CASE REPORT

Atypical Mycobacterium Infection Following Platelet-Rich Plasma Therapy For Knee Osteoarthritis: A Case Report

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Abstract

Intra-articular platelet-rich plasma (PRP) injection for the treatment of osteoarthritis has gained widespread attention in recent years. It is also a safe procedure with negligible adverse effects. In the literature, very few case reports of adverse effects after PRP injections have been reported. We report one such case of adverse reaction following intra-articular PRP injection. A 64-year-old male with well-controlled hypertension and diabetes mellitus presented to our clinic with knee pain and was diagnosed with grade 3 osteoarthritis. He was treated with intra-articular PRP injection. One week later, he developed pain and swelling at the injection site with subsequent abscess formation. Culture and sensitivity revealed the presence of atypical mycobacterium. He recovered completely in 2 weeks following abscess drainage and a course of antibiotics and analgesics.

Keywords: Platelet-rich plasma, Knee osteoarthritis, Atypical mycobacterium infection

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Introduction

Osteoarthritis (OA) of the knee joint is one of the most common degenerative diseases encountered in day-to-day practice. The incidence has increased further due to sedentary lifestyle and obesity. For years, it has been a major challenge to provide OA patients with efficient treatment with minimal side effects and long-term efficiency. Regenerative solutions and new tissue- engineering-based strategies have shown promising results for the treatment of moderate OA[1]. Since the first research on platelet-rich plasma (PRP) by Sampson et al.[2], there has been a considerable number of studies on the effect of PRP in the treatment of knee OA.

PRP has been shown to promote cell recruitment, proliferation, and angiogenesis, reduction in the critical regulators of the inflammatory process and a decrease in the expression of inflammatory enzymes, resulting in an improved healing process,[3] anti-inflammatory and analgesic effects[4], chondropromoting and chondroprotective effects[5].

Since PRP is prepared from autologous blood, it is considered to be safe with minimal side effects. Most common side effects seen are injection site pain & swelling, which subside in few days. Risk of infection following PRP injection is <1%.

Atypical mycobacteria are found in both natural and human-made environments. The incidence of soft tissue infections is 4 per 100,000 and can be seen in immune-compromised individuals undergoing invasive procedure. The risk of such infection in a minimally invasive procedure done under complete asepsis is considered negligible.

We chose to report this case as the incidence of infective complications following PRP administration is extremely low. Development of atypical mycobacterium infection following intra-articular PRP injection in spite of following strict asepsis was a rare and unexpected complication. This was the first case of infection following PRP injection in our pain clinic.

Case Report

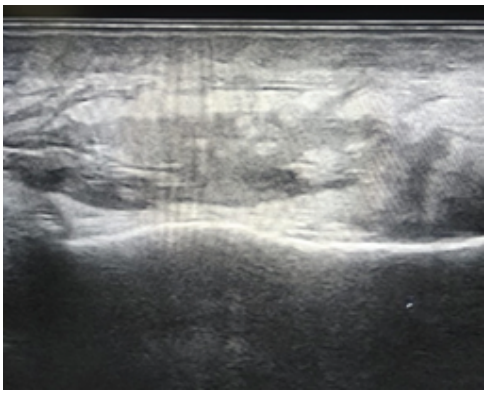
A 64-yr-old male with hypertension and diabetes mellitus presented to our pain clinic with bilateral knee joint pain since 3 years, which aggravated activities. He had transient relief with physiotherapy and pharmacotherapy. His general physical examination was unremarkable. Pain was assessed by numerical rating scale (NRS) which was 8/10 and functional abilities were assessed by Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score which was 45%. The knee joint on inspection was normal. On palpation, there was no local increase in temperature, medial joint line tenderness was present, and palpable crepitus with a normal range of motion was observed. Systemic examination was normal. His blood parameters were within normal limits. After clinical and radiological examination, a diagnosis of bilateral knee osteoarthritis of grade 11 according to Kellgren & Lawrence was made. He was advised to undergo radiofrequency ablation of genicular nerves followed by intra-articular PRP injection at an interval of one month. Under all aseptic precautions and under prophylactic antibiotic coverage, conventional radiofrequency ablation of 3 genicular nerves (superomedial, superolateral & inferomedial) of the left knee was performed at a temperature of 75°C for 90 seconds. Anti-neuropathics and a short course of NSAIDS were prescribed.

After a month, the patient was followed up for intra-articular PRP injection. His WOMAC score was 15%, and his NRS score was 2/10. Knee joint examination was normal except for palpable crepitus. For PRP, a 20 ml disposable syringe filled with 2ml of citrate dextrose was used to draw 18 ml of blood from the cubital vein in a sterile manner. This was transferred to a commercial kit (Dr.PRP kit) & a double centrifugation method was used for PRP preparation. PRP was gently aspirated using a 2ml syringe. The left knee was cleaned twice using povidone iodine and draped. It was allowed to dry before performing the injection. PRP injection was performed under the guidance of fluoroscopy by an anteromedial approach. Skin infiltration was performed with 2% xylocaine, a 22 G spinal needle was inserted, and joint injection was confirmed by contrast spread, which was followed by injection of 2ml of PRP. He was observed for 2 hrs and discharged

home with instructions to avoid weight-bearing activities and strenuous work for a few days.

The patient returned after 10 days with severe pain and swelling of the left knee. On examination, there was swelling of the knee joint, a local rise in temperature and tenderness in the prepatellar and infrapatellar regions was noted. **(Fig-1)**
USG of the left knee joint revealed hypoechoic signals in subcutaneous tissues over the prepatellar and infrapatellar regions, with no evidence of joint effusion. **(Fig-2)**

Fig. 1: Left knee joint after PRP injection



He was immediately referred to an orthopedic surgeon for further management. Incision and drainage were performed by orthopedic surgeons and sent for culture and sensitivity. Growth of atypical Mycobacterium was confirmed, and the patient was treated with intravenous linezolid for one week along with oral clarithromycin for 2 weeks. Pulmonologist

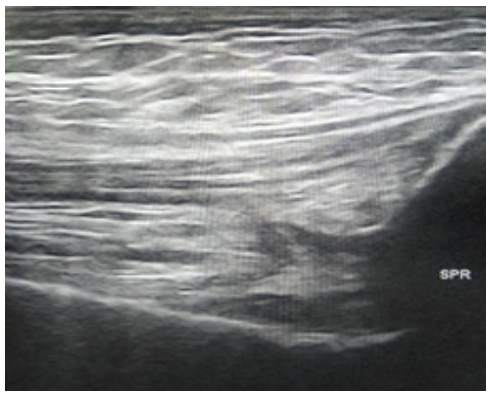


Fig. 2: USG Knee showing subcutaneous tissue edema and no evidence of joint effusion.

opinion was taken to rule out pulmonary infection. The patient returned after a month, his pain had subsided, and there were no signs of local inflammation. Table 1 showed the NRS and WOMAC score before and after the procedure.

Table I: NRS and WOMAC score before and after procedure

	NRS	WOMAC
Pre procedure	8/10	45%
One month Post Radiofrequency ablation	2/10	15%
Post PRP injection (during stage of infection)	9/10	-
One month post treatment of infection	2/10	10%

Discussion

PRP is a safe treatment modality that is easy to use with minimum skills[6] and with an extremely low incidence of side effects. The most adverse events reported in the literature are pain, stiffness, syncope, dizziness, headache, nausea, gastritis, sweating, and tachycardia, and all events self-resolved in days.[7,8]

Being an autologous preparation, infections are extremely rare. PRP is also believed to exert antimicrobial action. Recently, studies have evaluated the clinical and in vitro antibacterial activity of platelet lysate (PL) against various bacteria[9].

Wang et al did not report any local or superficial infections, allergic reactions, or any other complications related to intra-articular PRGF infiltration in 800 patients with knee OA during the study period[10].

In our case, despite following the utmost aseptic precautions, the patient developed localized subcutaneous infection by atypical mycobacterium following a minimally invasive procedure like intra-articular PRP injection, though a more invasive procedure of radiofrequency ablation which the patient underwent a month ago was uneventful. The only risk factor in this patient was recent onset diabetes which was well controlled. We ruled out other causes which may have similar presentation such as inflammatory arthritis, tubercular arthritis, and septic arthritis after thorough clinical & diagnostic evaluation.

Atypical mycobacteria are organisms that cause various diseases such as skin and soft tissue infection, lymphadenitis, pulmonary infection, disseminated infection, and a wide range of rare infections. The mycobacteria are opportunistic pathogens that occur freely in nature, are most commonly found in the soil, indoor and outdoor water sources, and are recognized to colonize poorly sanitized medical equipment. These organisms most commonly infect young children, immunocompromised individuals, individuals with indwelling medical equipment, and those who have recently undergone surgical or non-surgical procedures. Injection abscesses due to infection by atypical Mycobacteria are known to occur following tattooing, injections, vaccinations and implants[11].

There is not enough data available regarding serious complications related to PRP treatment. Till date, there are only 2 case reports of septic arthritis following intra-articular PRP.

Toraman et al[12] reported a case of a 62-year-old female with diabetes and hypertension who underwent an intra-articular leukocyte-rich platelet-rich plasma (LR-PRP) injection for bilateral Grade II knee and later developed Streptococcus mitis-induced septic arthritis. This is the first case report in the literature describing septic arthritis developing after intra-articular LR-PRP injection.

Satiş et al[13] reported a case of 71 years old male patient with osteoarthritis of the knee, who developed septic arthritis following platelet-rich plasma administration. The patient was mobilized by the help of suitable antibiotics and physical therapy application.

Kaux et al[14] reported a case of exuberant inflammatory reaction after 1 injection of PRP to treat jumper's knee in a 35-year-old male type 1 diabetic patient.

Dincer et al[15] reported a case of a 27-year-old professional football player who underwent PRP injection for grade II rupture in the left gastrocnemius muscle and later developed leg ulcer and Staphylococcus aureus infection that was confirmed after wound culture.

Limitation

Localised infection following PRP injection has been our observation in a single case. A direct cause-effect relationship cannot be solidly established. Data in a single case report is not sufficient and is inconclusive to permit clinical generalization which is best provided by case series or randomized studies with larger sample sizes.

Conclusion

Though PRP is safe, strict aseptic precautions is recommended to avoid unwanted effects. There is limited data available regarding adverse reactions and complications associated with PRP treatment. Further studies are required to asses the safety profile of PRP.

Declaration

Ethics approval: Not Applicable

Author contributions:

Conception and development of the idea
SD, MC, AF
Writing - Original draft preparation *AF & MC*
Review & editing *SD, MC, AF and KK*

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