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Alcohol Neurolysis of Genicular Nerves Using New Landmarks: A Case Report

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Introduction

Intra-articular (IA) corticosteroid injections are widely used to relieve pain in knee osteoarthritis (OA). However, pain relief can be transient or inadequate and repeated injections may cause adverse effects including cartilage degeneration, structural joint deterioration and hyperglycemia. Consequently, alternative interventions have gained attention. Genicular nerve block (GNB) or neurolysis is a minimally invasive technique targeting the sensory nerves of the knee joint, reducing pain while preserving joint mechanics. Alcohol neurolysis induces chemical denervation through protein denaturation and axonal destruction, enabling sustained modulation of nociceptive pathways. Precise targeting of the genicular nerves is crucial for optimal clinical outcomes. A recent cadaveric study by Tran et al. show that these nerves are located more posteriorly than the classically thought course. New anatomical landmarks have been proposed to increase nerve capture and enhance analgesic efficacy.

Case Report

A 77-year-old man presented with 1 month of persistent right knee pain. Two weeks prior to his visit, he was given a 20mg IA injection of triamcinolone but severe pain (Numeric Rating Scale [NRS] 7) persisted, limiting ambulation. Physical examination showed pain at terminal flexion during active and passive range-of-motion testing, without instability or erythema. Knee radiographs showed advanced degenerative changes corresponding to Kellgren–Lawrence (KL) grade 4 OA bilaterally.

Based on the study by Tran et al., fluoroscopy-guided alcohol neurolysis was performed targeting the superolateral (SLGN), superomedial (SMGN), and inferomedial genicular nerves (IMGN). Under anteroposterior fluoroscopy, the SLGN and SMGN were targeted at the femoral shaft junctions corresponding to the lateral and medial epicondyles, respectively. The IMGN was targeted at the junction of the tibial shaft and the medial tibial condyle. On lateral fluoroscopy, needle tips targeting the SLGN and SMGN were advanced posterior to the femoral midline, aligning with the posterior half of the femoral cortex. For the IMGN, the needle tip was placed posterior to the tibial shaft midline. At each target site, 0.25 mL of 2% lidocaine mixed with 0.5 mL of 50% alcohol was injected. There were no immediate complications.

At 1-, 3-, and 6-month follow-ups the patient showed significant pain reduction with the right knee NRS score decreasing to 3 with no adverse events or new neurological deficits.

Discussion

Our findings suggest that genicular nerve neurolysis using alcohol at a posteriorly adjusted target location can effectively control knee pain; however, this study is limited by its single-case design. Future studies with larger patient cohorts and comparative analyses to classical fluoroscopic landmark techniques are needed to further elucidate potential benefits of posteriorly adjusted targeting.

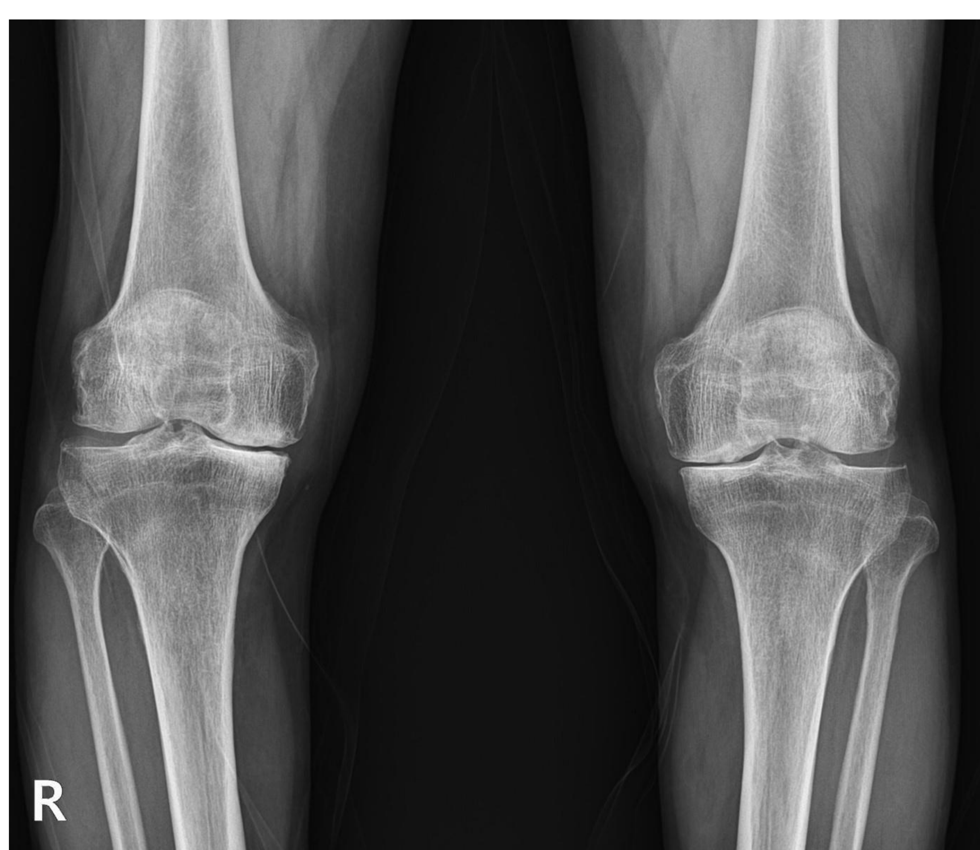

Figure 1. Anteroposterior radiograph of both knees showing advanced degenerative changes, including prominent osteophytes, marked joint space narrowing, and severe subchondral sclerosis, consistent with bilateral KL grade 4 OA
KL, Kellgren–Lawrence; OA, osteoarthritis

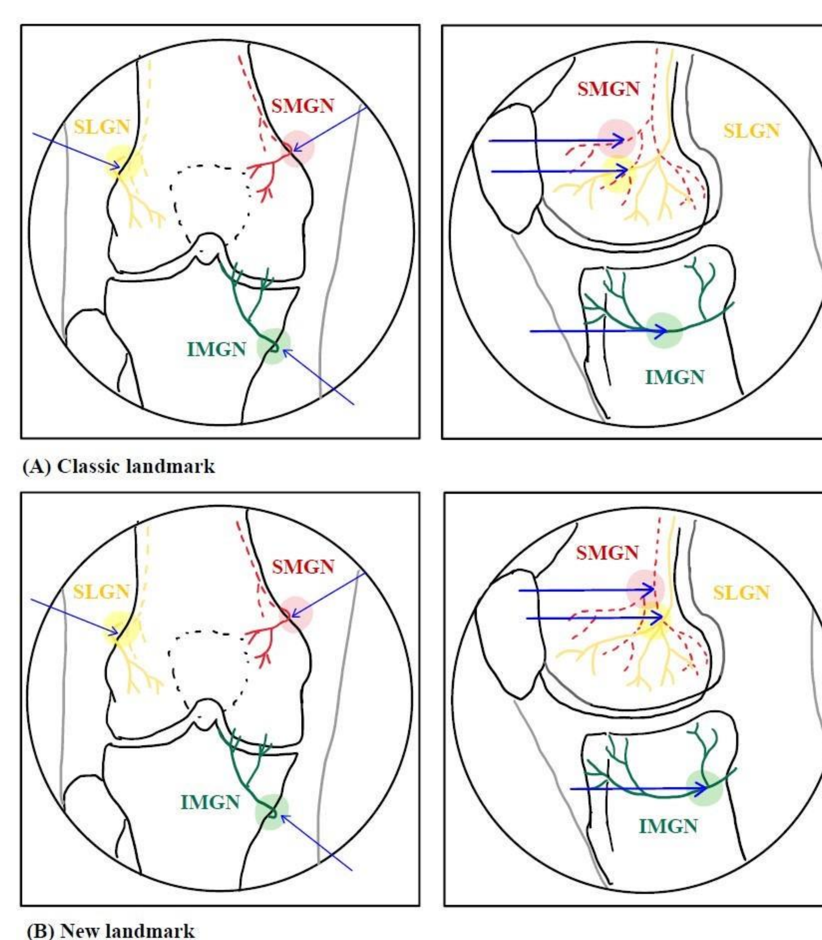

Figure 2. Landmarks for genicular nerve alcohol neurolysis. (A) Classical landmark. Schematic representation of conventional targets for genicular nerve neurolysis. In the anteroposterior view (left), the SLGN and SMGN are targeted at the junction of the femoral shaft midpoint with the lateral or medial femoral condyle, respectively, while the IMGN is targeted at the junction of the tibial shaft and medial tibial condyle. In the lateral view (right), needles are centered along the midline of the femoral and tibial shafts. (B) New landmark. Compared to the classical approach, the SLGN, SMGN and IMGN targets are shifted posteriorly on the lateral fluoroscopic view, with needles directed toward the posterior halves of the femoral and tibial shafts

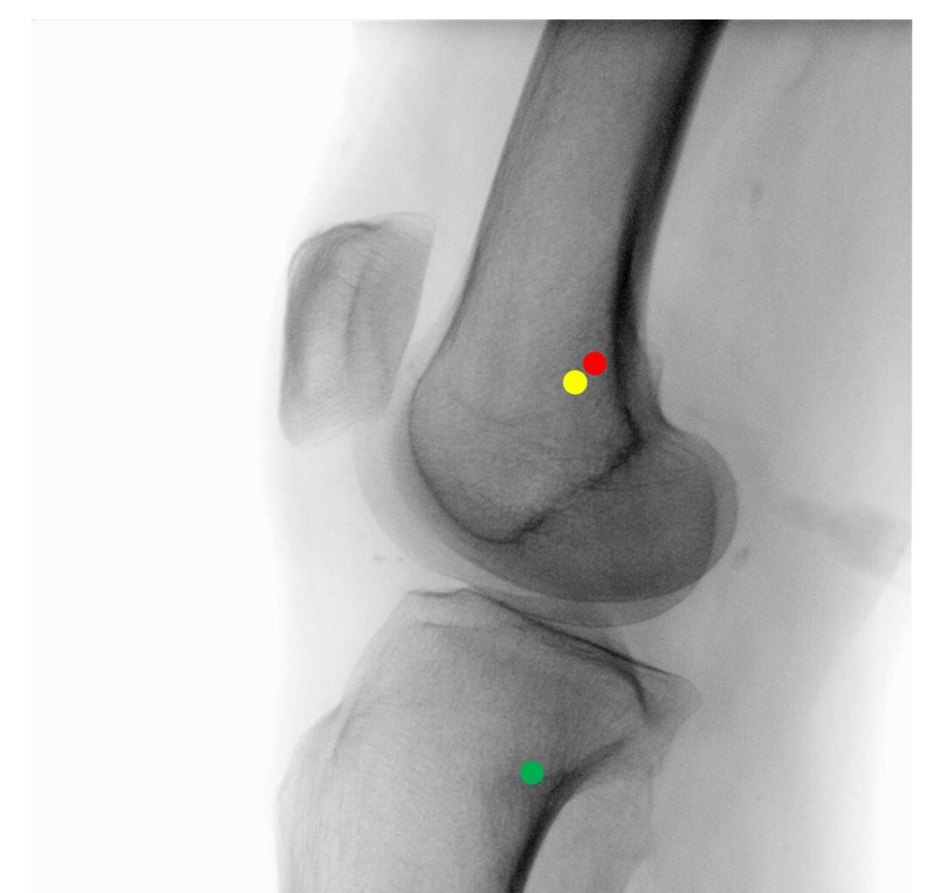

Figure 3. Lateral fluoroscopic image of the knee of the patient illustrating needle target points for genicular nerve alcohol neurolysis. The yellow dot indicates the target for the SLGN, while the red dot indicates the target for the SMGN; both located along the posterior half of the femoral cortex. The green dot represents the target for the IMGN, located posterior to the tibial shaft midline
SLGN, superolateral genicular nerve; SMGN, superomedial genicular nerve; IMGN, inferomedial genicular nerve.