



## Genicular Nerve Radiofrequency Ablation and Dual Subsartorial Block for Chronic Knee Pain Post Total Knee Replacement: A Case Report

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### ABSTRACT

**Introduction.** Chronic pain defines as pain persisting for three months or longer, chronic post-surgical pain can affect all dimensions of health-related quality of life, and is associated with functional limitations. treatment of chronic pain after total knee replacement is challenging, and evaluation of combined treatments and individually targeted treatments matched to patient characteristic. Genicular nerve block radiofrequency ablation is a safe and effective therapeutic procedure for pain associated with chronic pain due to knee osteoarthritis, and the evolution of newer regional analgesia techniques aids in reducing postoperative pain Dual Subsartorial Block (DSB) as a procedure specific, post total knee replacemet. historically there has been a reliance on using a pain-specific assessment tools Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)

**Case Presentation.** A 55-years old woman admitted she had pain on bilateral knee, the knee pain had affected her daily living, she was diagnosed with chronic knee pain post TKR because of osteoarthritis genu bilateral, the patient was planning genicular nerve radiofrequency ablation and dual subsartorial block, from the examination we found that numeric rating scale was 6 (moderate pain) with WOMAC score 76, before the procedure the patients are examined through radiology for any deformity in the knee. The genicular nerve radiofrequency ablation under ultrasound guidance on bonylandmark, resulting anesthesia of the anterior compartment of the knee, and dual subsartorial block that cover almost all the innervations of pain generating component of the anterior and posterior knee joint involved in TKR surgery. After the procedure we reevaluated the pain score using NRS was 2 (mild pain), and with WOMAC Score 19.

**Conclusion.** Treatment of chronic pain post total knee replacemet was challenging, targeted treatment may ameliorate the pain and prevent long term disability

**Keywords:** Genicular-Nerve--Radiofrequency-Ablation, Dual-Subsartorial-block, Chronic knee pain.

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## Introduction

Chronic knee pain post total knee replacement (TKR), The International Association for the Study of Pain (IASP) defines chronic pain as pain persisting for three months or longer, chronic post-surgical pain can affect all dimensions of health-related quality of life, and is associated with functional limitations, treatment of chronic pain after total knee replacement is challenging, and evaluation of combined treatments and individually targeted treatments matched to patient characteristic, chronic knee pain of all causes is undertreated and many people lack adequate access to effective pain management.<sup>1</sup>

Genicular nerve radiofrequency ablation is a safe and effective therapeutic procedure for pain associated with chronic pain due to knee osteoarthritis, and the evolution of newer regional analgesia techniques aids in reducing postoperative pain considerably as well as facilitates early ambulation and discharge, the Dual Subsartorial Block (DSB) as a procedure specific, motor-sparing and opioid-sparing post total knee replacement. Historically, there has been a reliance on using a pain-specific assessment tools Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) is widely used measure of symptoms and physical disability originally developed for people with osteoarthritis of the hip and or knee, the measure was developed to evaluate clinically, the WOMAC evaluates 3 dimensions: pain, stiffness, and physical function with 5,7, 12 question, and rated on an ordinal score 0 to 4, with lower scores indicating lower levels of symptoms or physical disability, the interpretation scores of WOMAC was the higher scores indicate worse pain, stiffness, and functional limitation.<sup>2,6,10</sup>

## Case Presentation

A 55-years old woman admitted she had pain on bilateral knee, the knee pain had affected her daily living, with history of progressively worsening pain and stiff. she was diagnosed with chronic knee pain post TKR et causa osteoarthritis genu bilateral, his job required a range of repetitive tasks, such as kneeling, squatting, assuming uncomfortable postures all the aforementioned tasks are know occupational risk factor for knee osteoarthritis with a body mass index 31 kg/m<sup>2</sup>. From the physical examination look, no eritem, scar in genu bilateral (+), feel patient feeling pain we touch, and from move, there's limited range of motion. the patient was planning genicular block radiofrequency ablation and dual subsartorial block, from the examination we found that numeric scale score was 6 (moderate pain) with WOMAC score 76 (worse pain in daily activity, stiffness) before the procedure the patients are examined through radiology for any deformity in the knee and to classified the osteoarthritis using Kellgren-Lawrence system.<sup>3</sup> The genicular nerve radiofrequency ablation (GNFRA), is reserved for patients with symptomatic knee OA who had failure for conservative treatment, the GNFRA has been shown to consistently provide short term (3 to 6 months) and sometimes longer, the radiofrequency ablation delivers heat that disrupt the outside of the nerves, which prevent them from sending a pain signal, the tip of which heats to about 176 F the heat from the needle tip



creates some inflammation which help disable the nerve, sensory branches that provide innervations to the knee joint (genicular nerves) before they enter the knee capsule, which indication for chronic knee pain, total knee arthroplasty, or procedure associated with moderate to severe postoperative knee pain the technique was conducted under ultrasound guidance on bony landmark with transducer position coronal orientation on the medial and lateral aspect of the knee, the heat disrupt the sensory terminal branches innervating the knee joint, resulting anesthesia of the anterior compartment of the knee. with the patient in a supine position with the knee slightly flexed by placing a pillow in the popliteal fossa. The innervation of knee is complex, to facilitate the understandin of knee invervation, the genicular nerves are called the superolateral (SLGN), superomedial (SMGN), inferolateral (ILGN), inferomedial (IMGN),<sup>8,9</sup>



Figure 1. Identification a) IMGN b) SLGN c) IMGN with ultrasound guided

This patient also using dual subsartorial block which is a combination of two blocks given below the sartorius muscle, the distal femoral triangle block and adductor canal block that cover almost all the innervations of pain generating component of the anterior and posterior knee joint involved in TKR surgery, the sartorius muscle is a common landmark for both femoral triangle and adductor canal block, with the external landmark middle third of the thigh, it required local anesthetic volume 10-20cc. After the procedure we reevaluated the pain score using NRS was 2 (mild pain) in dynamic condition, and 1 in static, with WOMAC Score 19, the symptomp and physical disability originally developed in this patient, the patient could getting up from the chair, sitting and also walking without feeling pain. Another day we do another examination in the patient and we find out the NRS was 1 in dynamic condition, and 0 in static (no pain), and the WOMAC score 19, patient was discharge from the hospital.<sup>5,8</sup>

## Post operative care

The patient was advised to undertake training involving gentle flexion and extension of the knee and



consumed oral analgesia (paracetamol and gabapentin) when patient when home.

## Discussion

The first line treatment for osteoarthritis genu bilateral was total knee replacement, a surgical procedure in which an artificial joint or prosthesis replaces a damaged knee joint, with high degree of success. However, recent studies have reported that many patients show dissatisfaction, including residual pain, even after total knee replacement. With exploration of the mechanisms underlying postoperative pain in TKR, it has been verified that both peripheral and central mechanisms are involved. Therefore, monotherapy alone is not enough to provide satisfactory postoperative pain relief after TKR.<sup>7,8</sup>

At present, multimodal analgesia is considered as the optimal method for perioperative pain management of TKR through targeting numerous pain pathways. Several types of medications and delivery routes, including preemptive analgesia, neuraxial anesthesia, peripheral nerve blockade (PNB), patient-controlled analgesia (PCA), local infiltration analgesia (LIA), and oral opioid and nonopioid medication.<sup>4</sup> The pain intervention that we used in this patient was genicular nerve block radiofrequency ablation and dual subsartorial block with hope to relieve pain and to promote recovery of the knee, and reduce opioid consumption and related side effect. In this patient GNBRF with ultrasound guided was performed with three injection sites (SLGA, SMGA, IMGGA) using local anesthetic drugs lidocaine to reduce the pain when we inject the RF needle tip, and DSB in distal femoral triangle and adductor canal using 10ml local anesthetic bupivacaine or ropivacaine (0.25-0.5%) result in an anesthesia of the skin from medial aspect of the leg and knee to the ankle joint and foot.<sup>3,5</sup>

The procedure lasted 2 hours. Stable hemodynamics while in the procedure, systolic blood pressure 110mmHg and diastolic blood pressure 70-80mmHg, pulse rate 70-75 beats per minute. There are no complications both during and after the procedure.

When the procedure is over, patient observed in the recovery room, hemodynamically stable, NRS score 2. Post procedure analgesic using paracetamol 500mg orally every 8 hours, and gabapentin 100mg every 8 hours. The patient was returned to the ward with an NRS score was 1 (mild pain).

## Conclusion

Chronic pain is a recognized adverse outcome after TKR, Treatment of chronic pain post total knee replacement was challenging, For patients, better pain management reduces distress and increases quality of life, function, social participation and mental wellbeing, Early identification and targeted treatment of



pain may ameliorate pain and prevent long-term disability.<sup>4</sup>

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