ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

Radiofrequency ablation of the genicular nerves of the knee yields desirable outcomes in patients with knee osteoarthritis

Dr Chia Zi Yang

MBBS, FRCS Edin, Graduate Diploma (Sports Medicine)

Singapore

Singapore General Hospital, Orthopaedic Surgery

Singapore General Hospital
SingHealth

Faculty Disclosure Information

- Nothing to disclose

Introduction

- Radiofrequency ablation (RFA)
  - minimally invasive procedure that delivers targeted thermal damage to surrounding neural tissue, thereby disrupting the transmission of pain signals to provide pain relief.
  - Duration of chronic pain relief provided by RFA has been reported to range from 3 to 12 or more months.
- While surgical modalities are present for knee osteoarthritis, some patients may not be eligible for surgery, resulting in the reliance of pharmaceutical analgesia for pain relief.
- Therefore, RFA presents an alternative nonpharmaceutical treatment option for knee osteoarthritis.
- This study investigates the functional outcomes of RFA in patients with knee osteoarthritis.

Methods

- A total of 32 consecutive patients with knee osteoarthritis who received RFA were available for data analyses.
- Preoperatively, patients completed assessment by physiotherapists
- RFA lesioning (CCOLIEF* CRFA; Avanos Medical) of the genicular nerves was performed. Anaesthesia (1% lidocaine) was used to provide procedural pain relief. Patients were instructed to refrain from strenuous activity for 1 week after the procedure.
- Postoperatively, patients were re-assessed at 6 months and 24 months.
- Outcomes scores obtained were:
  - Range of motion (ROM)
  - Knee Society Clinical Rating Score (KSC)
  - Oxford Knee Score (OKS)
  - Short Form Health Survey-36 (SF36)

Results

- Statistically significant improvement was noted at:
  - KSC: postoperative 6 months (19.0, P=0.001).
  - SF36: both 6 months and 24 months (physical function at 24 months: 35.8, P<0.001; role physical at 24 months: 69.3, P<0.001); bodily pain at 24 months: 18.9, P<0.001; general health at 24 months: 21.3, P<0.001; social function at 6 months 27.7, P=0.001; overall total at 24 months: 14.9, P<0.001)

Discussion

- Knee osteoarthritis is a debilitating condition that affects patient function and increases the healthcare burden significantly. The prevalence of knee osteoarthritis in the general population of our country is estimated to be 11%[1], with direct costs to the patient and indirect cost to society adding up to $7477 and $15799, respectively[2].
- While total knee replacement is a solution for late-stage knee osteoarthritis, surgery is not suitable for up to 25% of the patients due to old age, health status, amongst other reasons[3,4].
- RFA interrupts the transmission of pain signals via targeted thermal damage of nerve structures. Attenuation of pain is believed to be achieved with the restoration of the nerve structure[5,6].

Discussion

- Koshi E et al.[7] reported that at six months, 91% of patients reported continued >50% improvement of their baseline knee pain.
  - This is finding is corroborated in our study where statistically significant improvement in KSC was noted at postoperative 6 months (19.0, P=0.001). Statistically significant improvement for SF36 was noted at 6 months (social function at 6 months 27.7, P=0.001).
- In our study, benefits of RFA were also found at 24 months (physical function at 24 months: 35.8, P<0.001; role physical at 24 months: 69.3, P<0.001); bodily pain at 24 months: 18.9, P<0.001; general health at 24 months: 21.3, P<0.001; overall total at 24 months: 14.9, P<0.001).
  - Chen AF et al.[8] demonstrated in their systematic review that geniculate nerve thermal RFA is a superior nonsurgical treatment of knee OA compared with NSAIDs and intraarticular corticosteroid injections. None of the RCTs reported any serious AEs with geniculate nerve thermal RFA, as opposed to known cardiovascular, gastrointestinal, and renal AEs for NSAIDs and accelerated cartilage loss and periprosthetic infection risk for intraarticular corticosteroid injections.

Conclusion

- RFA can provide knee osteoarthritis patients with satisfactory short to long-term pain relief to allow participation in daily activities.

References

1. Noviani M, Thumboo J, Lee CM, Soh I, Ma S, Leung YY. SAT0463 The Prevalence of Knee Osteoarthritis Estimated by Validated Screening Questionnaire in The General Population of Singapore. Ann Rheum Dis. 2016;75(Suppl 2):838.3-838.

2. Xie F, Thumboo J, Fong KY, Lo NN, Yeo SJ, Yang KY, Li SC. Direct and indirect costs of osteoarthritis in Singapore: a comparative study among multiethnic Asian patients with osteoarthritis. JRheumatol. 2007;34(1):165-171.

3. Kamaruzaman H, Kinghorn P,Oppong R.Cost-effectiveness of surgical interventions for the management of osteoarthritis: a systematic review of the literature. BMC MusculoskeletDisord. 2017 May;18(1):183.

4. Gossec L, Paternotte S, Maillefert JF,Combescure C,Conaghan PG,Davis AM,Gunther KP,HawkerG,Hochberg M, KatzJN, Kloppenburg M, Lim K, Lohmander LS, Mahomed NN, March L, Pavelka K, Punzi L,Roos EM, Sanchez-Riera L, Singh JA, Suarez-Almazor ME,Dougados M;OARSI-OMERACTTask Force “Total Articular Replacement as Outcome Measure inOA”. The role of pain and functional impairment in the decision to recommend total joint replacement in hip and knee osteoarthritis: an international cross-sectional studyof 1909 patients.Report of theOARSI-OMERACTtask force on total joint replacement.Osteoarthritis Cartilage. 2011 Feb;19(2):147-154.

5. Abd-Elsayed A, Strand N, Gritsenko K, Martens J, Chakravarthy K, Sayed D, Deer T. Radiofrequency Ablation for the Knee Joint: A Survey by the American Society of Pain and Neuroscience. J Pain Res. 2022;15:1247-1255.

6. Conger A, Gililland J, Anderson L, Pelt CE, Peters C, McCormick ZL. Genicular Nerve Radiofrequency Ablation for the Treatment of Painful Knee Osteoarthritis: Current Evidence and Future Directions. Pain Med. 2021;22(Suppl 1):S20-S23.

7. Koshi E, Meiling JB, Conger AM, McCormick ZL, Burnham TR. Long-term clinical outcomes of genicular nerve radiofrequency ablation for chronic knee pain using a three-tined electrode for expanded nerve capture. Interv Pain Med. 2021;1(1):100003.

8. Chen AF, Mullen K, Casambre F, Visvabharathy V, Brown GA. Thermal Nerve Radiofrequency Ablation for the Nonsurgical Treatment of Knee Osteoarthritis: A Systematic Literature Review. J Am Acad Orthop Surg. 2021;29(9):387-396.