

BRIEF COMMUNICATION

Genicular Branch Radiofrequency Ablation: A New Modality for Pain Relief in Osteoarthritis Knee

¹Sunny Malik, ²Arun Puri

ABSTRACT

Chronic knee pain usually occurs in the elderly due to knee osteoarthritis. Many patients are not suitable candidates for replacement surgeries. For such patients who are not willing for surgery or have a multitude of co-morbidities, there are conservative options available including joint injections. Genicular nerve block (radiofrequency ablation) is a recently developed treatment modality which adds a good benefit in terms of pain relief in cases with osteoarthritis (OA) knee. The procedure is quite simple to do and can be done as an outpatient department (OPD) based procedure with the use of ultrasound.

Keywords: Genicular nerve, Osteoarthritis, Radiofrequency.

How to cite this article: Malik S, Puri A. Genicular Branch Radiofrequency Ablation: A New Modality for Pain Relief in Osteoarthritis Knee. *J Recent Adv Pain* 2017;3(3):140-141.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

As a pain physician we usually get patients for the treatment of chronic knee pain resulting from osteoarthritis (OA). The main symptom of OA is pain. Patient may feel pain during movement and at an advanced stage even at rest. Eventually as the disease progresses, the joints may also become stiff and swollen. If nothing is done at this stage, the disease may result in loss of range of movement in the joint. The symptoms of OA may then interfere with the normal daily activities, such as standing, walking, and dressing, and they may also disrupt the patient's sleep.

In the elderly population, e.g., 60 years and older, approximately 13% of women and 10% of men experience symptomatic knee OA.¹ The symptomatology of OA knee varies not only by grades but also from patient to

patient. Various treatment modalities are readily available for pain relief. Apart from the surgical option, a multitude of conservative treatments are available, such as weight loss, pharmacological therapy, transcutaneous electrical nerve stimulation, joint injections with steroids, viscosupplementation, ozone, and prolotherapy with platelet-rich plasma or stem cell therapy.²

There have been cases where these conservative as well as surgical options fail and knee pain continues as a suffering. Genicular neurotomy (ablation) is a recently developed, innovative treatment option for treating knee pain. A sophisticated type of radiowave is applied to the nerves surrounding and supplying the knee (the genicular nerves), resulting in diminution of pain in the knee. This is very useful in high-risk cases with multiple comorbidities who are poor candidates for replacement surgery. In 2011, Choi et al³ introduced a novel technique to alleviate chronic pain resulting from knee OA. This technique is very simple to understand. A series of nerves carry pain signals from the knee to the brain and the target is just to block this signal pathway. Since the brain will not receive the signal, patient will be relieved from pain.

The concept of pain relief looks quite simple, but the nerve network supplying the knee joint is complex, which every pain physician has to understand. Tributaries from tibial, common peroneal, femoral, and obturator nerves are found around the knee proper.⁴ The branches of the common peroneal and tibial nerves are noteworthy from the ablation point of view. Radiofrequency ablation (RFA) of the lateral superior, medial superior, and medial inferior genicular nerves is done under fluoroscopic or ultrasound (USG) guidance. The fourth nerve is left for joint proprioception. The nerves around the knee joint get stunned and the painful signal is prevented from reaching the brain. Previously, RFA of the genicular nerves was done using fluoroscopic guidance with the patient lying supine under the C-arm. This adds to extra cost and time. With the arrival of musculoskeletal ultrasonography, genicular branch RFA became an outpatient department (OPD) procedure. What we have to identify is the genicular artery lying at the junction of the condyle with the shaft of either femur or tibia. Nerves lie in close proximity to the genicular arteries. As a diagnostic injection, a mixture of local anesthetic with steroid is infiltrated around the genicular arteries under real-time

¹Consultant and Head, ²Senior Consultant and Head

¹Department of Anesthesia and Pain Medicine, Rajiv Gandhi Cancer Institute and Research Centre, New Delhi, India

²Department of Anesthesia and Pain Medicine, Max Super Speciality Hospital, New Delhi, India

Corresponding Author: Sunny Malik, Consultant and Head Department of Anesthesia and Pain Medicine, Rajiv Gandhi Cancer Institute and Research Centre, New Delhi, India, e-mail: dr.sunnymalik@gmail.com

USG guidance. If there is significant pain relief (>50%), one can go for therapeutic RFA which has an average pain-free interval from 6 to 24 months.

All of the probes (Standard RFA—90°C and “cooled” RFA—60°C) that are used to perform RFA are US Food and Drug Administration (FDA) approved and are commonly used to treat patients with chronic back pain. Cooled radiofrequency (RF) probes produce larger lesions for better pain relief and have a system of water running through the probe tip that keeps the probe tip at a lower temperature. Halyard Health, a medical technology company that specializes in products to eliminate pain, speed recovery, and prevent infections, developed Cooled RF, a thermal treatment for the relief of chronic, moderate-to-severe knee pain caused by OA. The FDA has cleared for marketing the COOLIEF Cooled RF thermal treatment device for knee OA, according to a press release published by Halyard Health.^{5,6} Recently, researchers did a study comparing steroid injection with Cooled RFA in knee OA patients. Patients were followed for 6 months following the procedure. They found that 5.2% of the Cooled RF group reported the same severity in comparison to 37.3% of the steroid injection group as measured by the Oxford Knee Score. The results of the study showed that in 74.1% of patients receiving Cooled RF treatment, pain was reduced by at least 50% by 6 months postprocedure. At 12 months postprocedure, pain was reduced by 50% in 65.4% of those patients.⁷

The RFA is a relatively inexpensive OPD procedure that can be performed in the pain clinic as compared with knee replacement. In many cases, patients can go back to work the same day with little needle prick pain

that can be controlled with analgesics. The patient can also return to normal day-to-day activities within a few days. Although it is not without complications, there are chances of arterial puncture and hematoma formation. But with the advent of USG one can see the needle tip and trajectory, thus minimizing this complication. However, there are likely chances of regeneration of the nerve tissue with time, which can result in remission of pain and the treatment is then to be repeated.

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