



Case Report

Non-Invasive Regenerative Therapy for Dupuytren's Contracture: A Case Report

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Abstract

Dupuytren's contracture is a common condition of the hands, it occurs due to fibrosis of the palmar fascia and it ranges from early to debilitating stages impacting hand function. Management differs from observation to a clinical trial of corticosteroid or collagenase injections for early presentation and surgery for advanced cases. This article discusses a middle-aged woman who experienced early left Dupuytren's contracture and sought to avoid surgery, having previously undergone right palm fasciotomy for Dupuytren's contracture with a prolonged recovery and ongoing palm numbness. She had one session of investigational platelet-rich plasma (PRP) injected directly into the pathologic cords of the left ring and little fingers, we used local anaesthesia and the procedure was performed under ultrasound guidance. Nine months after the therapy, she experienced significant improvement without complications or relapse. This case highlights the application of relatively safe and affordable clinic-based PRP therapy for Dupuytren's contracture, owing to the potential endogenous source of certain proteins in both the plasma and mesenchymal stem cells that enable myofibroblasts to reprogram and dedifferentiate into adipocytes. We could not find similar clinical literature using PRP for Dupuytren's contracture, making this case as a superb finding. We suggest conducting a large-scale randomized controlled trial to validate these findings and standardize the PRP technique, to make regenerative medicine a primary treatment option for early Dupuytren's contracture before considering surgery.

Keywords: Dupuytren's Contracture; Platelet-Rich Plasma; PRP; Corticosteroid; Collagenase; Mesenchymal Stem Cells

Introduction

Dupuytren's Contracture (DC) is a fibroproliferative condition that affects the palmar aponeurosis of the hand. Usually, men between 40 and 80 years old are impacted. Developing Dupuytren's disease is associated with risk factors such as smoking, diabetes, manual labour, hand injuries, excessive alcohol consumption and epilepsy [1-3]. Moreover, Dupuytren's contracture is linked to several genes and individuals with a family history of the condition tend to have more aggressive disease patterns with early onset before age 40 and bilateral involvement. It results from the development of myofibroblasts at the afflicted palmar fascia, which causes an increase in type III collagen to replace the typical type I collagen. Initial management of DC is through observation and physiotherapy with night extension splints [4].

Dupuytren's contracture does not have a permanent cure. Preventing neurovascular damage and correcting the deformity are the main goals of therapy. The fibrous cord may be removed, split or dissolved to accomplish this, enabling the affected digit to be extended and enhancing hand function. Regrettably, it is not feasible to remove all Dupuytren's tissue, therefore there is always a chance that the pathology will return, either at the same location or somewhere else [5].

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The use of radiotherapy corticosteroid injections and other non-operative therapeutic methods in isolation is not well-supported by high-quality research [6,7].

Of the non-operative procedures, collagenase therapy appears to provide the most convincing evidence of effectiveness. Collagenase is one of the several poisons that the *Clostridium histolyticum* bacteria produces. It dissolves aberrant type III collagen in cords to reverse the consequences of contractures [8]. Collagenase therapy can be expensive, it might require multiple sessions and is not available in every country. The complications of collagenase including failure, tendon rupture, skin tears, local bruising and rare allergic reactions. We have managed a case with early DC using a single dose of platelet-rich plasma injected directly into the Dupuytren's cords.

Case Report

A middle-aged right-hand dominant lady displayed symptoms of right thumb flexor tenosynovitis and early Dupuytren's Contracture (DC) on her left hand, with minimal hand function restriction (Fig. 1) and right thumb flexor tenosynovitis. Her blood tests revealed no evidence of inflammatory arthritis, hand X-rays showed normal metacarpophalangeal joints, mild osteoarthritis in the interphalangeal joints and the base of the thumbs. Her past history reported a few years ago she had right DC surgery, while the procedure went well and there was no relapse, she did experience some prolonged recovery and localized numbness in the palm, expectedly thought to be due to cutaneous nerve disruption.

She elected for investigational Platelet-Rich Plasma (PRP) injection under ultrasound guidance, we discussed the pros and cons of the PRP therapy with an informed consent signed, 30 ml of blood was taken to extract 5.5 ml of PRP, the procedure was done under local anaesthesia; 1.5 ml of PRP was injected into the right thumb flexor tendon sheath. The other 4 ml of PRP was injected directly into the palmar Dupuytren's cords of the left ring and little fingers as shown in [Video 1](#).

One month post procedure she reported complete resolution of the right flexor tenosynovitis with dramatic improvement of the left 5th DC cord but gradual response of the thickest ring finger cord. We followed the patient for 9 months with a significant improvement in the DC (Fig. 2). We have reported no recurrence and no complications suggest a good non-surgical outcome of a difficult-to-treat hand pathology.



Figure 1: Pre-treatment for Dupuytren's contracture.



Figure 2: Nine months post-PRP therapy for Dupuytren's contracture.

Discussion

Dupuytren's Contracture (DC) is currently treated with night splints, physical therapy and observation. There is no known long-term treatment for DC. The primary objectives of treatment are to prevent neurovascular injury and to correct the distortion. By cutting, breaking or dissolving the fibrous cord, the affected finger can be stretched to enhance hand function. The non-operative use of radiation therapy and corticosteroid injections failed to produce any healing effects [6,7]. However, collagenase treatment can be costly, require multiple sessions and is unavailable in many countries. Adverse consequences can include allergic responses, skin tears, tendon rupture and even failure [8].

While not frequently used for DC, Platelet-Rich Plasma (PRP) has the potential to stimulate the body's mesenchymal stem cells. Bone Morphogenetic Proteins (BMPs) are notable members of the Transforming Growth Factors- β (TGF- β) superfamily that play a significant role in the pathophysiology of DC. PRP is a potential endogenous source of certain BMPs. Myofibroblasts can be reprogrammed and dedifferentiated into adipocytes in response to high doses of recombinant BMP-4 and 7 [9]. This leads one to speculate that autologous PRP and adipose-derived stem cells contain BMP levels high enough to promote Dupuytren myofibroblast conversion into preadipocytes.

Although we think that fat-derived stem cell therapy in conjunction with plasma would be more desirable than plasma alone due to the synergistic effect [10], we only tried PRP on our patient. We believe this therapy can be used medically in early DC or post-surgical fasciotomy to prevent future recurrence. Our patient's recovery from early DC persisted for nine months following a single PRP therapy without a relapse.

PRP is currently not covered by many insurance companies, but we anticipate that might change for early DC cases because it is less expensive than surgery, far safer, easier to administer and less invasive than surgery with shorted recovery time. We need to standardize the process of PRP use in DC with early conditions so we can routinely try it to avoid future surgery.

Conclusion

We hypothesize the use of single Platelet-Rich Plasma therapy (PRP) has resulted in considerable improvement of the ring and little fingers Dupuytren's contracture. It is a relatively safe, inexpensive, clinic-based procedure with a fast recovery time and no serious complications; however, we require large-scale randomized research to validate our findings.

Conflict of Interests

The authors declare that there is no conflict of interest for this paper.

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