Economic Value of Cryoneurolysis versus Radiofrequency Ablation for Chronic Low Back Pain

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INTRODUCTION

Facet-mediated chronic low back pain (CLBP), transmitted via the lumbar medial branch nerves, is frequently treated with radiofrequency ablation (RFA). Cryoneurolysis is an alternative treatment that applies sub-zero temperatures to freeze targeted peripheral nerves to disrupt the nerve conduction pathway while preserving the nerve's connective-tissue scafold. A cryoneurolysis system tip (iovera° Smart Tip) designed to access deeper targets for facet-mediated CLBP has recently been cleared by the US Food and Drug Administration.

METHODS

A Markov cohort model was developed in Microsoft Excel to compare costs and outcomes associated with cryoneurolysis and RFA for the treatment of adults with CLBP in the United States, based on a randomized comparative trial with up to 12 months of follow up (N=30).[1] Patients were allowed to get additional spinal injections (facet, epidural, spinal trigger point, other) after day 180.

Patient-reported pain scores on the numeric rating scale (NRS), Oswestry Disability Index (ODI) scores, and retreatment rates were sourced from the trial.[1]

Direct and indirect resource use were estimated based on a published mapping of ODI-defined disability health states to resource use.[2–3]

Treatment-related costs and unit costs for each resource were obtained from standard US costing sources to estimate total costs.

NRS pain scores were mapped to health state utilities[4] to calculate quality-adjusted life days (QALDs).

In a cost-effectiveness analysis of treatments for chronic lower back pain in US adults:

the cryoneurolysis system was associated with better outcomes for patients and lower total costs for payers compared with radiofrequency ablation

- **Patients had less pain, less disability, and greater quality of life**
- **29% fewer patients needed retreatment**
- **Savings of at least $3,852.14 in total costs over 12 months, including at least $906.58 in direct cost savings**

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RESULTS

Compared with RFA, cryoneurolysis produced lower average pain scores, lower average disability scores, and higher quality of life over 12 months of follow up

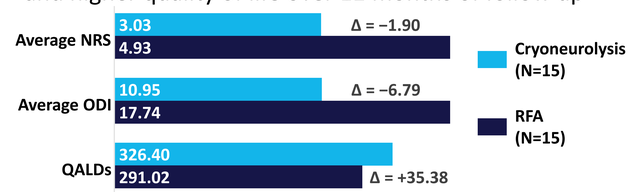


Figure 1. Effectiveness outcomes

Abbreviations: NRS, numerical rating scale; ODI. Oswestry Disability Index; QALDs, quality-adjusted life days; RFA, radiofrequency ablation.

In the most conservative analysis—treating 5 nerves/3 joints in a hospital setting—cryoneurolysis had higher treatment cost, but it is offset by lower projected costs of healthcare resource utilization and work productivity losses

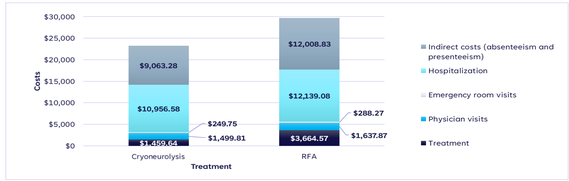


Figure 2. Cost outcomes

Abbreviations: RFA, radiofrequency ablation.

Cryoneurolysis had lower treatment costs in most treatment settings

Facility # nerves/joints	Cryoneurolysis	RFA	Difference
Hospital			
1 nerve/1 joint	$1,459.64	$3,664.57	**−$2,204.94**
5 nerves/3 joints	$4,287.67	$3,835.16	**$452.51**
ASC			
1 nerve/1 joint	$475.44	$1,898.63	**−$1,423.19**
5 nerves/3 joints	$1,335.06	$2,069.22	**−$734.15**
Outpatient clinic			
1 nerve/1 joint	$524.31	$795.31	**−$271.00**
5 nerves/3 joints	$1,269.56	$1,640.38	**−$370.82**

Table 1. Treatment costs by setting

Abbreviations: ASC, ambulatory surgical center; RFA, radiofrequency ablation.

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