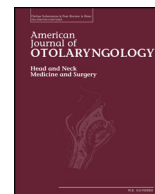




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Financial outcomes of transoral robotic surgery: A narrative review

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ABSTRACT

Objective: To determine the current cost impact and financial outcomes of transoral robotic surgery in Otolaryngology.

Data sources: A narrative review of the literature with a defined search strategy using Pubmed, MEDLINE, CINAHL, and Web of Science.

Review methods: Using keywords ENT or otolaryngology, cost or economic, transoral robotic surgery or TORs, searches were performed in Pubmed, MEDLINE, CINAHL, and Web of Science and reviewed by the authors for inclusion and analysis.

Results: Six total papers were deemed appropriate for analysis. All addressed cost impact of transoral robotic surgery (TORs) as compared to open surgical methods in treating oropharyngeal cancer and/or the identification of the primary tumor within unknown primary squamous cell carcinoma. Results showed TORs to be cost-effective.

Conclusion: Transoral robotic surgery is currently largely cost effective for both treatment and diagnostic procedures. However, further studies are needed to qualify long-term data.

1. Introduction

The use of robotic surgery has gradually risen over the past few years, particularly as the field of otolaryngology adopts robotic procedures. Transoral robotic surgery (TORs) has especially seen a rise since FDA approval in 2009 [1,2]. Previous studies show that TORs provides better prognosis in terms of oncological outcomes, both as a treatment and diagnostic tool, as well as provides surgical efficiency [3–8]. As more institutions begin to utilize TORs, it is necessary to examine the cost effectiveness in order to gain a comprehensive understanding of outcomes. The purpose of this narrative review is to examine where TORs is most cost effective compared to other methods. Our research can help provide a holistic approach to TORs indications and contraindications in patient specific scenarios.

2. Methods and materials

The authors performed a narrative review of English language related literature in June 2017, related to the topics of robot assisted surgery, cost impact, and Otolaryngology within Pubmed, MEDLINE, CINAHL, and Web of Science databases. Fig. 1 summarizes the search.

2.1. Inclusion and exclusion criteria

Only studies that included original research with extractable data conducting a TORs cost-analysis were considered. All study designs were considered. Articles discussing future cost based on computer projections are mentioned in the discussion. Only statistically significant data within studies is discussed.

3. Results

Fig. 2 details the article assessment process. The outlined methodology led to 24 results within PubMed, 29 within MEDLINE, 0 within CINAHL, and 3 within Web of Science. After screening for duplicates, 6 of the 55 results were eliminated. A screening through the 49 remaining articles at the abstract level resulted in 11 unique results relevant to analysis of cost-examination regarding TORs. A full text assessment resulted in six articles that were further screened for risk of bias assessment using the Cochrane Risk of Bias assessment guidelines, resulting in six total articles examined [9]. While the authors intended to complete a systematic review with meta-analysis, the data sets were assessed to have been too different to use for such a purpose.

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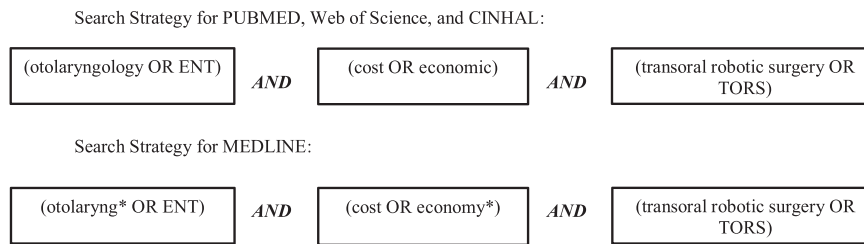


Fig. 1. Search strategy - Search criteria and guidelines used for article analysis.

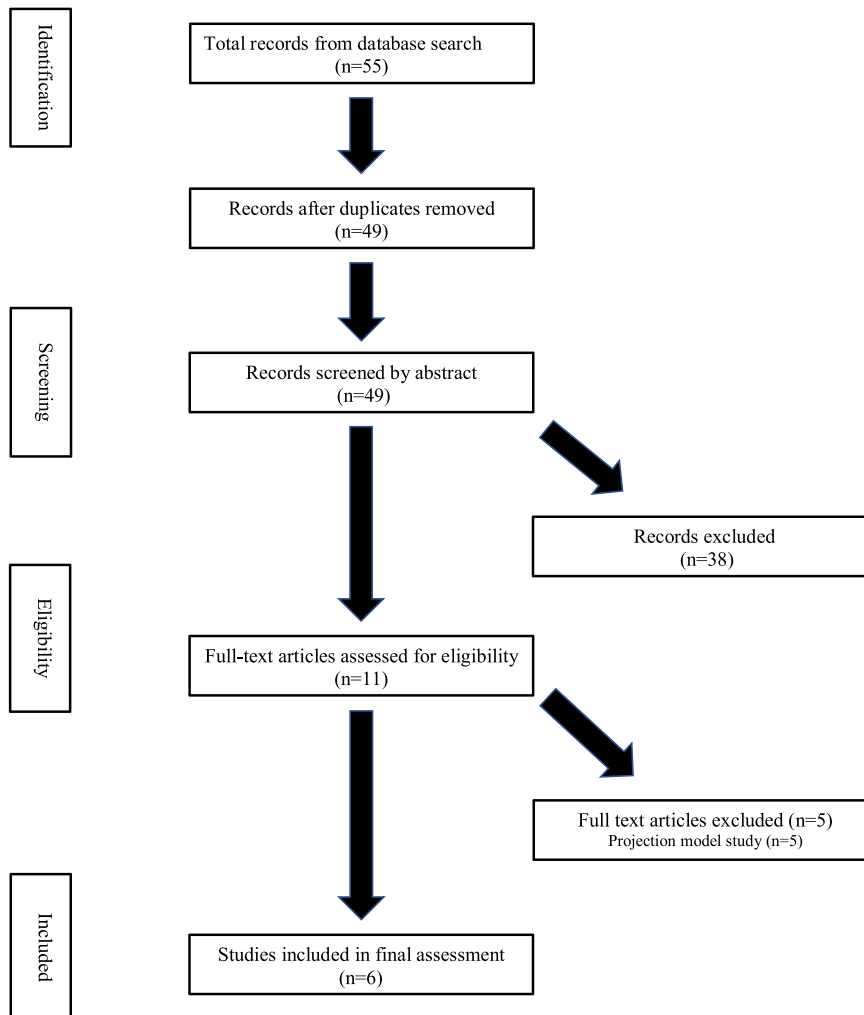


Fig. 2. Search results - TORs cost-effectiveness search results.

3.1. Article background

In order to account for information bias and variable patient follow up time, Table 1 lists study specifics and characteristics that may influence results.

3.2. Incremental cost outcomes

Table 2 provides a summary of total cost outcome per study and sub-study of TORs compared to other treatment methods.

TORs use in cancer treatment is consistently cost-efficient across studies when compared to conventional, open surgical methods. Variable sample size, procedural methods, study methods, and patient databases were undergone as referenced by Tables 2 and 3, and results all showed increased in cost efficiency regarding TORs vs. open surgery

[10–14]. Although studies examined various procedure types, TORs saved an average of \$8355 per procedure per study [10–14].

One outlier was Chung et al. found TORs for anterior tongue partial glossectomy to have no significant cost efficiency taken compared to conventional surgery [10]. It is worth noting that Chung was the only study to examine anatomically-specific procedures of the articles discussed in this study.

Rather than raw incremental cost difference, Byrd used Incremental Cost Effectiveness Ratio (ICER) [15]. ICER is a measure of cost-effective analysis directly comparing costs of two different procedures. Using this information, as well as standard costs in their medical center, the authors calculated the ICER for two experimental groups as defined in Table 2, respectively. Using a literature review of \$50,000–\$100,000 per quality-life adjusted year as cost effective, where the lower the number, the more likely society is willing to pay, the authors conclude

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