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Treatment of Hip Flexion Contracture with Psoas Lengthening through the Middle Window of the Ilioinguinal Approach

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Abstract

Hip flexion contractures may affect both children and adults with neuromuscular disorders. The iliopsoas is the major deforming force. Iliopsoas lengthening can be accomplished over the pelvic brim to treat hip flexion contractures. The traditional interval for this procedure occurs between the iliopsoas and sartorius. This technique however, puts the femoral nerve at risk through indirect exposure. The ilioinguinal approach is a well established technique that accesses the iliopsoas tendon and also allows for direct visualization of the femoral neurovascular structures. The purpose of this article is to describe a technique to lengthen the iliopsoas tendon using the middle window of the ilioinguinal approach in order to protect the femoral nerve. Iliopsoas lengthening may be safely performed through this approach.

Introduction

Hip flexion contracture is a common problem in patients with spastic paresis such as cerebral palsy (CP) and patients with trauma about the hip. These contractures may lead to impairment in gait and activities of daily living. The iliopsoas muscle is the main deforming force in these patients[1]. One effective treatment for hip flexion contractures is intramuscular psoas lengthening over the pelvic brim.[2-7]

Traditionally, intramuscular psoas lengthening is approached through the intermuscular interval between the iliopsoas and sartorius. First, an oblique incision is made along the inguinal ligament from the anterior iliac spine extending distal and medial. The external oblique fascia is identified and divided. The internal oblique and transversus abdominis are bluntly dissected to access the ilium. The iliacus and psoas are then identified medially and the tendon is divided from lateral to medial. The femoral nerve is contained within the same fascial compartment as the iliacus and psoas muscle and tendon. Medial to the iliopsoas lies the femoral neurovascular bundle in a distinct fascial compartment. Prior anatomic studies in children show that the distance between the neurovascular bundle and tendon is as close as 4mm. Internally rotating and flexing the hip can help differentiate the psoas tendon from the femoral nerve.[8] Indirect exposure in this technique puts the femoral neurovascular bundle at risk of iatrogenic injury.

The ilioinguinal approach has been previously described to perform intramuscular psoas lengthening for the treatment of snapping hip with good results.[9] The purpose of this article is to describe the use of the middle window of the ilioinguinal approach to perform intramuscular psoas lengthening for the treatment of hip contractures.

Surgical Technique

The procedure is conducted under general anesthesia. Preoperatively, a Thomas test is performed and hip range of motion is examined. Preoperative antibiotics are administered, typically a 1st generation cephalosporin. The patient is placed in a supine position on a regular table with a bump under the ipsilateral hip. The patient's hip is then prepped and draped in typical sterile fashion (Figure 1).

Bony landmarks include the iliac wing, anterior superior iliac spine, and pubic tubercle. The femoral artery is palpated and marked on the skin as an additional landmark. A 5-6cm incision is made medial to the anterior superior iliac spine along the inguinal crease through subcutaneous fat. The external oblique aponeurosis is incised parallel to the skin incision cranial to the inguinal ligament to expose the inguinal ring. The ilioinguinal nerve is identified and protected. The spermatic cord in men or round ligament in women is retracted to the medial aspect of the wound with a vessel loop. The transversus abdominis is released with a 1-2mm cuff of the inguinal ligament to free the muscular attachments from the inguinal

Figure 1. Iliac wing, anterior superior iliac spine, pubic tubercle and inguinal ligament marked.

ligament. This release begins at the anterior superior iliac spine and progresses medially to the conjoint tendon of the internal oblique and the pubic tubercle. The lateral femoral cutaneous nerve is encountered just deep to the conjoint tendon approximately 1-2cm medial to the anterior superior iliac spine. At this point, the iliopsoas muscle is exposed in the lateral portion of the wound with the femoral nerve lying on its anteromedial surface. The femoral artery and vein may be palpated medial to the iliopectineal fascia. The iliopectineal fascia is left intact to protect the vessels. The femoral nerve is dissected free from the iliopsoas and protected. The iliopsoas tendon may be lifted off the pelvic brim and transected safely with the hip in flexion (Figure 2). Hip range of motion is then reassessed. Note that the muscle is uninjured by this procedure and the insertion on to the lesser trochanter is undisturbed. The wound is then copiously irrigated and closed in a layered fashion.

Postoperatively, the patient is allowed to weight bear as tolerated. Perioperative antibiotics are continued for 24 hours after surgery. Aspirin is administered twice a day for six weeks for deep vein thrombosis prophylaxis. Physical therapy is initiated immediately after surgery. Therapy includes stretching of the iliopsoas tendon and progressive concentric resistive exercises of all the muscles around the hip.

Discussion

Hip flexion contracture is a debilitating condition that affects many patients with spastic paresis and prior hip trauma. Intramuscular psoas lengthening over the pelvic brim has been a well established technique to treat this condition.[2-7] The traditional approach for psoas lengthening has been described using the interval between iliopsoas and sartorius. This technique however, does not provide direct visualization and protection of the surrounding neurovascular structures such as the femoral nerve, artery and vein. The ilioinguinal approach has been previously described to perform intramuscular psoas lengthening for the treatment of snapping hip with good results.[9] This article is the first to describe the ilioinguinal approach for intramuscular psoas lengthening for the treatment of hip flexion contracture.

The ilioinguinal approach allows the surgeon to directly identify the femoral nerve in the same fascial compartment as the psoas. It also allows for direct visualization and protection of the femoral artery and vein. This technique is particularly important when treating patients that are able to ambulate in order to protect their function. In our experience all patients who have undergone this procedure have had improvements in their hip range of motion post operatively.

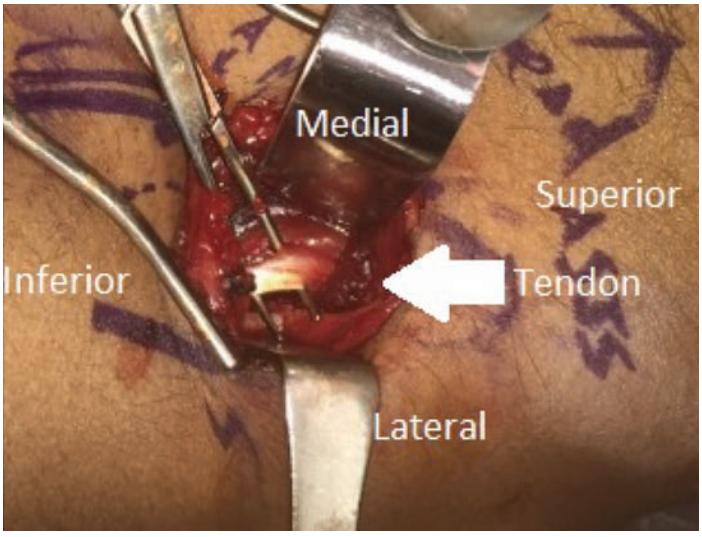

Figure 2.Psoas tendon identified with surrounding neurovascular structures protected.

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