

CASE REPORT

Treatment of Knee Joint Osteoarthritis with Genicular Nerve Radiofrequency Ablation and Platelet Rich Plasma in a Patient with Turner's Syndrome: A Case Report

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Abstract

Knee osteoarthritis (OA) is a major disabling disease in the world. Non-surgical therapeutic options are analgesics and physiotherapy, which are ineffective. So the newer modality of treatment is radiofrequency ablation (RFA) of genicular nerves and platelet-rich plasma (PRP) along with physiotherapy and short-term analgesics is a more effective nonsurgical treatment. In this case, a middle-aged female with a known case of Turner's syndrome, presented with severe pain in both knees and was subsequently diagnosed with Knee OA. We treated the patient with genicular nerve RFA and PRP. Following the procedure, pain intensity was reduced from 9/10 to 2/10 in the right knee and 8/10 to 1/10 in the left knee measured by a numerical rating scale (NRS). The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) reduced from 85% to 8% in the right knee and 70% to 5% in the left knee. Along with RFA and PRP, we advised the patient to do physiotherapy and weight reduction to have long-lasting effects.

Keywords: Osteoarthritis, Knee joint, Turner's syndrome, Platelet-rich plasma, Radiofrequency ablation, Genicular nerve

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Introduction

Knee joint osteoarthritis (OA) is one of the major disabling diseases in the world with a major impact on patient's daily life. Its clinical manifestations are joint pain and stiffness increase with exercise. Its prevalence increases with age and obesity¹. Knee OA is a degenerative joint disease that causes progressive loss of articular cartilage and erosion of articular surfaces of bone².

Treatment options that were available for knee joint OA are physiotherapy, weight loss, pharmacological and surgical treatment. Weight loss and physiotherapy are good treatment options but they have poor compliance. Pharmacological treatment with NSAIDs and opioids gives immediate pain relief but is not suitable for long-term treatment as they cause numerous adverse effects on long-term use. Surgical treatment also has several adverse effects such as perioperative surgical stress, blood loss, anesthetic complications, postoperative pain, etc³.

RFA is a noninvasive & target-specific technique that causes neurolysis, thereby modulating pain transmission⁴. Neurolysis is by using high-frequency current to produce an electromagnetic field that causes ionic vibration resulting in heat generation. This heat causes thermocoagulation and local neuronal tissue destruction. Wallerian degeneration occurs distal to the site of RFA⁵. On the other hand, PRP is a rich source of numerous growth factors like TGF- β , VEGF, PDGF, and IGF-1. These growth factors cause tissue regeneration by inflammation, cell proliferation and remodeling^{6,7}. Turner's syndrome occurs due to the absence of an X chromosome partially or completely in females. Its incidence is 1 in 2500 females. The characteristic features of Turner's syndrome are short stature, short neck, broad chest, and genu valgum^{8,9}. Knee joint OA is common in patients with Turner's syndrome.

Therefore, to overcome the adverse effects and complications of surgical treatments, a newer treatment approach is the use of regenerative therapy along with weight reduction, physiotherapy, and pharmacotherapy for the short term. This nonsurgical treatment consists of genicular nerve radiofrequency ablation (RFA) and intra-articular platelet-rich plasma (PRP) therapy. Thus, this case study was conducted to assess

the effect of genicular nerve radiofrequency ablation (RFA) and PRP therapy for knee OA in patient with Turner's syndrome.

Case presentation

A 52-year-old woman came to our center with complaints of pain in both knee joints for 7 years which was insidious in onset, gradually progressive, dull aching, more in the right knee than left knee, moderate grade (right knee: WOMAC 85% and NRS- 9/10, left knee: WOMAC- 70% and NRS- 8/10), non-radiating, more on prolonged walking, standing, squatting and reduces on taking pain killers. No history of trauma to the knee joint, and no history suggestive of infection and other red flag signs.

Her past medical history reveals the absence of menstruation even after 17 years and was diagnosed with Turner's syndrome and she was prescribed OCPs. Also, she is a known case of type 2 diabetes mellitus and hypertension.

A general physical examination revealed that body mass index (BMI) of 30 Kg/m² indicating obesity, breast development- stage 4 of tanner staging, retrognathia with high arched palate, sternomental distance 11.5 cm indicating short neck, sparse pubic hair, knock knees and flat feet.

Systemic examination revealed no significant abnormality. Local examination of both knees - revealed Genu valgus deformity in both knee joints, joint line tenderness more in the lateral side, crepitus, and range of motion in the normal range. Investigations – Ultrasonography of both knee joints reveals reduced thickness of cartilage. Also, other investigation reports like platelet count, coagulation profile, and hemoglobin were noted and they were within limits.

With clinical findings and investigations knee joint OA was diagnosed with Grade 3 osteoarthritis and planned for genicular nerve RFA followed by 3 sittings of PRP treatment.

Case management

Each of the knee joints is treated with conventional RFA and 3 sittings PRP. Under strict aseptic precau-

tion, genicular RFA is performed after placement of radiofrequency needles under ultrasound guidance such that the needle tip is adjacent to the genicular artery. After checking for muscle contraction due to motor stimulation, injection Lignocaine 1% 3ml is given to prevent pain during RFA. RFA is performed with a temperature of 80° C for 2 minutes followed by injection of triamcinolone with bupivacaine to prevent neuritis. The nerves that are ablated are superomedial genicular nerve, superolateral genicular nerve, and inferomedial genicular nerve. RFA is followed by viscosupplementation under fluoroscopic guidance.

After RFA, 15 days later PRP treatment is started and 3 sittings of PRP are given each with a gap of 15 days. For preparing PRP 18ml of blood is drawn from the patient along with acid citrate dextrose (ACD) and put into commercially available PRP kits. These kits are kept for 1st spin of 2800 RPM for 7 minutes followed by 2nd spin of 2800 RPM for 8 minutes. After that, the PRP is administered into the knee joint with sterile precautions under fluoroscopic guidance by an antero-medial approach. Pain relief and status of the knee joint are assessed clinically and by USG every 15 days.

Table I: WOMAC and NRS score at different point of time

Different point of time	Right knee		Left knee	
	WOMAC	NRS	WOMAC	NRS
Before intervention	85%	9/10	70%	8/10
15 days After RFA	40%	6/10	45%	6/10
15 days After 1 st PRP (1 month post RF)	30%	5/10	30%	4/10
15 days After 2 nd PRP	20%	4/10	20%	2/10
15 days After 3 rd PRP (2 months post RF)	10%	3/10	8%	1/10
4 months post RFA and 2 months of PRP treatment	8%	2/10	5%	1/10

Data presented as absolute number and percentages.

The patient came with severe pain in both knee joints with a right knee NRS of 9/10 and WOMAC of 85% and in Left knee NRS is 8/10 and WOMAC is 70%. After RFA in both knee joints, WOMAC and NRS reduced to 40% and 6/10 in the right knee and 45%

and 6/10 in the left knee joint. After PRP treatment WOMAC and NRS reduced further in both knee joints. In the right knee, WOMAC reduced to 30%, 20%, 10% and NRS reduced to 5/10, 4/10, 3/10 after 1st PRP, 2nd PRP, and 3rd PRP. In the left knee, WOMAC reduced to 30%, 20%, 8% and NRS reduced to 4/10, 2/10, 1/10 after 1stPRP, 2nd PRP, and 3rd PRP. After 2 months the patient was reviewed again and WOMAC and NRS reduced further to 8% and 2/10 in the right knee. In the left knee, WOMAC and NRS reduced to 5% and 1/10. Along with RFA and PRP, other modalities of treatment like pharmacotherapy to support the growth of cartilage, physiotherapy, and weight reduction were continued.

Discussion

Knee OA is commonly associated with Turner's syndrome. As the incidence of Turner's syndrome is less and in those patients, RFA and PRP treatment for knee OA is further less in number. We did not find any article on the effect of knee joint RFA and PRP treatment in a patient with Turner's syndrome. In this study, we treated first with RFA to provide pain relief and then PRP treatment to repair the cartilage damage caused by the degenerative process of OA.

Hui Jin et al. published a case report of pulsed RF of genicular nerves followed by PRP treatment for knee OA. The outcome was measured in terms of NRS and WOMAC scores before starting treatment, at 1 month, 3 months, and 6 months. NRS was 9, 4, 3, and 2 before treatment, at 1 month, 3 months and 6 months. WOMAC scores were 66%, 35%, 33%, and 32% before treatment, at 1 month, 3 months and 6 months¹.

Another study conducted by Luca GG et al. on pulsed radiofrequency ablation and PRP in degenerative knee arthritis included 2 patients. The baseline visual analogue scale (VAS) score was 8/10 and 7/10 for 2 patients. After 1, 4, and 12 weeks of the procedure, the VAS score was 3/10, 2/10, and 1/10 in both patients. Also, both patients were able to do all the activities with minimal discomfort, were able to walk without aid, and range of movements improved¹⁰.

In our study, WOMAC and NRS of right knee were 85% and 9/10. After RFA, WOMAC and NRS

reduced to 40% and 6/10. 15 days later, 3 sittings of PRP treatment started with a gap of 15 days. With each PRP treatment, WOMAC reduced further to 30%, 20%, and 10%, and NRS to 5/10, 4/10, and 3/10. After 2 months of 3rd PRP treatment (4 months post-RFA), WOMAC was 8%, and NRS was 2/10. In the left knee, WOMAC and NRS were 70% and 8/10. After RFA WOMAC reduced to 40% and NRS to 6/10. Then, with each PRP treatment, WOMAC was further reduced to 30%, 20%, and 8%, and NRS reduced to 4/10, 2/10, and 1/10. After 2 months of 3rd PRP treatment (4 months post-RF) WOMAC is 5% and NRS is 1/10.

Conclusion

RFA of genicular nerves followed by intra-articular PRP is an effective treatment modality for knee OA in patient with Turner's syndrome.

Declaration

Ethics approval

Not applicable

Author contributions:

Conception and development of the idea: SD

Data collection: NKK

Data analysis: NKK, MC

Writing - Original draft preparation: NKK

Review & editing: SD, MC

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Conflict of interests: None

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