

Outcomes of Cooled-Radiofrequency Ablation of Lumbar Nerves as Treatment for Chronic Low Back Pain

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Introduction

- Chronic low back pain is particularly burdensome and very common, with a lifetime prevalence of 84%¹
- Low back pain is often a multifactorial condition but frequently arises from lumbar vertebrae, facet joints, spinal nerve roots, or intervertebral discs²
- Conservative therapy for low back pain includes exercise, physical therapy, weight loss, muscle relaxants, and other pharmacotherapies
- Many patients experience chronic pain refractory to conservative treatment and would potentially benefit from minimally invasive therapy for pain relief
- Cooled radiofrequency ablation (CRFA) is a minimally invasive therapy where an intermittently cooled electrode tip is positioned adjacent to the target nerve, allowing radiofrequency waves to generate localized thermal energy, thereby inducing neurolysis of the nerve fibers responsible for transmitting pain signals^{3,4}

Methods

- Retrospective analysis of 1450 procedures between 2015-2024 for patients who received CRFA for chronic low back pain, 1236 were included
- Exclusion criteria included missing pre-op or post-op pain scores and other invasive procedures at the ablation site
- Visual analog scale (VAS) was used to measure pre-operative and post-operative pain scores
- A two-tailed paired t-test was used to statistically analyze the preoperative and postoperative pain scores, with a p-value of ≤ 0.05 considered significant.
- Only procedures documenting symptom improvement ($>0\%$), were included to analyze the duration of pain relief.
- All adverse events associated with the procedure were included in the analysis

Results

Table 1: Changes in VAS Pain Scores and Duration of Improvement Following Procedure

Average VAS pain score pre-procedure (n=1236)	6.44 ± 1.67
Average VAS pain score post-procedure (n=1236)	3.21 ± 2.45
VAS % improvement in effective RFAs (n=1062)	60.56 ± 27.21
Average Duration of improvement (n=1236), days	267.43 ± 393.18

Table 2: Reported adverse events

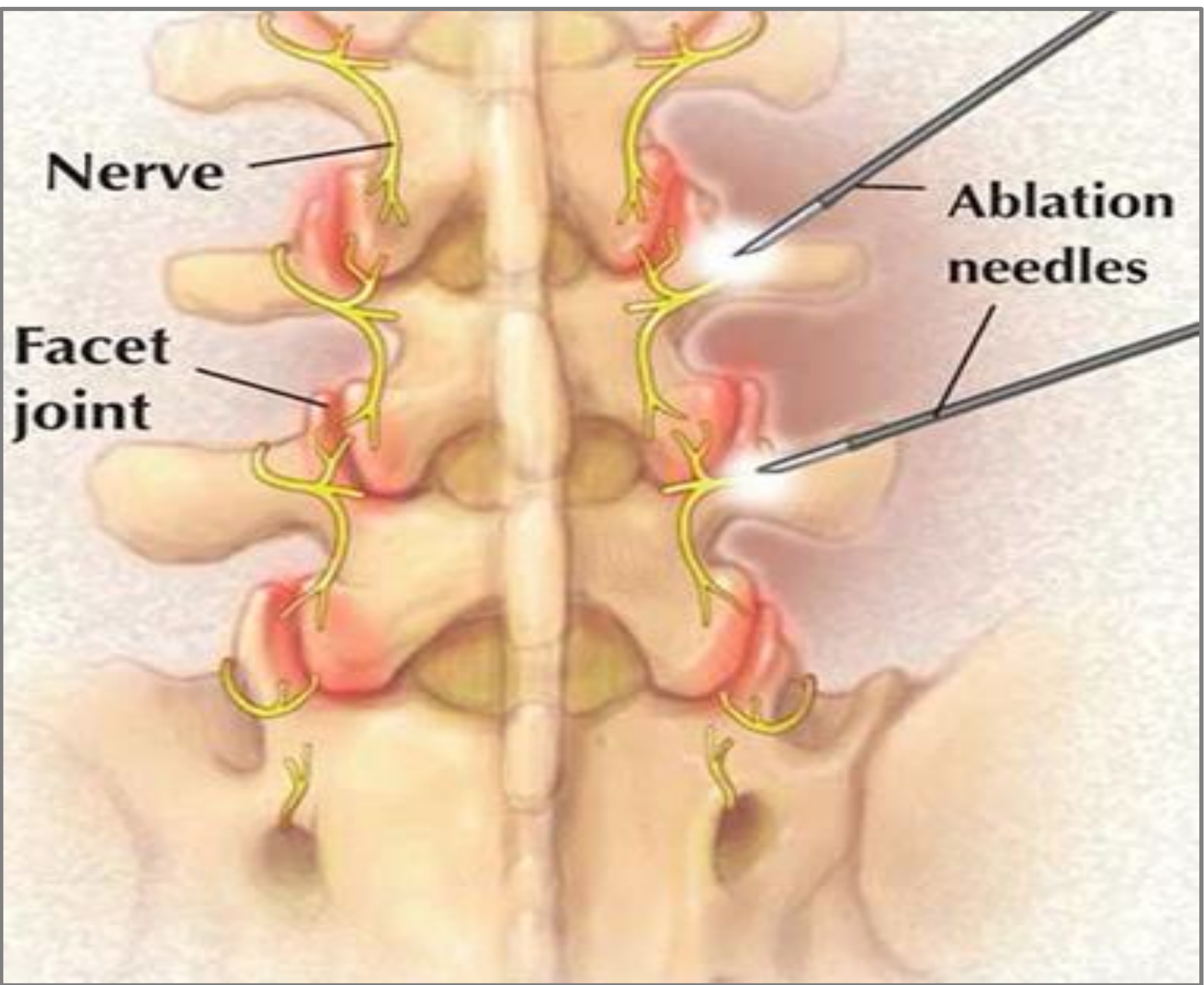
Adverse event	Number reported
Worsened pain following procedure	26
Numbness	6
Hypotension	5
Skin rash	3
Procedure was painful	2

Table 3: Patients' demographics

Total # CRFA (n)	1450
Total # patients (n)	1026
Sex (F/M)	584/442
Age (years), mean ± SD	59.81± 13.40
BMI (kg/m2), mean ± SD	31.67± 7.13

Discussion

- Average reduction in pain scores from pre-op scores was 60.56% with an improvement in pain scores reported in 85.92% of patients
- Previous studies report 60.5% decrease in pain at 6 months⁵
- In this study, 14.08% (n = 174) of patients experienced a complete remission of their pain, a finding not observed in previous research.
- 42 adverse events were reported of 1236 procedures (3.39%), however all were self-limiting and resolved shortly after procedure
- 214 of 1450 procedures lacked pre- and post-op scores which were excluded from analysis
- COVID-19 pandemic contributed to patient loss at follow-up
- Our study includes the largest cohort ever published on the efficacy of RFA of lumbar medial branches for treating low back pain



Conclusions

- Cooled radiofrequency ablation is an effective treatment for chronic lower back pain refractory to other treatments
- CRFA provides significant long term pain relief with minimal side effects

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