Comparing Two Protocols for Head and Neck Cancer: a Cost-Effectiveness Analysis

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Abstract and Objective

A decision analytic model has been developed to perform a cost-effectiveness analysis on the addition of docetaxel to the standard treatment for Head and Neck Cancer (HNC). The point of view of the analysis is the Italian National Healthcare Service (NHS). The new therapeutic opportunity, while more or less doubling the cost, has been shown to significantly improve survival in two recent clinical trials. They evaluated the use of docetaxel in two slightly different protocols, i.e. ChemoTherapy + RadioTherapy (CT+RT) and ChemoTherapy + ChemoRadioTherapy (CT+CRT), respectively. To represent the disease progress, Markov processes have been included in the model. Data have been derived mostly from the two trials and, where not available, from literature and expert panel. Adding docetaxel is cost-effective leading to a cost of € 12,880 and € 8,820 per life year saved for the two protocols, respectively. The robustness of the results has been tested with a probabilistic sensitivity analysis.

Keywords:

Cost-effectiveness, Markov model, Head and neck cancer.

Methods

HNC relates to a group of malignant tumors originating from the upper aerodigestive tract. Each year more than 500,000 new cases are diagnosed worldwide, representing 8% of all cancers. Unresectable HNC 5-year survival is lower than 40%. Induction CT (i.e. CT as initial treatment) with cisplatin and fluorouracil (PF) significantly improves prognosis in these patients. Moreover, two recent trials in Europe [1] and USA [2] have shown that adding docetaxel to induction therapy with PF (so called TPF) further improves the overall survival.

We developed a decision model based on Markov processes representing patient's weekly transitions among different therapeutic (CT, RT, CRT, surgeries, palliative care) and disease states (complete/partial/no response, progression, recurrence) related to PF and TPF protocols. Life expectancy years (LYs) were used as the measure of effects. The considered costs were: therapeutic protocol administration, blood tests, instrumental tests, visits, concomitant medications, surgical interventions, palliative care and treatment for adverse events. We compared the different protocols in the Italian scenario. Data on costs were obtained from DRG tariffs and official charges in the Italian NHS. Future costs and life years were discounted applying a 3% discount rate. Model parameter values were obtained from the two trials, from the literature and from experts' opinions. In particular, raw data were available for trial [1], allowing to refine the presented results.

Results and Conclusion

Considering a 5-year temporal horizon, the Incremental Cost-Effectiveness Ratio (ICER) resulted in € 12,880/LY and € 8,820/LY for the protocols [1] and [2], respectively. Probabilistic sensitivity analyses were performed varying transition probabilities by 10% and costs by 30% of their basal values. The analyses showed that 70% and 99% of the results lie below the threshold of € 50,000/LY for [1] and [2], respectively.

In our analysis TPF induction chemotherapy always proved to be cost-effective as compared to PF, having an ICER similar to other commonly accepted healthcare programs.

References

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