Systematic Review of Economic Evaluation Studies in Cranial Neurosurgery

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Background

• Health care spending in Canada is expected to reach around 242 billion dollars in 2017 which would account for nearly 11.5% of our gross domestic product

• Neurosurgery is one of the most expensive fields in medicine

• Number of studies have evaluated the cost effectiveness of spine surgery

• Other sub-specialities of neurosurgery have received less attention in regards to cost effectiveness
PRSIMA Flow Sheet

Identification

Records identified through database (n = 3862)
PubMed, Embase, Cochrane Library

Additional records identified through other sources (n = 21)
Google scholar, citations of published literature

Records after duplicates removed (n = 3485)

Screening

Title and Abstracts screened (n = 3211)

Records excluded (n = 3182)
Conference abstracts
Reviews, Editorials, Books
Burden-of-illness studies
Study types other than economic evaluations

Eligibility

Full-text articles assessed for eligibility (n = 303)

Full-text articles excluded (n = 250)
Not involving cranial neurosurgery treatments
Health outcomes other than LY, QALY, or DALY

Included

Studies included in qualitative synthesis (n = 53)
No. publications per year

Economic evaluation studies included in the systematic review based on year of publication.
Subspecialty

Distribution of economic evaluation studies based on study location.
Distribution of economic evaluation studies based on subspecialty of neurosurgery. Studies are organized based on the reported cost-effectiveness ratio against a willingness to pay threshold of 50,000USD per health outcome (i.e. QALY, LY). If the specific intervention at study met the following criteria; 1) less costly and, 2) led to improved health outcome, it was deemed 'dominant' over the alternative treatment option. If the cost-effectiveness ratio of the intervention in question was less than 50,000USD per health outcome, it was categorized as 'met'. If the cost-effectiveness ratio of the intervention in question was more than 50,000USD per health outcome, it was categorized as 'unmet'.
Results

• 28 studies (53%) found the surgical treatment in question to be cost effective using a willingness to pay threshold of 50,000 USD

• 11 studies (21%) found the specific surgical option to be dominant (cost saving and improved outcome)
  ▪ Endovascular thrombectomy for ischemic stroke
  ▪ Carotid endarterectomy for carotid stenosis
  ▪ Intraoperative mapping for low grade glioma
  ▪ Radiosurgery for metastatic brain tumors
  ▪ Endoscopic pituitary resection
  ▪ Transphenoidal surgery for prolactinoma
Conclusion

• Increase in the number of cost-effectiveness studies within neurosurgery in the last 5 years

• Neurosurgical procedures are costly, but there are a number of procedures that are cost effective

• Subset of procedures that are cost-effective and improve health outcomes