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Does a history of spinal surgery affects functional outcomes and healthcare utilization following spinal cord stimulation therapy?

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Introduction

Chronic low back pain (CLBP) is a highly prevalent condition with spinal cord stimulation (SCS) being a well-established treatment option for patients who experience CLBP from persistent spinal pain syndrome (PSPP) and more recently, nonsurgical refractory chronic low back pain (NSRCLBP) [1-3]. Therefore, the objective of this study was to evaluate if a history of spinal surgery affects functional outcomes and healthcare utilization (HCU) after high-frequency (10 kHz) SCS therapy.

Materials and Methods

This was a retrospective single-center observational study of 160 subjects who underwent a 10 kHz SCS trial and subsequent implant for CLBP, Institutional Review Board (IRB) approval was obtained. Subjects were divided in two cohorts based on the history of lumbar spinal surgery: 81 subjects in group A (surgical) and 79 subjects in group B (nonsurgical). Functional outcomes included the numeric rating scale (NRS) and the Oswestry Disability Index (ODI), and the rate of HCU using the number of emergency department (ED) visits, the number of interventional pain procedures related to CLBP, and opioid utilization measured by morphine milliequivalents (MME). These outcomes were then compared for the pre-and post-implant periods up to 12 months. Descriptive statistics and statistical analysis were performed to calculate statistical significance (p-value <0.05) and the minimally clinically important difference (MCID).

Results/Case Report

The study population consisted of 160 subjects with a mean age of 62 years and a mean body mass index (BMI) of 32. Table 1 summarizes demographic data and patient characteristics. The overall self-reported improvement in pain among all participants was 67.5%, with the surgical group mean improvement of 66.8% and 68.3% for nonsurgical group. Both cohorts had statistically significant improvement in NRS and ODI from baseline to 12-month follow-up. Interestingly, MCID in pain relief was equivalent between cohorts, however, the surgical group had more subjects reaching MCID in disability. Table 2 summarizes outcome changes in each cohort. There was no statistical significance in pain and disability outcomes between the surgical and nonsurgical groups. Both groups equally achieved statistical significance individually. Table 3 summarizes these findings. There was a statistically significant reduction in ED and procedure related visits within each cohort individually, yet here was no statistical difference

between the surgical versus the nonsurgical group. Interestingly, there was no statistically significant change in opioid use in either group. However, when all subjects were analyzed as a combined cohort (surgical and nonsurgical), there was a statistically significant reduction ($p<0.0001$) in opioid use with a mean decrease of 24.5 MME overall and a mean of 78.2% dose reduction with 91.5% reaching the MCID of a 30% dose decrease.

Discussion

10 kHz SCS was equally effective in improving pain and reducing disability in NSCLBP and PSPS patients up to 12-month follow-up. Furthermore, 10kHz SCS demonstrated similar efficacy to decrease HCU measured by the number of ED and office visits for interventional pain procedures in both cohorts up to 12-month follow-up. Our findings suggest that 10kHz SCS is an effective therapy to reduce pain, disability, and HCU in subjects with or without a history of lumbar spinal surgery.

References

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Disclosures

Yes

Tables / Images

Characteristics at baseline	Category	N(%) Total = 160
Gender	Male	69(43.1)
	Female	91(56.9)
History of Alcohol Use	No	87(54.4)
	Yes	73(45.6)
History of Tobacco Use	No	100(62.5)
	Yes	60(37.5)
History of Diabetes	No	110(68.8)
	Yes	50(31.3)
History of Psych Illness	No	73(45.6)
	Yes	87(54.4)
History of Spine Surgery	No	79(49.4)
	Yes	81(50.6)

Table 1. Demographic and patient characteristics at baseline.

Group A (Surgical History)	Outcome	Baseline (Mean)	12-month follow-up (Mean)	p-value	% Subjects reached MCID
	NRS	5.63	4.53	0.0001*	42%*
	ODI	44.85	38.10	0.006*	51%*
	ED	0.14	0.03	<0.0001*	n/a
	MME	36.28	25.27	0.082	40%*
	PROC	1.46	0.28	0.0001*	n/a
Group B (Nonsurgical)	Outcome	Baseline (Mean)	12-month follow-up (Mean)	p-value	
	NRS	5.53	4.45	0.001*	41%
	ODI	43.72	38.01	0.02*	29%
	ED	0.10	0.02	0.03*	n/a
	MME	27.77	33.62	0.26	41%
	PROC	1.30	0.26	<0.0001*	n/a

Table 2. Outcome changes from baseline to 12-month follow up in group A and group B.

Comparison (A vs B)	Outcome	p-value
	NRS	0.97
	ODI	0.52
	ED	0.47
	MME	0.04*
	PROC	0.62

Table 3. Comparison of outcomes between groups A and B.