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# A complex case of prosthetic joint infection post total knee replacement: A case report

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## ABSTRACT

One of the strongest and most complicated joints in the body is the knee. The knee connects the bone of the thigh (femur) to the shin bone (tibia). The other bones that form the knee joint are the smaller bone that runs alongside the tibia and the knee cap. Surgical site infection is a serious complication following total knee arthroplasty leading to considerable morbidity. The incidence is reported to be up to 2%. Prompt physical therapy leads to achieve functional goal. The prosthetic failure or infections commonly seen which is characterized by pain in the joint oozing from the joint which then then treated surgically followed by a well-planned physical therapy rehabilitation program including pain reduction, strengthening, stretching, and mobilization in the later period to avoid adhesion formation which my in term lead to restricted joint play educating the patient about the condition and prevention of secondary complication plays an important role as ignoring such important point may lead to complication in future. A 50 year old man came with discharge from his right knee. It was diagnose on x-ray. The patient was present with pain and was unable to walk and sit. Planned physical therapy program with education regarding the condition along with medical management showed good results.

**Keywords**: Knee Arthroplasty, Post-Operative Complications, Physical Therapy.

## 1. INTRODUCTION

The most common cause to undergo knee arthroplasty is degenerative changes with age it is commonly seen in males and in females after menopause, given the increasing number of distal femur fracture can be augmented by screw augmentation with bone cement is an alternative to improve implant anchorage (Wähnert et al., 2021). Total knee arthroplasty is the one of the commonest procedure in orthopedics surgery and does not always fulfill patients expectations of pain relief, mobility and function (García-López et al., 2021). TKR have been implanted perpendicular to the mechanical axis of knee joint, with external rotation of the femur in flexion relative to the posterior condylar axis (Maag et al., 2021). The conventional physical therapy includes ROM exercise and strengthening exercise the recent

rehabilitation consist of a virtual reality which proved to be more effective as compared to the conventional physical therapy protocol alone in this VR simulated scenario is created or with the help of condition specific developed games with goals shows a good prognosis (Hadamus et al., 2021). Prosthetic joint infection (PJI) is a devastating complication of knee replacement surgery, recent evidences suggest that the burden of the disease increases more and more knee replacement procedure performed, the incidence of revision TKR is 7.5 cases per 1000 primary joint replacement procedure at 10 years, revision surgery for PIJ is a complex-surgery with associated complication post-surgery the 5 year patient mortality is comparable to some common cancer diagnoses, and more that 15% of patient require re- revision by 10 years (Sabah et al., 2021).

## 2. CASE PRESENTATION

A 50 year old male met with a road traffic accident in 2013 after consultation to orthopedic surgeon, x-ray was done with revealed supracondylar fracture of right knee with knee dislocation. Patient underwent surgical treatment with plate osteosynthesis with total knee replacement on 31 January 2013. The patient was apparently alright till December 2019, in January 2020 he started seen discharge coming from wound, he went to a doctor and medication were given after which discharge had stopped. Since last 6 months he is having discharge coming from the wound. Patient comes with complaint of discharge from wound which was insidious in onset and gradually progressive, discharge is purulent in nature and non-foul smelling and white in color. Aggravated to movement and relieved by taking medication. It is associated restriction of knee joint range of motion. No h/o trauma.

**Local Examination**

***On Inspection***

Patient was examined in supine position with both ASIS at the same level. Attitude of the limb was in 70 degree of flexion at hip and knee joint. Diffuse swelling seen over the right knee joint. Skin appears tense and shiny. Hair loss present around knee joint. Healed surgical scar were extending from the distal thigh centering over the patella seen of the previous surgery. 1 discharging sinuses were seen over the anteromedial aspect of knee joint. 2 discharging sinus are in anterolateral to the knee joint. 1 discharging sinus was seen at anterior aspect of knee joint. Limb length discrepancy seen. Whitish discharge seen coming from the wound, it is non-foul smelling. Muscle wasting was seen over the right thigh and calf region as compared to the left side.

**On Palpation**

Inspector findings were confirmed. Local rise of temperature were present. Grade 2 Tenderness were present over the joint line. Fixed flexion deformities of approximately 70 degrees of right knee joint were seen. Active ankle and toe movements present. Dorsalispedis and posterior tibial artery pulsation present. Mild warmth present on the knee.

**On Examination of Right Hip (February 20, 2021)**

No swelling. Abduction deformities of 10 degree were seen. Flexion deformity of 40 degree was seen. Overlying skin was normal. All inspector finding are confirmed. No local rise of temperature. No tenderness present. Abduction deformity of 10 degree with jog of movement was possible. Greater trochanter was irregular. Hip Range of motion is restricted and painful.

*Manual Muscle Testing*: During the muscle strength evaluation, bilateral upper limb strength was found to be 4/5 on a conventional grading system of muscle strength. Whereas the bilateral lower limb strength was found to be 3+/5 on an oxford grading system of muscle strength.

*Rage of motion*: The range of motion of both the upper limbs at shoulder joint, elbow joint, wrist joint and hand, fingers were full and functional (complete and pain free). Lower limbs Range of motion are depicted in table 1.

**Table 1** ROM Assessment

| Joint | Movement | Left | Right |
|---|---|---|---|
| Hip | Flexion | 0-120 | 0-130 |
| | Extension | 0-10 | 0-15 |
| Knee | Flexion | 70-120 | 0-120 |
| | Extension | 0-70 | 0-120 |
| Ankle | Planter flexion | 0-30 | 0-30 |
| | Dorsi Flexion | 0-25 | 0-25 |

*Tightness:* Soft tissue tightness in the muscles, ligaments was NIL for both the upper limbs at shoulder, elbow, wrist and hand. In the lower limb soft tissue tightness examination, severe posterior knee capsule tightness for the right knee was noticed.

*Diagnostic Assessment*: Radiological investigations i.e. right knee x-ray was done in anterior and lateral view (Fig 1). X-ray for pelvis and hip joints posterior view was also done (Fig 2). On physical examination of the affected area patient's leg was covered with bandage and external fixation was noted (Fig 3).

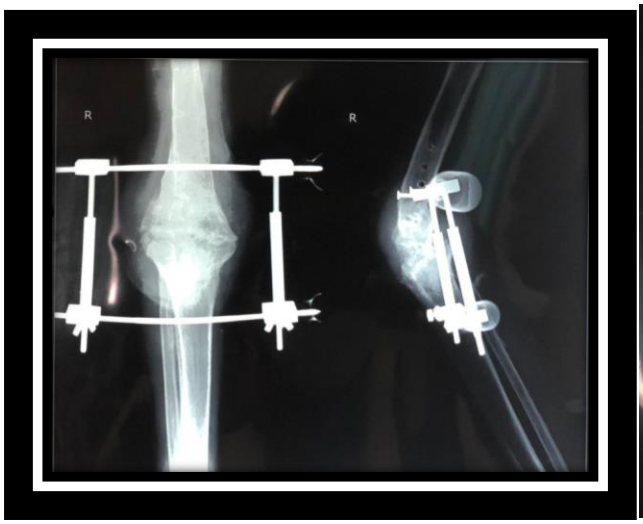


**Figure 1** Anterior and lateral view of Right Knee.


**Figure 2** Posterior view of Hip.

**Figure 3** Right knee with external fixator

**Timeline**

| | |
|---|---|
| Date of Injury | 22/01/2021 |
| Date of Surgery | 02/02/2021 |
| Date of Physical therapy | 04/02/2021 |

**Medical Management**

Sterile dressing was done. He was on medication tab. Pantoprazole 40 mg once daily, tab. Paracetamol 650 mg thrice a day, tab. Vitamin-C 500 mg twice daily, tab. Multivitamin once daily, inj. Ceftriaxone + sulbactum 1.5 gm IV twice a day.

**Physical Therapy Management**

On day one of treatment we evaluated the patient for strength, range of motion, tightness and pain. Before starting the treatment education regarding the operative procedure was explained to the patient. Patient was explained the importance of exercise for his better rehabilitation and early return to ADLs. Patient was taught how to safely mobilize using walker. Further management is in Table 2.

**Table 2** Physiotherapy Management

| Intervention | Dosage | Rationale |
|---|---|---|
| Statics | 5 sec hold 10 repetition | To maintain muscle contractility and maintain strength |
| Active assisted ROM for knee | 10 repetition as much as possible | To maintain mobility of the joint |
| Pre-crutch training | To help patient in walking in initial phase | To strengthen upper limb muscle. |
| Toe touch ambulation | 2 times a day | To train proprioceptors. |
| Breathing Exercise | 10 repetition every hourly | To maintain lung compliance and avoid accumulation of secretions. |
| Strengthening | Strengthening of sound lower limb and bilateral Upper extremity. | To prevent weakening due to bed rest |
| Stretching | 30sec 3 reps | To lengthen the tight structure |

## 3. DISCUSSION

Certain Cases like PJI can be treated with surgical treatment followed by a tailored rehabilitation protocol (Goyal et al., 2020). The rehabilitation consist of pain relief, strength training stretching and joint mobilization for the affected joint (Darware and Naqvi, 2020). Stretching in such cases to gain ROM is important (Zade and Deshmukh, 2019). A recent study shows that the use of Augmented reality or virtual reality plays an important role in patients rehabilitation by engaging them in the games on AR and VR devices (Burhani and Naqvi, 2020). Physiotherapy plays an important role in gaining the patients confidence and improve the quality of life significantly (Srivastava et al., 2020).

## 4. CONCLUSION

We conclude that a complicated case of prosthetic joint infection requires a multidiscipline approach for complete recovery, which include surgical, Medical, and physiotherapeutic management. The physiotherapeutic management consists of patient education on the condition and its poor prognosis, educating the patient and relative pertaining the secondary complication like infection on tightness formation, avoid complex joint motion at the operated joint which may lead to implant failure. After this a proper strengthening program for lower limb and stretching showed improvement in patient condition.

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**Author's Contribution**

All authors have contributed substantially for the concept, assessment and evaluation, data acquisition and development of this work. All authors read and approved the final version of the manuscript.

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**Conflict of Interest**

The authors declare that there are no conflicts of interests.

**Informed Consent**

Written & oral informed consent was obtained from the patient in this case report. Additional informed consent was obtained from all individuals from whom identifying information is included in this case report.

**Data and materials availability**

All data associated with this study are present in the paper.

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