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Corresponding Author
K. Navin Kumar,
#12, 12th E main road, Bandappa Garden, Muthyala Nagar, Bangalore-560054

Author Designation

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Treatment of knee Joint Osteoarthritis With Genicular Nerve Radio-Frequency Ablation and Platelet Rich Plasma in a Patient With Turner's Syndrome : A Case Report

[1]Sudheer Dara, [2]Minal Chandra and [3]K. Navin Kumar
[1]Director-Epione, Center for pain relief and beyond, Hyderabad
[2]Co-founder and Consultant- Epione, Center for pain relief and beyond, Hyderabad
[3]IAPM Fellow - Epione, Center for pain relief and beyond, Hyderabad

Abstract
knee OA is major disabling disease in the world. Non surgical therapeutic options are analgesics, physiotherapy which are not effective by itself. So the newer modality of treatment is RFA of genicular nerves and PRP along with physiotherapy and short term analgesics is more effective non surgical treatment. These treatment options is used to treat knee OA in a known case of turner's syndrome. A middle aged female with diagnosed case of turner's syndrome, came with severe pain in both knee who was diagnosed with Knee OA and treated with genicular RFA and PRP. Pain reduced in both knee, WOMAC reduced from 85%-8% in right knee and from 70%-5% in left knee. NRS also reduced from 9/10-2/10 in the right knee and 8/10-1/10 in left knee. We conclude that RFA and PRP is effective in treatment of knee OA in a patient turner's syndrome. Along with RFA and PRP we need to advice patients to do physiotherapy, weight reduction and short duration of medications to have long lasting effect.

INTRODUCTION

Knee joint osteoarthritis(OA) is one of major disabling disease in the world with a major impact in patient's daily life. Its clinical manifestations are joint pain and stiffness increases with exercise. Its prevalence increases with age and obesity[1]. Knee OA is a degenerative joint disease which causes progressive loss of articular cartilage and erosion of articular surfaces of bone[2].

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 a poor compliance. Pharmacological treatment with NSAIDS and opioids give immediate pain relief but 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 preop and intraop surgical stress, blood loss, anaesthetic complications, post operative pain etc[3].

Therefore, to overcome all these adverse effects and complications a newer treatment approach is use of regenerative therapy along with weight reduction, physiotherapy and pharmacotherapy for short term. Therefore surgery is avoided and this non surgical treatment consists of genicular nerve radio-frequency ablation(RFA) and intra-articular platelet rich plasma(PRP) therapy.

RFA is a non invasive and target specific technique which causes neurolysis, thereby modulating the pain transmission[4]. Neurolysis is by using High frequency current to produce electromagnetic field which causes ionic vibration resulting in heat generation. This heat causes ther mocoagulation and local neuronal tissue destruction. Walleri an degeneration occurs distal to the site of RFA[5].

PRP is a rich source of numerous growth factors like TGF-ß, VEGF, PDGF and IGF-1. These growth factors cause tissue regeneration by inflammation, cell proliferation and remodeling[6,7].

Turner syndrome occurs due to absence of 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, genu valgum[8,9].

Knee joint OA is common in patient's with turner's syndrome and this case report is to study the effect of genicular nerve radiofrequency ablation and PRP therapy in knee joint OA.

Case Report:

History and Examination: A 52 year old woman came to our center with complaints of pain in both the knee joint since 7 years which was insidious in onset, gradually progressive, dull aching in nature, more in 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 knee joint, No history suggestive of infection and other red flag signs.

Her past medical history reveals absence of menstruation even after 17 years and it was diagnosed as turner's syndrome and she was prescribed OCPs. Also she is known case of type 2 diabetes mellitus and hypertension.

General physical examination revealed following
vitals were within normal range
BMI-30Kg/m^2-indicates obesity
Breast development-stage 4 of tanner staging
Upper lip bite test-indicates retrognathia
High arched palate
Sterno mental distance-11.5 cms indicating short neck
Sparse pubic hair
Knock knees and Flat feet

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

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

Procedure: Each of the knee joint is treated with conventional RFA and 3 sittings PRP. Under strict aseptic precaution genicular RFA is performed after placement of radio-frequency needles under usg guidance such that needle tip is adjacent to genicular artery. After checking for muscle contraction due to motor stimulation, inj Lignocaine 1% 3ml is given to prevent pain during RFA. RFA is performed with a temperature of 800c 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 is given each with a gap of 15 days. For preparing PRP 18ml of blood is drawn from patient along with Acid Citrate Dextrose (ACD) and it is 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 which the PRP is administered into knee joint with sterile precautions under fluoroscopic guidance by anteromedial approach.

Pain relief and status of the knee joint is assessed clinically and by USG every 15

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

Patient came with severe pain in both knee joints with 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 jonts WOMAC and NRS reduced to 40% and 6/10 in right knee. In left knee WOMAC and NRS to 45% and 6/10. After PRP treatment WOMAC and NRS reduced further in both knee joints. In right knee WOMAC reduced to 30%, 20%, 10% and NRS reduced to 5/10, 4/10, 3/10 after 1stPRP, 2nd PRP , 3rd PRP. In left knee WOMAC reduced to 30%, 20%, 8% and NRS reduced to 4/10, 2/10, 1/10 after 1stPRP, 2nd PRP , 3rd PRP. After 2 months patient was reviewed again, WOMAC and NRS reduced further to 8% and 2/10 in right knee. In 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.

RESULTS AND DISCUSSION

We did not get any article on effect of knee joint RFA and PRP treatment in a patient with turner's syndrome. So we compared outcomes of our study with other studies which included patients without turner's syndrome.

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

Another study conducted by Luca GG on pulsed radio-frequency ablation and PRP in degenerative knee arthritis which included 2 patients. Baseline VAS score was 8/10 and 7/10 for 2 patients. After 1, 4 and 12 weeks of procedure VAS score was 3/10, 2/10 and 1/10 in both the patients. Also both patients were able to do all the activities with minimal discomfort, were able to walk without aid and range of movements improved[10].

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 gap of 15 days. With each PRP treatment WOMAC reduced further to 30%, 20%, 10% and NRS to 5/10, 4/10 and 3/10. After 2 months of 3rd PRP treatment (4 months post RF) WOMAC was 8% and NRS was 2/10. In 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 further reduced to 30%, 20%, 8% and NRS reduced to 4/10, 2/10, 1/10. After 2 months of 3rd PRP treatment (4 months post RF) WOMAC is 5% and NRS is 1/10.

Limitations of Our Study:

- we couldn't get the study involving turner's syndrome patients for comparison as turner's syndrome incidence is less and in those patients RFA and PRP treatment for knee OA is further less in number
- This is a case report involving a single case, so it cannot be generalized to the population of turner's syndrome as it requires a study with larger sample size and randomized controlled trial

CONCLUSION

We conclude that RFA and PRP is effective in treatment of knee OA in a patient turner's syndrome. We treated first with RFA to provide pain relief and PRP treatment to repair the cartilage damage caused by degenerative process of OA. Along with RFA and PRP we need to advice patients to do physiotherapy, weight reduction and short duration of medications to have long lasting effect.

Declaration:
Ethics Approval: Not applicable

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Conflict of Interests: nil

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