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Effectiveness of Platelet Rich Plasma (PRP) as a Pain Management Method in Bunion Hallux Valgus; A Case Series

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Abstract
Chronic foot pain resulting from bunion hallux valgus deformity is a common complaint in family medicine, sport medicine and orthopedics practices especially in females. It is a deformity in metatarsophalangeal joint of big toe because of laxity of joint capsule and ligaments resulting in failure of stabilization of the affected joint. High heels, tight and narrow tiptoe box pointed shoes are potential apparent causes of this pathology. Initial treatment remains conservative with large toe box shoes, pain control medicines and surgery as a last choice. When indicated, surgical treatment is controversial because of the greater than 100 described surgical procedures and a historically high prevalence of recurrence. Platelet rich plasma (PRP) is an autologous treatment and pain management method came out in last twenty years, now it is so popular in orthopaedic, rheumatology and sport medicine practices because of it's effectiveness and cheapness and safety. The authors reported and managed chronic pain by PRP local injections for four cases complaining from long standing bunion hallux valgus deformity and pain.
Keywords: Platelet-rich plasma, pain, bunion, hallux

Introduction

The term bunion refers to soft tissue swelling over the first metatarsophalangeal joint associated with abnormal angulation of the joint that results in a prominent first metatarsal head and overlapping of the first and second toes, called the hallux valgus deformity and it is one of the most common causes of foot pain.[1] Hallux valgus is a common condition estimated to affect as many as 23% of adults.[2] The etiology of the hallux valgus complex is multifactorial. Failure of the stabilizing soft tissue structures around the first ray of the foot may be a common cause of hallux valgus.[3] Furthermore, high-heel shoes or a typical narrow tiptoe box might induce deviations in both the proximal phalanx of the hallux and the first metatarsal bones.[4] The deformity can often be attributed to ill-fitting shoes, and sometimes there is a familial disposition. Women are much more commonly affected than men It is generally accepted that an imbalance of the extrinsic and intrinsic foot muscles and the ligamentous structures is involved.

Diagnosis is made by clinical examination and radiological features. Clinically the lateral deviation of the great toe is obvious when the patient stands barefoot and measuring hallux valgus angle, radiologicaly a dorsoplantar radiograph with the foot under load is required.[5] Initial treatment remains conservative with large toe box shoes, pain control, stretching, taping, or spacers. When indicated, surgical treatment is controversial because of the greater than 100 described surgical procedures and a historically high prevalence of recurrence.[6] According to the suggestion given by the American College of Foot and Ankle Surgeons, which is wildly accepted, patients should use conservative treatments before surgical treatment and only patients with very severe pain or dysfunction and those whose symptoms do not improve under a conservative regimen should be referred to a foot surgeon.[4]

Platelet rich plasma (PRP) is an autologous treatment and pain management method came out in last twenty years, now it is so popular in orthopaedic, rheumatology and sport medicine practices because of it's effectiveness and cheapness and safety. PRP owns the therapeutic effectiveness as a result of it's role in wound healing and soft tissue repair processes, this role can be explained by growth factors released α granules in platelets which have regenerative properties. Tissue repair is a complicated mechanism in which many cellular functions occur like chemotaxis, angiogenesis, cell proliferation, extra cellular matrix formation.[7]

Case One

A 51 year old female presented in February 2019 to the 1st. author clinic in Kirkuk, Iraq with right foot pain, bunion and valgus for few years duration, there was a several years history of wearing tight and pointed shows, her BMI was (26.7).

An autologous platelet rich plasma prepared from the patient's own blood which drawn from patient vein with 50 ml syringe. Nine ml from drawn blood placed in aseptic tube with 1 ml 3.8% sodium citrate as an anticoagulant. The tube then centrifuged at 1500 rpm for 10 min separating the sample into three parts, the upper part made of plasma, the middle part (buffy coat) made of white blood cells while the lower part made of red blood corpuscles. The upper two thirds of plasma were then discarded while the lower third was transferred to another aseptic tube centrifuged again for 15 min at 3000 rpm, the upper half of the sample was discarded while the lower half would form the PRP. Under aseptic condition, 1 ml of 2% lignocaine infiltrated then 1.5 ml of PRP infiltrated subcutaneously. Three sessions of PRP injection done with spacing of 4 weeks in between, patient follow up done for 12 months after last session, the patient was completely pain free.

Case Two

A 49 years old female presented in July 2019 to the 1st. author clinic in Kirkuk, Iraq with painful and tender bilateral bunion hallux valgus for few months duration. She is a primary school teacher wearing high heels and tight shoes and standing for a long periods, she is diabetic (Type 2), her BMI is 29.3. PRP prepared from patient's own blood and injected, the procedure was exactly as in case number (1). Pain relieved immediately for both sides, 4 weeks later the left side remained pain free but pain recurred in right side, so we repeat PRP injection for right side. Patient follow up done for 12 months after last session, the patient was completely pain free.

Case Three

A 58 years old female presented in December 2019 to the 1st. author clinic in Kirkuk, Iraq with right foot pain, bunion and valgus of few months duration, pain was worsened on wearing tight shoes and walking, her BMI was (35.3). PRP prepared from patient's own blood and injected, the procedure was exactly as in case number (1), three sessions of PRP injection done with spacing of 4 weeks in between, patient follow up done for 12 months after last session, the patient was completely pain free.

Case Four

A 62 years old female presented in March 2020 to the 1st. author clinic in Kirkuk, Iraq with right foot pain, bunion and valgus for few months duration, pain increases by wearing tight shoes or standing for long time, there was a long history (several years) of wearing pointed shoes, patient is diabetic (Type 2), hypertensive and her BMI is (31.1). PRP prepared from patient's own blood and injected, the procedure was exactly as in case number (1), two sessions of PRP injection done with spacing of 4 weeks in between, patient follow up done for 12 months after last session, the patient was completely pain free.

Discussion

Chronic foot pain now is epidemic in United States with more than 40 million person complaining from pain in their feet. The deformity in the first metatarsophalangeal (MTP) joint, commonly called a bunion is the typical presentation of long standing foot pain., "more than half of the women in America have bunions" The American Academy of Orthopaedic Surgeons reported.[8]

The first metatarsophalangeal (great toe) joint (1st MTP jt) is a condyloid synovial juncture.[9] The metatarso-sesamoid complex consists of the head of the first metatarsal, the base of the proximal phalanx, six muscles, eight ligaments and two sesamoid bones. The base of the proximal phalanx is concave and has a large base to receive its muscular and ligamentous attachments.[10] The ligaments of the joint are the joint capsule, the medial and lateral collateral ligaments, the medial and lateral sesamoid ligaments, the plantar transverse metatarsal ligament, the inter-sesamoid ligament, and the hood ligament.[11]

Bunion and hallux valgus is a foot disfigurement that happens when the big toe angles toward the other toes, the shifting in the toe lead to development of bunion which is a boney projection on the medial side of the big toe trying to more stabilize movement of the joint.[12]

Chronic pain due to bunion valgus making patients to try different relieving available management methods. The patients in our study had had many trials of many form of therapy before reached to us, like none steroidal anti-inflammatory drugs, oral steroids, local steroid injections and physiotherapy. Among predictable treatment methods, surgery is not always advised for bunion valgus. hallux valgus surgery is among the most common orthopedic operations in Western industrialized countries"; roughly 209,000 hallux valgus surgeries are done annually in the United States.[13]

PRP is an attractive relatively recent safe pain management method for musculoskeletal injuries and pathologies widely accepted and used in family medicine and sports medicine practice as a cheap and natural physiological method. PRP first use was in 1987 in an open heart surgery, then used in dental medicine in patients with jaw cancer and jaw reconstruction. In 2009, PRP became so popular when it was reported that two of the Pittsburg Steelers received PRP for their ankle injuries before their triumph at the Super Bowl championship.[14] PRP has more than 1500 bioactive proteins like transforming growth factor beta (TGF-β), fibroblast growth factor (FGF) and platelet-derived growth factor (PDGF) which are vital for tissue healing.[15,16]

For bunion valgus current clinical treatment methods like medications and local steroid injection carry the risk of potential side effects, other methods like reconstruction surgeries, do not adequately heal this pathology and mostly will resulting in tissue scar occurrence.

In our study we used PRP local injection as a chronic pain management method as it contains a hundreds of growth factors that are responsible for its potential effects in reconstruction, regeneration and strengthening of the affected ligaments and soft tissues involved in bunion valgus pathology.

In conclusion, PRP local subcutaneous injection seems to be a safe, effective and cheap pain management method for chronic pain resulting from bunion hallux valgus.

Conflict of Interests

None declared.

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