

Utilization of Spinal Cord Stimulation in Patients with Failed Back Surgery Syndrome

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Introduction

Post-laminectomy pain syndrome (aka Failed back surgery syndrome or FBSS) represents a major source of chronic neuropathic pain. Several landmark studies in the field have demonstrated superior pain relief, improved quality of life, and functional capacity following treatment with spinal cord stimulation (SCS) compared to spinal reoperation or medical management. (1-2) The goal of this study was to determine the real world utilization of SCS in this population and compare complications, charges and healthcare resources in a large, independent cohort of FBSS patients undergoing surgical intervention.

Methods

The Reuter's MarketScan database was utilized to perform a retrospective, cross-sectional, population-based study. FBSS patients who underwent SCS or spinal reoperation (laminectomy, fusion, revision fusion) between 2000 and 2009 were identified. Logistic regression analysis was used to examine long-term complication rates. Propensity score matching was utilized to compare a matched cohort of patients, examining hospital charges and healthcare resource utilization. **TABLE 1**. Postoperative complications in patientsundergoing lumbar surgery and SCS

		Total	Lumbar re-operation	SCS	p-value
Index hospitalization	Total N	16455	16060	395	
complications	N(%)	1906 (11.58)	1886 (11.74)	20 (5.06)	< 0.0001*
30-day complications	Total N w/ 30 days post-op data	15880	15504	376	
	N(%)	2250 (14.17)	2225 (14.35)	25 (6.65)	< 0.0001*
90-day complications	Total N w/ 90 days post-op data	14724	14386	338	
	N(%)	2096 (14.24)	2074 (14.42)	22 (6.51)	< 0.0001*

Table 2.	Healthcare	costs for	[•] patients	undergoing	lumbar
surgery a	nd SCS				

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		-	Matched population				
			Lumbar	SCS	p-value		
Characteristics at th	Characteristics at the time of procedure		re-operation	(n=111)	-		
			(n=111)				
Hospital days	Index hosp.		3 (2)	2 (1)	< 0.0001*		
[mean (SD)]	Post-op 1yr total		2 (4)	2 (7)	0.7786		
	Post-op 2yr total		3 (6)	4 (9)	0.8191		
Outpatient services	Post-op 1yr total		82 (79)	82 (68)	0.4228		
[mean (SD)]	Post-op 2yr total		161 (151)	170 (129)	0.1783		
Outpatient ER	Post-op 1yr total		3 (7)	4 (11)	0.1978		
services[mean(SD)]	Post-op 2yr total		6(11)	9 (20)	0.1563		
Medications	Post-op 1yr total		38 (34)	45 (42)	0.4178		
[mean(SD)]	Post-op 2yr total		75 (71)	92 (86)	0.2767		
Hospital	Index hosp.		40433 (32240)	31210 (27327)	0.0162*		
charges[mean (SD)]	Post-op 1yr total		6820 (15495)	10812 (34862)	0.7479		
	Post-op 2yr total		15150 (39268)	19972 (44086)	0.5633		
Outpatient	Post-op 1yr total		9592 (10639)	10153 (11885)	0.8174		
charges[mean (SD)]	Post-op 2yr total		20210 (23334)	20156 (20672)	0.6211		
Outpatient ER	Post-op 1yr total		308 (801)	430 (996)	0.1595		
charges[mean (SD)]	Post-op 2yr total		765 (1808)	815 (1454)	0.1962		
Medication charges	Post-op 1yr total		2841 (3507)	4789 (7098)	0.4597		
[mean(SD)]	Post-op 2yr total		5766 (7462)	9332 (13218)	0.3838		
Total costs: index	1 year	-	61830 (52902)	56964 (54941)	0.3069		
hosp +postop	2 year		82586 (66154)	80669 (68575)	0.8772		
Abbreviations: SD = Standard Deviation							

Results

Cohort characteristics: Of 16,455 patients diagnosed with FBSS undergoing a either repeat lumbar surgery or SCS, only 395 (2.4%) underwent SCS implantation. While the mean age of patients undergoing SCS and lumbar surgery were similar, significantly more females underwent SCS implantation (63.8% vs. 55.3%). Those with Commercial and Medicare insurance were more likely to undergo lumbar surgery, with significantly more Medicaid patients undergoing SCS implantation (19.0% vs. 7.5%)

Complications: The incidence of postoperative complications during the index hospitalization was significantly higher in those who underwent lumbar surgery (11.7%) compared to patients who underwent SCS (5.1%) (p < 0.0001). Even at 90 day follow-up, those in the lumbar surgery group experienced complications at more than 2 times the rate as those in the SCS group (14.4% vs. 6.5%, p < 0.0001) (Table 1).

Conclusions

Despite prior data suggesting improved functional outcomes, lower complications, and hospital charges with SCS compared to spinal re-operation, only a small percentage of FBSS patients currently receive SCS.

Healthcare resource use: Those who underwent lumbar surgery had a one day longer hospital stay compared to those in the SCS group (3 vs. 2 days, p < 0.0001), resulting in significantly higher hospital costs for the index hospitalization (\$40,433 vs. \$31,210, p = 0.016). However, overall cost at the end of 2 years was similar between the two groups (\$82,586 vs. \$80,669, p = 0.88).

References

1. North, RB et al. Spinal cord stimulation versus repeated lumbosacral spine surgery for chronic pain: a randomized, controlled trial. Neurosurgery, 2005.

2. Kumar, K et al. Spinal cord stimulation versus conventional medical management for neuropathic pain: a multicentre randomised controlled trial in patients with failed back surgery syndrome. Pain, 2008.