

Cost Effectiveness Analysis of Salvage Therapies in Locally Recurrent Previously-Irradiated Head and Neck Cancer

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Abstract

Objectives: The addition of Cetuximab to Platinum-based chemotherapy has been established as one standard of care for recurrent previously-irradiated head and neck cancer. Re-irradiation with or without chemotherapy is also commonly used as an alternative standard of care. However, there is no prospective comparisons currently guide practice. Therefore, herein, we conducted a cost effectiveness analysis of different treatment modalities for previously-irradiated head and neck cancer.

Methods: We developed a Markov model using 1-month cycle over a 3-year time horizon with 5 treatment strategies: 1) Platinum-based chemotherapy alone, 2) chemotherapy plus Cetuximab, 3) Stereotactic body radiation therapy (SBRT) alone, 4) SBRT plus Cetuximab, 5) Intensity-Modulated Radiation Therapy (IMRT) plus chemotherapy. Transition probabilities, quality of life utilities and costs associated with each therapy were captured in the model based on a comprehensive literature review and on Medicare reimbursement in 2017. Strategies were compared using the incremental cost effectiveness ratio (ICER), with effectiveness measured in quality-adjusted life years (QALYs). 1-way sensitivity analyses were performed. Strategies were evaluated with a willingness-to-pay (WTP) threshold of \$100,000 per QALY.

Results: Median survival was assumed to be same as 10 months except for chemotherapy alone (7 months). In base case analysis, the common base line therapy was chemotherapy alone (the least costly and the least effective) and no treatment strategy was cost-effective with a WTP threshold. The most cost effective therapies were SBRT alone and SBRT plus Cetuximab with an ICER of \$150,866 and \$219,509 per QALY gained, respectively. In addition, chemotherapy plus Cetuximab (standard of care) was absolutely dominated (less effective and more costly). In one-way sensitivity analyses, results were most sensitive to variation of median survival and utility of tumor progression. If better survival is assumed for SBRT alone or SBRT plus Cetuximab (> 1 month gain), SBRT was economically reasonable.

Conclusions: No treatment strategy was cost-effective using a threshold of 100,000 per QALY, however among the available treatment strategies SBRT-based treatments are the most cost-

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effective. If better survival than the assumed 10-months can be confirmed with prospective comparative data, SBRT becomes cost effective at threshold of 100,000 per QALY gained. Our result highlights the importance of evidence-based data comparing clinical effectiveness among salvage treatments recurrent head and neck cancer.