

ECONOMIC EVALUATION OF RANIBIZUMAB IN THE TREATMENT OF VISUAL IMPAIRMENT DUE TO DIABETIC MACULAR EDEMA IN AUSTRIA

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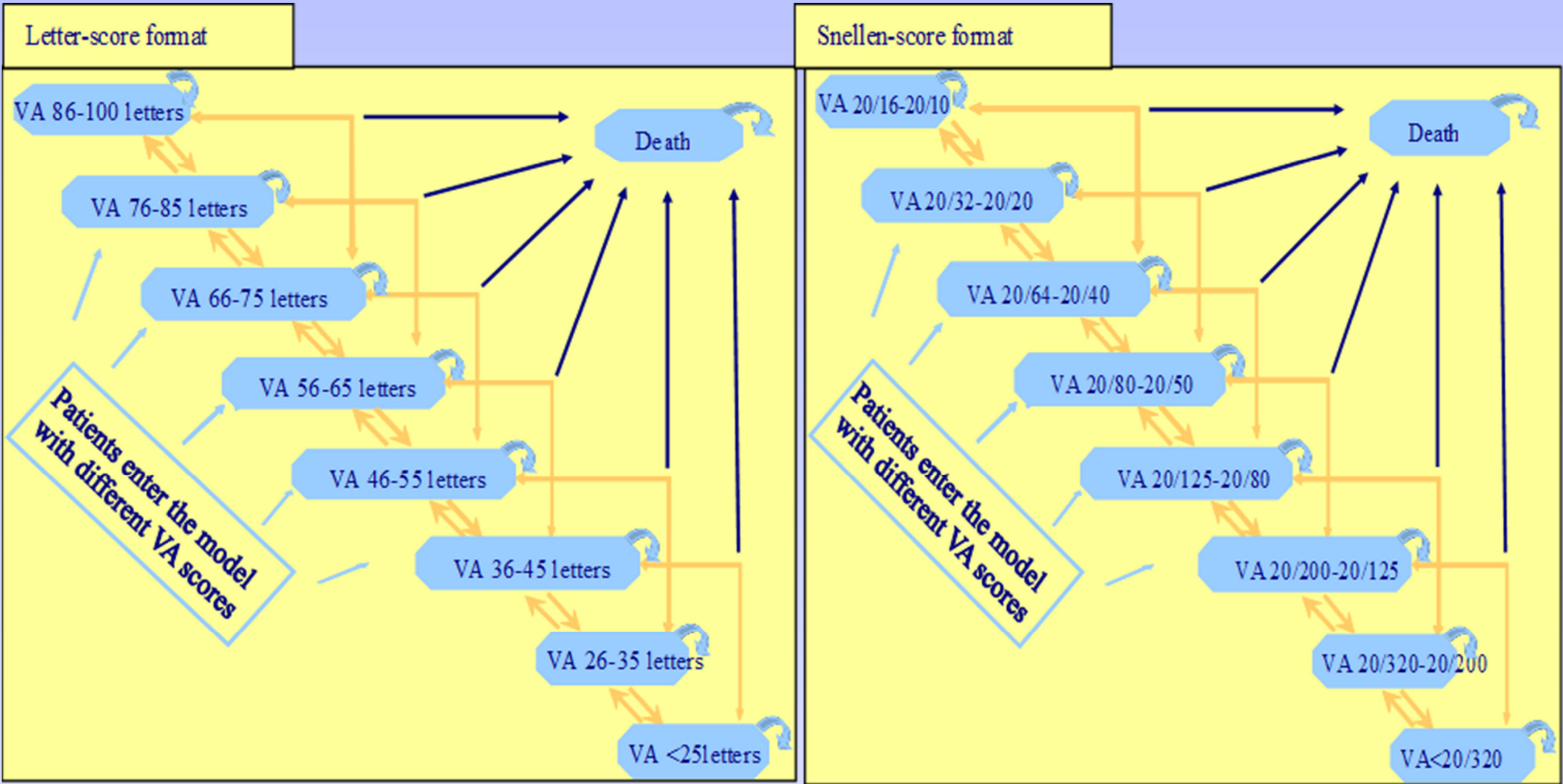
Introduction

Diabetic macular edema (DME) is an ophthalmological complication of diabetes that may lead to visual impairment and blindness if left untreated, and even despite treatment with the current standard of care, laser coagulation. Currently, an estimated 2% of diabetics suffer from DME with vision loss. The aim of the study was to evaluate the cost-effectiveness of Ranibizumab versus laser coagulation in the treatment of visual impairment due to DME.

Methodology

This retrospective pharmacoeconomic analysis of Ranibizumab versus laser coagulation was performed using a Markov model adapted for Austria. The Markov model is based on the PHIII-RESTORE trial. Efficacy assessment was based on the outcome measure 'Vision years' and QALYs. The analysis period was lifetime. The analysis was performed from the perspective of the healthcare system. Costs were captured for the year 2010. The model, representing 9 health states, is based on letter-score-format resp. Snellen-score format and death. The cycle length was 3 months. The patients enter the model with different visual-acuity scores. A change in visual acuity of 10 letters leads to a passover into the next health state. There is no significant difference of adverse event probability between the two alternatives; therefore adverse events have not been included. The discount rate for costs and outcomes is 5%. The model structure is shown within fig.1.

Fig. 1: Model Structure



Source: IMS Health 2010

Resource Use and Cost

Direct medical costs comprise all treatment costs due to diabetic macular edema (medication cost, consultations, inpatient cost, cost for hospital outpatient department, treatment cost like ophthalmologic CT or fluorescence angiography, cost of blindness). Patients consult their ophthalmologist 3-12 times p.a. and their general practitioner 1-2.5 times p.a. according to best corrected visual acuity (BCVA) and kind of treatment (Ranibizumab versus laser coagulation). Laser coagulation is performed in the inpatient setting in Austria. Resource use was verified by expert opinion. Costs are from Austrian tariff catalogues, the Austrian DRG catalogue and official price lists. Medication costs represent social health insurance prices. The cost of blindness was incorporated using data from an Austrian cost-of-illness-analysis and represents cost of blindness due to diabetic retinopathy (Brennig et al. 2010, see *Poster PSS16*). The model time horizon was remaining life expectancy (25 years). The analysis was performed from the perspective of the Austrian healthcare system according to the Austrian Guidelines for Health Economic Evaluations.

Results

The model assumes 7 injections of Ranibizumab in the first year and 4 injections in the second year, as well as 2 treatments with laser coagulation in the first year and one treatment in the second year. After 2 years, there are no more injections or laser treatments. Lifetime costs amount to €17,417 for Ranibizumab and to €16,286 for laser coagulation. The ICER is €5,354 (incremental QALYs gain with Ranibizumab of 0.21). The number of vision years is 10.19 for Ranibizumab and 8.57 for coagulation; the incremental cost per additional vision year gained is €701.

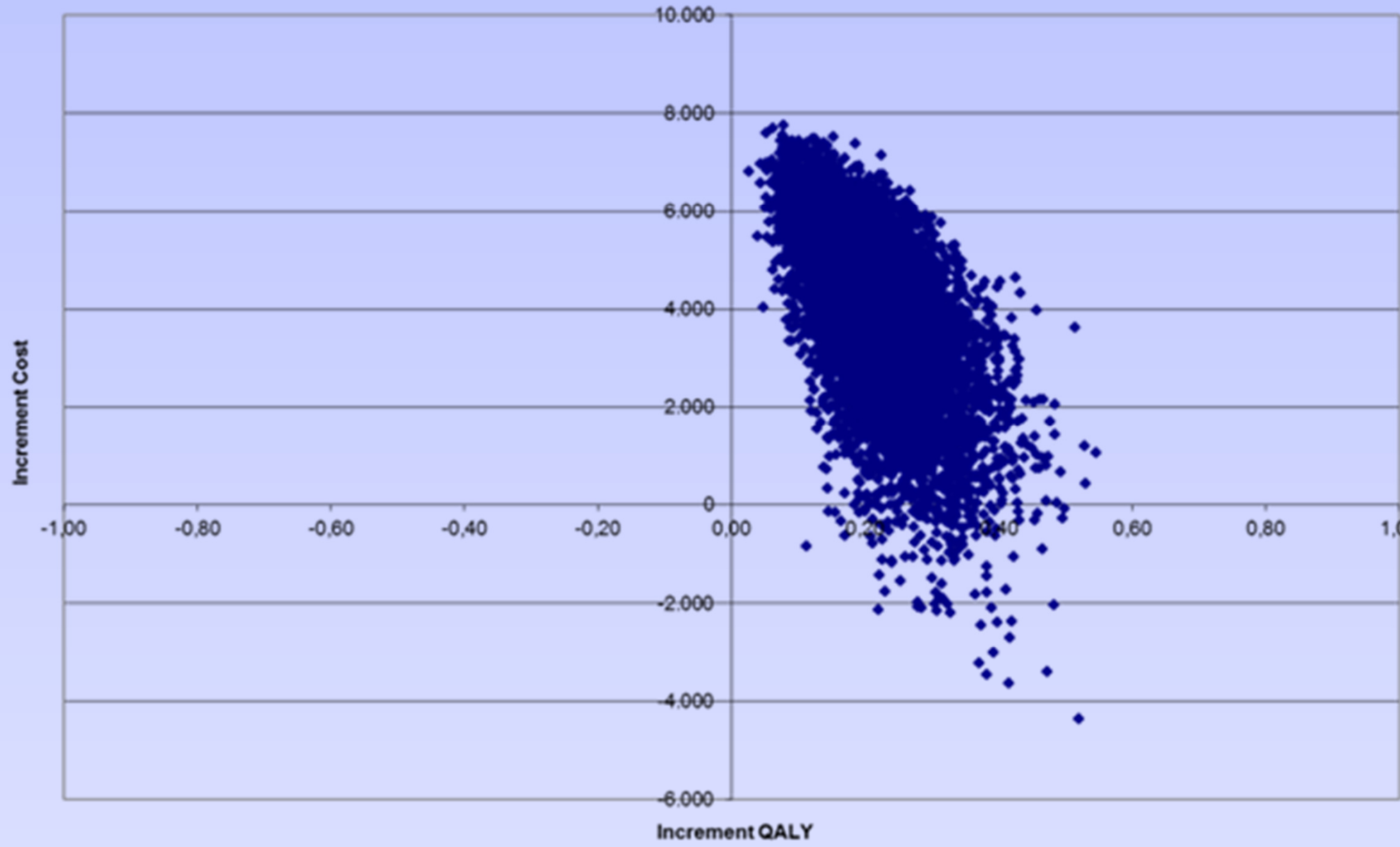
Fig. 2: Results in €

Strategy	Cost C	Difference Cost ΔC	Outcome (Vision Year) E	Difference Outcome ΔE	Cost-Effectiveness C/E	Incremental C/E ICER
Time Horizon: Lifetime						
RAN	17,417		10.19		1,710	701
Laser	16,286	1,131	8.57	1.61	1,899	
Strategy	Cost C	Difference Cost ΔC	Outcome QALYs	Difference Outcome ΔE		Incremental C/E ICER
Time Horizon: Lifetime						
RAN	17,417		8.68			5,354
Laser	16,286	1,131	8.46	0.21		

Source: IPF own calculations

The results of sensitivity analysis show that the majority of points can be found within the upper quarter on the right side.

Fig. 3: Probabilistic Sensitivity Analysis



Source: IPF own calculations

Furthermore the deterministic sensitivity analysis (frequency of injections of Ranibizumab, cost of blindness, cost of laser treatment, discount rate and time horizon) has shown the robustness of the model, with exception of variation of the discount rate.

Conclusion

Diabetic macular edema may occur within every state of diabetic retinopathy and threatens visual acuity of patients. Diabetic retinopathy accounts for immense economic consequences concerning direct and indirect cost. The study suggests that in Austria, Ranibizumab treatment for visual impairment resulting from DME is a cost-effective strategy vs. the current standard of care, laser coagulation.

Literature

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