Platelet Rich Plasma Therapy in an Athlete with Adductor Longus Tendon Tear

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While the popularity of sports and physical activities have increased tremendously within society recently, so too have the number of traumatic and overuse injuries. In order to aid soft tissue healing, recent series have suggested the use of autologous blood products to enrich the healing environment. Platelet-rich plasma (PRP), a form of prolotherapy, has been used in a variety of applications, specifically related to the ability to provide and promote growth factor release.

Platelets, derived from megakaryocytes with a circulating life of eight to twelve days, participate in clotting and hemostasis. When activated by thrombin, platelets transform into a pseudopod structure and release an abundance of growth factors and chemokines. These factors directly result in the healing process and tissue regeneration. Few series with small sample sizes have shown efficacy of platelet rich plasma in aiding the healing process in epicondylitis and plantar fasciitis. This case report presents the clinical application of PRP in an athlete with adductor longus tendon tear.

Case Report

A 28 year old male presented to the sports medicine clinic complaining of significant pain to his left groin following accidental injury while playing soccer four days prior. He had sustained a laterally directed force to the medial aspect of his left calf. The patient was adducting his leg while cutting to the right, carrying the soccer ball with his left foot, when he was struck by an opposing player. This direct blow caused the patient's body to lift off the ground. The tendon tear resulted from an eccentric load while the patient was in abduction. He immediately felt a severe pain in his left groin, focusing on the area of his left inguinal tract. He also heard a "popping sound."

Initial examination of the left lower extremity revealed significant swelling and ecchymosis over the left groin extending from the scrotum to mid-thigh. The patient had severely limited active and passive range of motion of the left hip secondary to pain. The patient was unable to actively adduct his limb with a manual muscle grade of 0/5. On palpation, the patient had significant tenderness along the inguinal tract, pelvic rim, and over the pelvic crest. The tenderness extended distally to the mid-thigh on the medial aspect of the limb. The right side was unaffected with normal active and passive range of motion, normal strength, and no tenderness to palpation. AP and lateral left hip and AP pelvis radiographs showed no osseous or articular abnormalities (Figure 1). An MRI revealed a complete tear of the left adductor longus tendon from its insertion at the anterior surface of body of pubis as well as high grade muscle strain (Figure 2). The bone itself showed no evidence of subchondral edema or fracture. Retraction of the tendon distally was noted with prominent edema extending between the muscles and the medial aspect of the left proximal thigh. There was also high grade strain of the adductor brevis muscle. After these findings were discussed with the patient, he was referred for a surgical consult. It was from this surgical consult that the patient was made aware of an option to have platelet rich plasma therapy performed.

Two sets of PRP injections were planned six weeks apart. The procedure was ultrasound guided and done under standard aseptic protocol. The area marked for injection was based off radiologic landmarks, ultrasound findings, as well as physical examination and demarcations of the areas with the greatest amount of tenderness to palpation. Upon initial ultrasound, a fluid collection was noted in the area of the adductor longus tendon attachment site to the pelvis. The patient had 7cc of autologous PRP mixed with fibrinogen injected directly into the adductor longus tendon under ultrasound visualization. Once the procedure was finished, the patient was given instructions for limited activity. The patient returned to the clinic six weeks later for the second injection and discharged to outpatient therapy.

At the initial physical therapy assessment, the athlete was guarding with passive range of motion. The adductor injury was protected using rest, ice, compression and elevation. Once the spasms had subsided, the patient was initiated on an active therapy regimen, consisting of isometric exercises without resistance and graduating to exercises with resistance. Following strengthening and co-activation of both abdominal and hip flexor muscles, the patient progressed to dynamic, proprioceptive, and sport-specific exercises. The patient returned to full-strength 5/5 and was able to participate in competitive soccer without symptoms

Discussion

The role of platelet rich plasma therapy has been discussed in recent series for treatment of tendinopathy, yet its proven efficacy is still limited. Before discussing tendon injuries, it is important to value the nomenclature of tendinopathy versus tendonitis. What was once thought of to be an inflammatory process is now more readily

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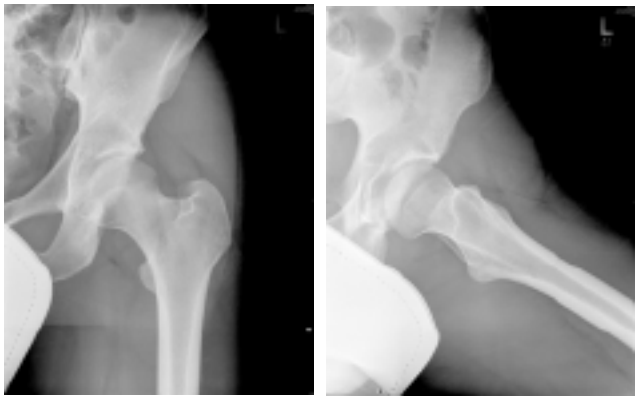

Figure 1. AP and lateral radiographs of the left hip were obtained. No plain film osseous or articular abnormalities are identified.

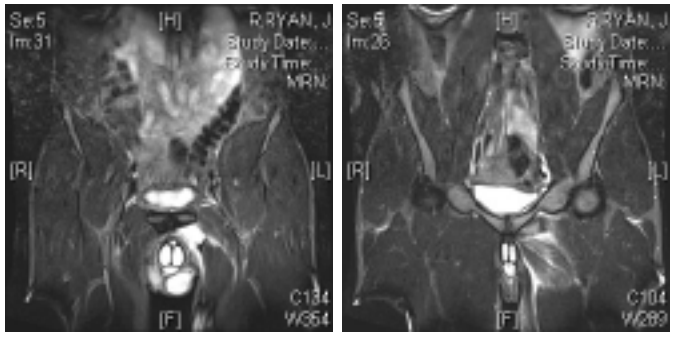

Figure 2. Proximal insertional tear of the left adductor longus tendon with associated high grade strain of the left adductor longus and brevis muscles.

understood to be a process of repair and regeneration within the tendon sheath[1]. A series from Stanford University assessed twenty patients with epicondylitis. Fifteen patients were treated with one PRP injection and the remaining five were control subjects treated with lidocaine only. The PRP group reported clinical improvement of 60% at 8 weeks, 81% at 6 months, and 93% at mean 25 months[2]. This compares to the control group who reported only 16% improvement. Barrett et al studied nine patients with plantar fasciitis. These patients had not been exposed to previous treatments and were administered 3cc of autologous PRP with ultra-sound guidance. At one year follow-up, 78% of the patients had complete relief from pain and returned to normal activities[3]. The patient in this case report regained complete functional mobility within eight weeks following initial PRP therapy. However, in a recent study from JAMA, Vos et al randomized 54 patients with Achilles tendinopathy to either PRP or placebo groups. This was the first double-blind, block-randomized, placebo-controlled trial on the clinical use of PRP injection. Using pain and activity level measures, the study reports there was no significant difference between both groups[4].

While there are few series proving PRP efficacy in tendinopathy, wound and bone healing are two areas where PRP has shown some benefit. McAleer et al débrided 33 wounds, which had not shown a reduction in surface area over 6 months, to expose underlying granulation tissue. The wounds were injected with PRP every 2 weeks. Twenty wounds showed complete healing and epithelialization at mean 11.5 weeks[5].

While there still remains a paucity of evidence supporting the use of PRP in tendinopathies, anecdotal and small case series suggest its efficacy. Conservative treatments alone have not proven to increase the healing process of tendinous injuries. A meta-analysis of more than 20 randomized control trials reported that physical therapy did not have statistically significant improvement in outcomes for lateral epicondylitis[6]. These small numbers of trials were insufficiently powered to prove clinical improvement following lateral epicondylitis. However, in a meta-analysis from 2007, eccentric overload training did seem to improve pain measures in patients with Achilles tendinopathy. The limitation of this review was flaws in methodology to clearly draw conclusions regarding functional outcomes in these patients[7].

Growth factors have been shown to play an instrumental role tissue regeneration and maturation. They attract stem cells and enhance their differentiation, causing a proliferative matrix for healing[8]. Tendons, while relatively acellular, are made up of specialized cells and collagen fibers woven together to form a durable structure securing muscle to bone. They are directly responsible for transmitting great forces in a flexible manner to avoid disruption. Injuries to tendons often are not accompanied by inflammation, suggesting tendinosis a more appropriate term than tendonitis[9]. In addition, due to the relatively poor blood supply, tendon healing occurs at a slower rate.

The future of PRP therapy offers a promising and robust application in a number of various arenas. While the natural history of adductor tendon injuries is not well defined, the patient presented in this case report achieved optimal functional recovery following PRP injection and physical therapy. PRP has the theoretical advantage of enhancing the healing of injured musculotendinous tissue. Little is still known regarding the natural course of PRP's role in tendon healing. In addition, post-injection protocols and algorithms are not universally accepted as of yet. The potential, anecdotal benefit of PRP to enhance healing has been largely responsible for the level of interest in the scientific community. More clinical trials are needed to fully appreciate the efficacy of PRP in healing wounds, tendon injuries, fracture healing, and even interventional spine.

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