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A CANADIAN PERSPECTIVE OF COST-EFFECTIVENESS ANALYSIS OF SACRAL NEUROMODULATION IN REFRACTORY OVERACTIVE BLADDER

Hypothesis / aims of study

Refractory overactive bladder (OAB) with urge incontinence is an underdiagnosed condition with significant burden on the healthcare system and diminished patient's quality of life. A substantial number of patients will fail conservative treatment with optimized medical therapy (OMT) and may benefit from minimally invasive procedures including sacral neuromodulation (SNM) or onabotulinumtoxin-A (BoNT-A) injection. Currently, the safety, efficacy and effectiveness are conventional hurdles for patient access. With the evolving treatment options actually available, the efficiency evaluation of a treatment modality which is considered in the health economic analysis should be implemented with the affordability issue through budget impact analysis. The goal of this study was to estimate the cost-effectiveness of SNM vs. OMT and BoNT-A.

Study design, materials and methods

An economic Markov model with Monte Carlo simulation was used to assess the incremental cost-effectiveness ratio (ICER) of SNM vs. BoNT-A and OMT. The model calculated the ICER in deterministic (base-case) and probabilistic (sensitivity) analysis from a Canadian provincial payer's perspective over a 10-year time horizon with 9-month Markov cycles. The Willingness-To-Pay or acceptability curve for ICER calculation was assumed at \$50,000. Clinical data, healthcare resource utilization and utility scores were acquired from recent publications and an expert panel of 7 Canadian surgeons. Cost data (2011-Dollars) were derived from provincial health insurance policy, drug benefit formulary, and hospital data. All cost and outcomes were discounted at 3% rate.

Results

The annual incremental cost of SNM vs. BoNT-A was \$7,237 in year-1 and -\$9,402 in year-10 and was respectively between \$8,878 to -\$11,447 vs. OMT. In the base-case deterministic analysis, the ICER for SNM vs. BoNT-A and OMT were within the acceptable range (\$44,837 and \$15,130 respectively) at the second year of treatment, with SNM being dominant in the consequent years (Table 1). Furthermore, the probability of ICER obtained from the base-case deterministic analysis of being below the acceptability curve was >94.4% for SNM vs. BoNT-A at year 4 and >99.9% for SNM vs. OMT at year 2 (Table 2). Finally, graphs 1A and 2A represent the cost-effective planes which show SNM was more expensive than BoNT-A and OMT at year 1 of treatment. However, graphs 1B and 2B demonstrate the cost-effectiveness of SNM would be met when compared to these 2 treatment modalities at year 5.

Interpretation of results

These results showed that sacral neuromodulation is a cost-effective treatment option for the management of patients with refractory overactive bladder when compared to either onabotulinumtoxin-A or optimal medical therapy.

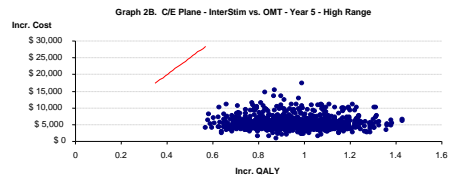
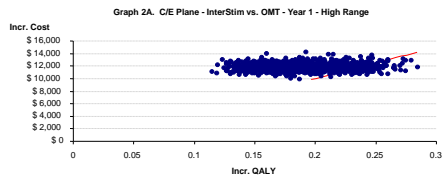
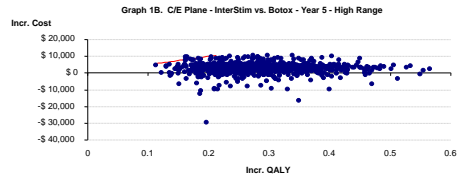
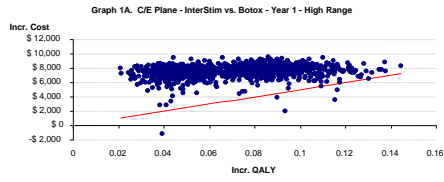
Concluding message

At least from a Canadian payers' perspective, sacral neuromodulation should be considered as first line treatment option in patients with refractory overactive bladder.

Table 1 Deterministic Analysis									
INTERSTIM vs. BoNT-A									
	Incr. Cost			Incr. QALY			C/QALY		
	Mean	Low Range	High Range	Mean	Low Range	High Range	Mean	Low Range	High Range
1 year	\$7,237	\$7,574	\$6,709	0.05	0.05	0.05	\$144,067	\$150,769	\$133,058
2 years	\$4,318	\$4,884	\$3,591	0.09	0.09	0.09	\$44,837	\$50,708	\$37,286
4 years	-\$651	\$277	-\$1,691	0.19	0.19	0.19	Interstim Dominant	\$1,436	Interstim Dominant
5 years	-\$2,775	-\$1,701	-\$3,941	0.24	0.24	0.24	Interstim Dominant	Interstim Dominant	Interstim Dominant
10 years	-\$9,402	-\$7,698	-\$11,129	0.51	0.51	0.51	Interstim Dominant	Interstim Dominant	Interstim Dominant
INTERSTIM vs. OMT									
	Mean	Low Range	High Range	Mean	Low Range	High Range	Mean	Low Range	High Range
1 year	\$8,878	\$8,812	\$9,008	0.19	0.19	0.19	\$45,999	\$45,655	\$46,672
2 years	\$5,888	\$5,847	\$6,029	0.38	0.38	0.38	\$15,130	\$15,024	\$15,491
4 years	\$348	\$335	\$323	0.76	0.76	0.76	\$455	\$438	\$564
5 years	-\$2,233	-\$2,236	-\$2,039	0.94	0.94	0.94	Interstim Dominant	Interstim Dominant	Interstim Dominant
10 years	-\$11,447	-\$11,347	-\$11,246	1.76	1.76	1.76	Interstim Dominant	Interstim Dominant	Interstim Dominant

Table 2 Probabilistic Analysis			
(Willingness-To-Pay = \$50,000)			
INTERSTIM vs. BoNT-A			
	% < C/E threshold		
	Mean	Low Range	High Range
1 year	0.50%	0.10%	0.40%
2 years	26.70%	21.60%	48.60%
4 years	94.40%	95.60%	93.90%
5 years	93.20%	94.60%	89.40%
10 years	85.80%	88.60%	77.70%
INTERSTIM vs. OMT			
	Mean	Low Range	High Range
1 year	17.90%	22.00%	9.40%
2 years	99.90%	99.80%	100.00%
4 years	99.60%	99.60%	100.00%
5 years	99.60%	99.60%	100.00%
10 years	64.70%	61.40%	78.00%

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Disclosures

Funding: none **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** Economic model based on retrospective data
Helsinki: Yes **Informed Consent:** No