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COMPLICATIONS OF HIP ARTHROSCOPY

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Arthrosccopy of the hip has become more popular as the techniques and skills are taught to residents, fellows, and orthopaedic surgeons at the Learning Center in Chicago. The hip is one of the last appendicular joints to be considered for treatment with this method for the following reasons: (1) the hip is deep and surrounded by dense structures such as muscle, tendon, fascia, and fat. (2) The hip joint is a ball and socket type, which limits maneuverability of instruments within the confines of the deep joint and capsule. (3) The capsule most often requires distraction forces to facilitate introduction of the scope and instruments into the joint.[1] (4) Special equipment is necessary for hip arthroscopy, such as longer arthroscopes and instruments, and attachments to the operative table for distraction and monitoring not included in most operating rooms.

Most of the complications associated with hip arthroscopy are a result of traction and fluid management, and are usually preventable. Fortunately, most are not serious and are usually transient in nature with rare permanent damage.

Among the pioneers in hip arthroscopy, most of the complications occurred early in their experience, and modifications to the technique, such as the use of special distractors and monitoring with tensiometers, have reduced the incidence of neuropraxias.[6]

Glick and Sampson have found that the use of a tensiometer allows for careful monitoring of the distraction forces and the length of time they are applied.[5] It is clear that the traction should be considered

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analogous to the use of a tourniquet. When the forces are kept below 50 pounds for less than 2 hours, it is expected that no neuropraxias will occur provided there is an adequate sized (7 to 9 cm diameter) peroneal post with proper padding. Glick has shown with evoked potentials monitored during hip arthroscopy that above 50 pounds of force will reduce nerve transmission (personal communication, 1999).

Byrd found 20 complications (1.34%) in 1491 cases reviewed among several experienced surgeons and those reported in the literature.[1] Pudendal nerve neuropraxias occurred most often (six cases) followed by four cases of sciatic nerve neuropraxias. There was one femoral nerve involvement and two lateral femoral cutaneous nerves. In only one case was there permanent damage from a laceration of the lateral femoral cutaneous nerve. He also found one scrotal necrosis, one retrieved broken instrument, and one case of heterotopic ossification. There also were three cases of intraabdominal fluid extravasations requiring paracentesis.

Funke and Munzinger reported on three complications in their series of 19 patients treated in the lateral decubitus position. Two transient pudendal nerve palsies were due to poor positioning and insufficient padding of the perineal post and one due to fluid escaping into the peritoneum, causing lower abdominal pain while the patient received regional anesthesia. They also had one labia majora hematoma. As a result, they have added more padding to the post and raised it laterally. They also discontinued the use of regional anesthesia for hip arthroscopy.[4]

MATERIALS AND METHODS

We have looked at all of our complications in 530 cases done since 1977 by JMG and TSG, and have found 34 cases. Of those, we felt 27 were transient and 3 were significant as outlined in Table 1. All except 11 patients were done in the lateral decubitus position. All hips were

Table 1. COMPLICATIONS IN 530 HIPS

Transient neuropraxias	
Peroneal	10
Pudendal	4
Lateral femoral cutaneous	1
Femoral/sciatic	1
Sciatic	4
Total neuropraxias	20
Fluid extravasations	
Intra-abdominal	9
Instrument breakage	2
Scuffing	2
Avascular necrosis femoral head	1
Total	34

distracted with one of three devices, of which two used electronic tensiometers. The indications for arthroscopy are well reported.[3, 6, 8, 9]

RESULTS

There were 20 transient nerve injuries, in which 10 were peroneal, 4 pudendal, and 4 sciatic, with one case both femoral and sciatic. The high number of peroneal neuropraxias could be related to the early developments and evolution of hip distractors for the lateral approach. All neuropraxias occurred from prolonged traction times (5 to 6 hours) on complex cases despite relieving the traction intermittently thoughout the surgery.

The high numbers of fluid extravasation (nine cases) are due to longer operative times and extraarticular procedures, such as iliopsoas tendon release, in which the surgery is done with a pump. We have recently changed to an outflow-dependent pump, which has reduced the total amount of fluid necessary for the arthroscopy and reduced the incidence of extravasations.

There were no infections, thombophlebitis, lacerated nerves, nor deaths.

We had neither scrotal or labial injuries from the peroneal post, nor any foot injuries from the foot holder.

All neuropraxias were transient, and in all, except for the one femoral and sciatic injury, the numbness and weakness never exceeded more than 2 to 3 days. The patient with the femoral and sciatic nerve neuropraxia resolved in 1 week. He required 4 hours of operative time with traction up to 95 pounds done intermittently for the removal of loose bodies.

Two patients suffered significant scuffing of the femoral head because of inadequate distraction. To facilitate entry of the arthroscope and operative equipment, the femoral head must be subluxed at least 1 cm.[6] With tissue stiffness, previous trauma, or arthritis, it can be more difficult to decompress the seal of the joint and require large forces to obtain adequate distraction. With inadequate distraction, the head of the femur is at great risk for gouging and the labrum is at risk for an iatrogenic peripheral tear or avulsion.

Most hip arthroscopies will result in minor scuffing from needle placement and instrument maneuvering, but shouldn't result in permanent damage.

The one patient who developed avascular necrosis of the femoral head was a 36-year-old man who tore his labrum after slipping off a ladder at work. Seven months after a partial labrectomy and debridement for minor arthritis, magnetic resonance (MR) imaging revealed avascular necrosis, a core decompression was done. The initial hip arthroscopy was done within the safe parameters as outlined above. It is speculated that his hip may have been at risk for avascular necrosis;

Table 2. CLASSIFICATION OF COMPLICATIONS ASSOCIATED WITH HIP ARTHROSCOPY

Traction injuries	*Distraction Type*
	Neuropraxia
	Femoral nerve
	Sciatic nerve
	Lateral femoral cutaneous nerve
	AVN—Femoral head
	Compression Type
	Neuropraxia
	Pudendal Nerve
	Scrotal necrosis
	Labia majora hematoma
Inadequate traction injuries	Cartilage scuffing (gouging)
	Labral avulsion
Fluid injuries	Extravasations
	Intraabdominal thigh
Infection	Deep
	Superficial
Instruments	Breakage
Late	Heterotopic ossification

however, the distraction and partial capsulectomy done to facilitate instrument mobility may have contributed to the event.

Table 2 is a classification of complications of both reported and potential problems encountered during hip arthroscopy.

DISCUSSION

Most complications occurring from hip arthroscopy are related to traction. Too much force for too long causes neuropraxias from stretching of the nerves or compression injuries to the perineum and pudendal nerve. Traction is necessary to see the innermost depths of the hip socket; without it, only a small portion of the extraarticular structures can be visualized.[2] If done with good padding on the foot plate and in the perineum, and a peroneal post 7 to 9 cm in diameter, compression problems can be avoided. The careful attention to the amount of traction (< 50 pounds) for less than 2 hours and releasing traction intermittently for prolonged cases will reduce the incidence of neuropraxias due to distraction.

It is important to understand the inherent laxity index of each patient to modify distraction forces during surgery. A dysplastic hip with a 4+ laxity index may require very little force for distraction after the suction seal of the hip of broken (< 25 pounds). Too much force may result in hyperelongation of the leg and neuropraxia of the nerves at risk.

Inadequate distraction can result in traumatic entry of instruments into the hip and scuff the cartilage surface or avulse the labrum.

Extravasations of fluid into the abdominal space and thigh are predictable with prolonged cases, acetabular fractures, and extraarticular hip arthroscopic procedures as in iliopsoas release. Careful attention to the pump mechanics and strict attention to the outflow will reduce this problem. If the pump is spinning and no fluid is outflowing, the fluid has to be going somewhere. Predictably, it is filling up the thigh or going intrapelvic.

SUMMARY

Complications associated with hip arthroscopy occur between 1.6% and 5%. Fortunately, with the greater understanding of the causes and advancements in techniques and equipment, the incidence is declining. Most of the complications were transient neuropraxias and fluid extravasations resulting in no permanent damage. Severe scuffing of two femoral heads and one case of avascular necrosis were considered serious and permanent, thereby resulting in a 0.5% rate in our series for significant complications.

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