Objective: This study aims to characterize the changing utilization between surgical and non-surgical treatment options for laryngeal cancer, to examine trends in the cost of these various modalities using Medicare reimbursement patterns as a proxy for national health spending.

Study Design: Retrospective cohort study

Methods: Surveillance, Epidemiology, and End Results (SEER)-Medicare database was queried to identify laryngeal cancer cases and linked data regarding Medicare payments for associated services. We stratified data based on treatment type, cost of treatment, and patient factors, including age, sex, race, income quartile, disease stage, primary site of surgery.

Results: We identified 5,536 patients in the SEER-Medicare database from 2000 to 2007 who were treated for squamous cell carcinoma of the glottic or supraglottic larynx, and therefore met inclusion criteria. Overall, 956 patients underwent surgery, 2,932 patients underwent radiation alone, and 1,638 patients underwent combined therapy. There was a significant increase in use of radiation from 2000 to 2007 and a decrease in combined therapy, as well as a decrease in the use of total laryngectomy. We report this shift, in 2007, intensity-modulated radiation therapy (IMRT) treatment of was of high significance to Medicare.

Conclusions: We demonstrate a recent trend toward non-surgical treatment for laryngeal cancer, including increasing use of IMRT, with associated cost differences. In the changing landscape of American healthcare, cost will be a significant driver of treatment.

Therefore, investigating the comparative efficacy of various treatment modalities will be needed to determine if increased cost correlates with patient outcomes.

Methods and Materials

The Surveillance, Epidemiology, and End Results Program (SEER), a National Cancer Institute-supported database, records incidence and survival which cover 26% of the US population. SEER-Medicare Trends in Laryngeal Cancer database from 2000 to 2007 who were treated for SCC of the glottis or supraglottis. This included 4,467 males and 1,069 females, for a male to female ratio of approximately 4:1. Overall, 956 patients underwent surgery, 2,932 patients underwent radiation alone, and 1,638 patients underwent combined therapy. There was a significant increase in use of radiation from 2000 to 2007 and a decrease in combined therapy (p < 0.001) (Table 2). The use of IMRT increased from 1.3% to 21.9% while the use of non-IMRT radiation decreased from 86.7% to 78.1% (p < 0.001) (Fig 1). Medicare costs by treatment.

Our study illustrates several important findings. There has been an increase in the use of radiation alone from 2000 to 2007. There has been no significant change in the use of surgery overall. Furthermore, there has been a dramatic increase in the use of IMRT. This is associated with a three-fold increase in cost when compared to non-IMRT radiation therapy as well as surgery. IMRT has become a widely adopted modality for both primary and adjuvant treatment of head and neck cancer over the last decade. There have been numerous retrospective studies demonstrating a reduction in long-term toxicity including damage to the salivary gland tissue, mandible and mucosal surfaces (4, 7). There have been no definitive long-term studies assessing whether newer treatment strategies such as IMRT have any clinical benefit including loco-regional control or a survival benefit over traditional radiation or surgical treatments for laryngeal squamous cell carcinoma (25). Small short-term benefit has been shown in terms reduced toxicities (esophagitis and dysphagia symptoms, but favorable cost-effectiveness of IMRT will depend on long-term improvement in materiality and morbidity which has yet to be demonstrated by any high-quality studies. Despite this, there is some indication that the current costs of this technology have increased to the point where these newer technologies might be more cost-effective. As a result, this cost has been a driving force in which treatment option are favored, particularly in cases where oncologic and functional outcomes are equally important.

Conclusion: The treatment of laryngeal cancer has evolved over the last few decades, with a paradigm shift in the use of radiation and surgery. The increasing adoption of IMRT and the decreased use of total laryngectomy as well as any significant change in the use of surgery overall. Furthermore, there has been a dramatic increase in the use of IMRT. This is associated with a three-fold increase in cost when compared to non-IMRT radiation therapy as well as surgery. IMRT has become a widely adopted modality for both primary and adjuvant treatment of head and neck cancer over the last decade. There have been numerous retrospective studies demonstrating a reduction in long-term toxicity including damage to the salivary gland tissue, mandible and mucosal surfaces (4, 7). There have been no definitive long-term studies assessing whether newer treatment strategies such as IMRT have any clinical benefit including loco-regional control or a survival benefit over traditional radiation or surgical treatments for laryngeal squamous cell carcinoma (25). Small short-term benefit has been shown in terms reduced toxicities (esophagitis and dysphagia symptoms, but favorable cost-effectiveness of IMRT will depend on long-term improvement in materiality and morbidity which has yet to be demonstrated by any high-quality studies. Despite this, there is some indication that the current costs of this technology have increased to the point where these newer technologies might be more cost-effective. As a result, this cost has been a driving force in which treatment option are favored, particularly in cases where oncologic and functional outcomes are equally important.

References

Pratik B. Patel, MD, PG-Y2
UCLA Head and Neck Surgery
Website: http://headandnecksurgery.ucla.edu/
Email: pbpatel@mednet.ucla.edu
Phone: 310-206-6766

Fig 1. Radiation patterns

Fig 2. Surgery patterns

Fig 3. Medicare costs by treatment.

Fig 4. Neck dissection costs by stage.

Fig 2. Surgery patterns

Fig 3. Medicare costs by treatment.

Fig 4. Neck dissection costs by stage.

Table 1. Characteristics stratified by treatment.

Table 2. Overall treatment pattern by year.