be acutely aware of the signs of intra-abdominal fluid extravasation.
sation and communicate with each other throughout the case. The authors recommend using a transparent drape over the operative extremity and abdomen to allow easy monitoring for increased tension or distention. Pump pressure should be maintained as low as possible to facilitate arthroscopy. In the MAHORN report, 1 mean pump pressure in cases with intra-abdominal fluid extravasation was 69.4 mm Hg (range, 45-90 mm Hg), and in all arthroscopic procedures, mean pump pressure was 55.6 mm Hg (range, 30-80 mm Hg). Pump pressure in this case was kept relatively low, between 40 and 50 mm Hg, indicating that low pump pressure alone may not be enough to avoid intra-abdominal fluid extravasation in these cases. This emphasizes the need for vigilant monitoring for signs of intra-abdominal fluid extravasation when surgery is performed in patients with this variant. Special attention should be paid to the amount of fluid used during arthroscopy, with an attempt made to balance outflow with inflow. If an increase in fluid consumption occurs without an accompanying increase in outflow, this may be a sign that fluid is being lost. The anesthesia team should monitor the patient’s core temperature and hemodynamic needs closely, alerting the surgical team to any acute changes.

Within 40 minutes of incision, the current patient’s temperature dropped nearly 2°C to 34.7°C, although the surgical team was not notified. This emphasizes the importance of communication between the surgical and anesthesia teams during these high-risk cases.

Others have advocated various treatments for intra-abdominal fluid extravasation, including observation, diuretics, and open surgical drainage. 1,3,4 In this case, ultrasound-guided paracentesis was performed because of the patient’s severe pleuritic chest and abdominal pain. The patient had almost immediate relief, with a significant decrease in pleuritic pain, after paracentesis. She was hemodynamically stable, required no pulmonary assistance, and mobilized with physical therapy before discharge home less than 24 hours later. The authors recommend performing these high-risk cases in a facility with the capability to handle this potential complication. In the current case, a radiologist with experience with ultrasound guidance performed paracentesis. Alternatively, this procedure could be performed by a general surgeon with these skills who would also be able to perform open laparotomy if necessary.

Given the nature of fluid distribution within the retroperitoneum, ultrasound-guided drainage does not help to decrease the fluid burden. This is infiltrated within various tissue layers of the retroperitoneum, not in discrete collections, such as occurs within the peritoneum. This infiltrated fluid is not amenable to direct decompression and should be left to be absorbed and subsequently secreted. The decision to perform paracentesis was made to decrease acute pleuritic pain caused by diaphragmatic irritation and to avoid potential subsequent pulmonary complications.

REFERENCES


