

NON-SURGICAL TREATMENT OF PAINFUL FIFTH TOE NEUROMA WITH INTRATUMORAL INJECTION OF AUTOLOGOUS PLATELET RICH PLASMA

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Abstract

Abstract:

Introduction: Management of painful neuromas of foot and ankle are challenging because of persistence of pain and recurrence after resection (1). This report describes non-surgical treatment of very painful 5th toe neuroma with associated allodynia and hyperalgesia with intratumoral injection of autologous platelet rich plasma (aPRP).
Case Report: A man aged 40 years, a physician by profession, presented with left little toe pain that began about a year and half ago. Pain was sharp in nature and lasted 30 minutes to one hour. The pain was localized to the left lateral and dorsal aspects of the little toe. Bed rest helped alleviate the pain to some extent. Past history was remarkable for surgery for Tailor's bunion (bunionette) that the patient underwent 3 year earlier. After several medical consultations, the condition was clinically diagnosed to be a neuroma or entrapment neuropathy resulting from prior surgery. Three injections of dexamethasone one month apart provided symptomatic relief for a short period but the pain returned following which the patient received 7-8 injections of absolute alcohol. Digital nerve neuroma was diagnosed by MRI. Over the four months prior to consultation with us, the pain had become very severe with allodynia and hyperalgesia with relief only with large doses of non-steroidal antiinflammatory drugs (NSAIDs). During the current consultation, clinical examination revealed swollen little toe with inflammation extending 5cm proximally. The lesion was non-pulsatile. Pain score was 9 on 10 of visual analog scale (VAS) and was associated with allodynia and hyperalgesia. Current medications included paracetamol and tramadol. An ultrasound examination revealed well-defined ovoid homogeneous hypoechoic lesion measuring about 0.7 x 0.8 cm. Four ml of aPRP was prepared with refrigeration model of centrifuge machine using double-spin method. After field block with 6 ml of 0.25% bupivacaine, about 0.8 ml of aPRP was injected into the lesion percutaneously and the remaining PRP was injected into the surrounding inflamed areas. Pain got relieved progressively over 4 days with swelling disappearing completely. At 2 weeks post-injection, the pain score was 3 on VAS with no allodynia or hyperalgesia.

Conclusions: PRP injections have wide applications in degenerative joint lesions and sports injuries (2). PRP is a good source of molecules involved in tissue repair and regeneration. The present case represents the first report of intratumoral injection of PRP in the treatment of painful peripheral nerve neuroma. The case is being followed up to evaluate long-term benefits.
References:
1. Gould JS, Naranje SM, McGwin G et al. Use of collagen conduits in management of painful neuromas of the foot and ankle. Foot and ankle international 2013;34:932-40.
2. Andia I, Maffulli N. Platelet-rich plasma for managing pain and inflammation in osteoarthritis. Nature reviews Rheumatology 2013;9:721-30.

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Introduction and Case Report

Introduction: Management of painful neuromas of foot and ankle are challenging because of persistence of pain and recurrence after resection. This report describes non-surgical treatment of very painful 5th toe neuroma with associated allodynia and hyperalgesia with intratumoral injection of autologous platelet rich plasma (aPRP).

Clinical History

1. A man aged 40 years, a physician by profession, presented with left little toe pain that began about a year and half ago. Pain was sharp in nature and lasted 30 minutes to one hour. The pain was localized to the left lateral and dorsal aspects of the little toe.
2. Bed rest helped alleviate the pain to some extent. Past history was remarkable for surgery for Tailor's bunion (bunionette) that the patient underwent 3 year earlier. After several medical consultations, the condition was clinically diagnosed to be a neuroma or entrapment neuropathy resulting from prior surgery.

Treatment History:

1. Three injections of dexamethasone one month apart provided symptomatic relief for a short period but the pain returned following which the patient received 7-8 injections of absolute alcohol. Digital nerve neuroma was diagnosed by MRI.
2. Over the four months prior to current consultation, the pain had become very severe with allodynia and hyperalgesia with relief only with large doses of non-steroidal antiinflammatory drugs (NSAIDs).

Case Report

3. During the current consultation, clinical examination revealed swollen little toe with inflammation extending 5cm proximally. The lesion was non-pulsatile. Pain score was 9 on 10 of visual analog scale (VAS) and was associated with allodynia and hyperalgesia.
4. Current medications included paracetamol and tramadol. An ultrasound examination revealed well-defined ovoid homogeneous hypoechoic lesion measuring about 0.7 x 0.8 cm.



Current Treatment

1. aPRP was prepared by refrigeration model of centrifuge machine using double-spin method (Figure)
2. Field block with 6 ml of 0.25% bupivacaine was given
3. About 0.8 ml of aPRP was injected into the lesion percutaneously and the remaining PRP was injected into the surrounding inflamed areas

Post Injection Findings

1. Pain got relieved progressively over 4 days with swelling disappearing completely.
2. At 2 weeks post-injection, the pain score was 3 on VAS with no allodynia or hyperalgesia
3. Two months after injection pain started recurring again requiring NSAIDs treatment
4. Another injection aPRP injection is being contemplated



Preparation of PRP and Discussion



Physiology of platelets

1. Smallest structure among circulating blood cells, Anucleate and cannot replicate
2. 2 to 4 microMitres in diameter
3. Survive for about 10 days in circulation
4. Normal platelet concentration in blood is 1.5L to 4.5L platelets per microliter
5. For therapeutic effect, the concentration should be increased to 1 million (10L) platelets per microliter

Role of Platelets in Tissue Repair

1. Platelet derived growth factor (PDGF)
2. Multiple growth factors (GFs) in inactive form
3. Transforming growth factor-beta (TGF-beta)
4. Fibroblast growth factor (FGF)
5. Insulin like growth factor I (IGF-I)
6. Connective tissue growth factor (CTGF)
7. Hepatic growth factor (HGF)

Discussion

Guidelines for PRP preparation

1. The American Association of Blood Banks Technical Manual, 18th ed, 2014
2. Dhurat R, Sukesh M. Principles and Methods of Preparation of Platelet-Rich Plasma: A Review and Author's Perspective. Journal of cutaneous and aesthetic surgery 2014;7:189-97.
- 3) Practical Aspects: REMI centrifuge: (Rotor 6 cm radius)
 - a) Centrifugation at 12 to 16 degrees centigrade

Stage	RPM	g-Force	Time
Separation (Female)	2700	490	12 min
Separation (Male)	2800	525	12 min
Concentration	3200	690	7 min

Guidelines for Use of PRP

1. Platelet Rich Plasma (PRP) Guidelines: International Cellular Medicine Society - 2011 (Last Accessed 2014 Dec 15, Available from <http://www.cellmedicinesociety.org>)
2. Typical uses
 - a) Degenerative osteoarthritis
 - b) Achilles Tendonitis
 - c) Sports ligamentous injury
 - d) Plantar fasciitis & Tennis elbow
 - e) Frozen shoulder & damaged rotator cuff
 - f) Non-healing ulcers
 - g) Traumatic disc rupture
3. Contraindications:
 - a) Platelet count < 1 lakh/cumm
 - b) Hb < 10 gm%
 - c) Acute phase of disease process
 - d) Concurrent NSAIDs or Steroid therapy
 - e) Concurrent aspirin/clopidogrel therapy
4. Repeat Injections: Depending on the type of case usually 2-3 repeat injections are required in 1st yr

The present case represents the first report of intratumoral injection of PRP in the treatment of painful peripheral nerve neuroma.