Utilization of PRP injection and conservative treatment on partial UCL tear in professional baseball pitcher.

Connor J. Grant, Jason C. Craddock

Florida Gulf Coast University, Department of Rehabilitation Sciences, Fort Myers, FL USA

Abstract

Background: Baseball athlete, pitcher, 23 years old. PMH: Valgus extension overload of R arm 2 years prior. Pt. presents with R medial elbow P! on pitching arm. Onset: Chronic. Pain scale: 5/10 MOI: Repetitive excessive valgus force placed on medial elbow. Pt. noticed tautness 5 days prior and continued with activity before seeing trainer. P! increases with valgus stress and late cocking phase of pitching. P! alleviates with rest. Pt. presented with no obvious swelling or discoloration around injury site. Pt. was TTP on UCL ligament. UCL laxity and cubital valgus of R arm was present. GIRD was also noted when examining pitching mechanics. Full AROM present, but decreased strength in the wrist flexors was noted. (+) Moving valgus stress test, (+) UCL laxity. **Differential Diagnosis:** Pronator muscle strain, medial epicondylitis, UCL sprain. **Treatment:** Athlete was administered PRP injection into right elbow. Athlete then began conservative treatment with the sports medicine staff. Plan of care regarding this athlete consisted of a variety of therapeutic techniques and exercises in order to restore and enhance the functional limitations present. This first consisted of pain management of injury site as well as PRP injection. This was done through the use of passive modalities such as a game ready to reduce pain and inflammation at site of injury. Assessments of possible contributing factors including the ST, GH, and elbow joint were evaluated for function, which will guide the treatment plan. Treatment sessions comprised of passive mobility including soft tissue mobilizations, joint mobilizations, and stretching, as well as active treatment consisting of strengthening of surrounding musculature, plyometrics, and a return to throwing protocol. Once achieved, the pt. progressed back into their designated functional activity, pain and symptom free. **Uniqueness:** Recently PRP injections have been getting a lot of credibility for their positive effects on tissue healing. The literature is filled with a variety of studies that compare rate of return to play post PRP injection with conservative treatment rather than surgical intervention. One study reviewed the return to play for 23 athletes with UCL insufficiency who received PRP injections. 22 of the 23 individuals were able to return to play and demonstrated reconstitution of the UCL on MRI. Return to competition level play following PRP injection and conservative treatment was a mean of 82 days. This type of treatment can prove beneficial over surgical intervention as the RTP following PRP injections is about 2 months compared to 11 months post surgical. This specific case utilizes the implementation of a PRP injection on a ligamentous injury, followed with conservative treatment with the hypothesis of increased healing rates and accelerated RTP for the baseball athlete. Further research concluding the effects of PRP injections on ligamentous injuries in relation to accelerated return to play is needed. **Conclusion:** This case highlights the conservative treatment of an athlete who has sustained UCL insufficiency due from the nature of their sport. This case further highlights the success of managing this injury with the implementation of PRP injections to accelerate the healing process and return to play. This single case review refutes evidence on PRP injections and their effects on ligamentous injuries in relation to return to play.

Introduction

The use of biologic adjuncts such as platelet-rich plasma (PRP) is an area of increasing interest and promise for the treatment of many orthopedic injuries. Platelet-rich plasma has been gaining more and more popularity over the years as many doctors are beginning to offer platelet-rich plasma therapy to their patients as a way to treat joint problems caused by damaged and inflamed tendons. It is being used as an alternative to surgery in some cases and as an adjunct to speed healing in others. Current research indicates that a majority PRP therapy has been geared towards ligamentous/tendon injuries, but treatment of muscle and bone is a possibility. Medial ulnar collateral ligament (UCL) injury is increasingly prevalent in professional baseball pitchers due to a majority of factors. Among major league pitchers, 25% (96 of 382) had a history of UCL reconstruction, while minor league pitchers showed a 15% (341 of 2324) prevalence[1]. With a UCL tear being a potential career-ending injury, it is imperative that the best treatment option is provided to these throwing athletes, which is a major concern to professional pitcher. If not fully torn, individuals can opt for either nonoperative treatment or surgical reconstruction. Return to pitching following reconstruction requires 12-16 months of post-operative rehabilitation, while return from non-operative treatment requires about 5.5 months. Introducing PRP injections, in theory, would accelerate the healing process allowing for a faster return to play based on the ability to progress through an interval-throwing program. Sánchez et al, looked at the effects of PRP and found that it enhances the recruitment, proliferation, and differentiation of cells involved in tissue regeneration. Introducing PRP injections into nonoperative treatment of ligamentous/tendon injuries can give us a better insight on the efficacy of PRP, and whether individuals should opt for conservative w/ PRP injection vs operative treatment. The purpose of this case report is to demonstrate the diagnostic process of implementing PRP injections for ligamentous injuries in baseball pitchers, in particular partial tears to the UCL, to determine its efficacy on increasing healing rates allowing for an accelerated return to play without surgical intervention.

Case Report

Patient History: Individual is a 23-year-old professional baseball player who presents with medial elbow pain on right arm (pitching arm). Individual has past medical history of valgus extension overload on same arm 2 years prior. Onset of injury is insidious due to nature of sport, placing repetitive valgus stress on medial elbow during pitching. Individual noticed abnormal tautness of medial elbow 5 days prior to seeing a trainer and continued activity. The individual's goals for physical therapy was to receive nonoperative treatment in the offseason in order to return to play in a timely fashion for following season. Based on the data presented so far, it can be indicated that differential diagnoses may include, but not limited to; UCL sprain, pronator-flexor strain, or medial epicondylitis. The plan for examination should include an in-depth history, inspection of involved and surrounding structures for any abnormalities, measures including ROM, strength, joint mobility, and special tests to provoke symptoms in order to confirm or deny differential diagnoses. This individual presents as a good candidate for this case report based on sustaining a partial UCL tear and prior history of valgus laxity and valgus extension overload. The timing of the injury also allowed the individual to select this method of treatment knowing if conservative treatment with the PRP injection failed, the individual would be able to opt for UCL reconstruction and follow a rehab plan for that in a timely fashion in order to return to a pre-injury state for the following season. This case report can then serve as important data on PRP injections and conservative treatment, and the ability to RTP at an accelerated rate successfully.

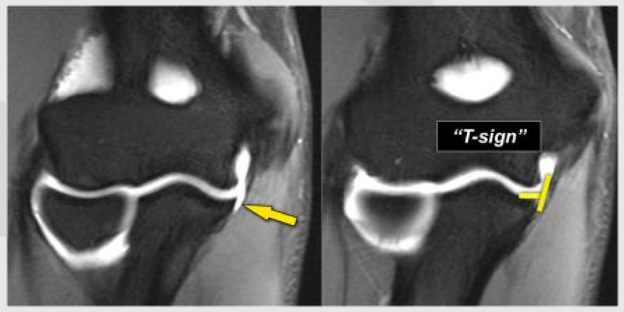
Examination: Upon examination, individual presented with cubital valgus and no obvious swelling or discoloration but was tender to palpation at the UCL ligament. Full AROM and PROM with no pain was noted. MMT of involved arm showed decreased strength in wrist flexors, and joint mobility testing showed increases valgus laxity. Valgus stress testing was positive for pain, leading to the indication of a UCL sprain or partial tear. Individual had an MRI done, which confirmed the diagnosis of a partial tear in his UCL ligament, displaying a classic "T-sign". The individual poses as a great target for implementing the intervention of PRP therapy and conservative treatment, as research is very limited on this topic in regard to professional pitchers sustaining nonoperative UCL injuries and the effects of PRP therapy and accelerated RTP. Hypotheses of what should be observed if the intervention is successful would be an accelerated healing process allowing the tendon to be strengthened and loaded quicker than your conventional conservative treatment without PRP. Expected RTP with PRP therapy and conservative treatment is 16 weeks compared to 24.5 weeks.

Intervention: PRP has been used clinically in humans since the 1970s for its healing properties attributed of autologous growth factors and secretory proteins that may enhance the healing process on a cellular level. Injections with PRP result in a multiple fold increase in the number of growth factors present such as platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), and insulin-like growth factor (IGF). These growth factors help to recruit cells to stimulate angiogenesis and endothelial cell growth to increase blood flow, allowing the initiation of an accelerated healing cascade.[2] Like previously stated, this intervention can be utilized for almost any orthopedic injury, but the literature suggests the best use is for ligamentous/tendon injury due to the poor vascularization and length of healing these structures have. The individual decided to utilize this intervention as it worked in his favor in regard to returning to play before the season starts. Following a PRP injection, individuals are then to follow a PRP injection rehabilitation protocol, specific to there injury. The mean time for return to play for a standard UCL rehabilitation protocol is 24.5 weeks. Whereas mean time for return to play in a UCL PRP injection rehabilitation protocol is 16-18 weeks. The rehabilitation plan is to be followed as planned, keeping in mind that this protocol is accelerated.

Rehabilitation and Results

Protocol: With the patient opting for conservative treatment with the utilization of a PRP injection, and accelerated rehabilitation protocol was administered to the patient. The rehabilitation protocol follows a 16 week return to play, including an accelerated return to throw protocol. The protocol was designed with five phases, including an interval throwing program, with particular criteria for the athlete to progress to the next phase. Phase I criteria consisted of diminishing pain and inflammation, restoring range of motion, maintaining muscular strength and flexibility of shoulder, elbow, wrist, hand and graft site (Gracilis). An elbow brace was also administered for the first two phases and eventually discontinued. In order to reduce inflammation, besides the use of modalities and treatment, the team physician prescribed anti-inflammatory for the athlete until inflammation decreased. Phase II criteria consisted of gradually increasing to full elbow ROM, promoting optimal healing of repaired tissue, and progressively regain and improve muscular strength of surrounding musculature. Phase III consisted of increasing strength, power, and endurance of surrounding UE musculature as well as graft site, and maintaining full elbow extension ROM. Phase IV consisted of normalizing shoulder/forearm strength, progressing power/endurance, and introducing upper extremity plyometrics to prepare for interval throwing program. Phase V consists of an accelerated interval throwing program, progressing the athlete from light catch/long toss consisting of 25 tosses at 45, 60, 90, and 120 feet to the mound with increasing volume and intensity.

Outcome: In order to gather objective patient related outcome measures throughout rehab, we incorporated the QuickDASH questionnaire. This patient related outcome measure (PROM) is specific to the upper extremity and asks the individual about their symptoms as well as rating their performance for certain activities such as activities of daily living and sport specific activities. These activities were graded on a scale from one to five, one pertaining to no difficulty with activity to five being unable to perform activity. Individual was given questionnaire at beginning of protocol in order to gather baseline information. These questionnaires were then followed up every four weeks to progressively gather outcome measures for the length of rehab. Patient's outcome measure scores were taken throughout the rehabilitative process and showed positive progression in all categories tested. Patient's follow up scores compared to baseline scores showed significant improvements in both sport specific and daily activity categories, with many fours and fives becoming ones and twos.



Discussion and Summary

This case report went over the utilization of PRP injections for ligamentous/ tendon injuries with the theory of accelerating the healing process in order to allow for a faster return to play. Studies have shown promising results with the incorporation of PRP injection followed with conservative treatment. This biological adjunct can be used for a variety of orthopedic injuries, making it an easily accessible intervention to consider when sustaining an injury with no major side effects and limited contraindications. This case report, along with numerous studies, have shown the efficacy of PRP injections being utilized in UCL sprain rehabilitation protocols with a successful accelerated return to play. While the current literature has shown promising results, there has been little data regarding standardization of the PRP injections. Injection schedules are greatly varied throughout the literature, ranging from a single injection to three injections in the recovery period. Additionally, the preparations of the PRP vary greatly in concentration of platelet concentrations, and there is a lack of data supporting any particular concentration in the literature. These areas require additional investigation.

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