Cost-effectiveness of amyloid-targeting therapies: modelling based on 5724 biomarker positive AD patients in the Swedish Registry of Cognitive Disorders

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This is the first study to report on the cost-effectiveness of amyloid-targeting therapy based on integrated disease progression and cost data from a large, representative cohort of amyloid-positive early AD patients. Results were sensitive to assumptions regarding treatment effects on mortality.

INTRODUCTION

The emergence of new disease-modifying therapies for Alzheimer's disease (AD) has raised concerns regarding affordability and long-term cost-effectiveness [1]. Previous health economic models have relied on combining multiple sources of data on treatment efficacy, natural disease progression, costs and health outcomes, often derived from patients with dementia without biomarker confirmation of underlying etiology [2]. We utilize integrated data from Swedish registries to estimate the cost-effectiveness of amyloid targeting therapy

REFERENCES

Please follow QR code for references, contact details and more information

METHODS

5724 patients with longitudinal clinical follow-up data were included from the Swedish Registry of Cognitive Disorders (SveDem), linked with the national patient registry, prescription drug registry, elderly care registry, cause of death registry and the neurochemistry database at Sahlgrenska University Hospital. Amyloid positivity was determined from the CSF beta amyloid 1-42 / p-Tau ratio, with optimal cut-off levels determined from beta amyloid 40/42 ratios.
Patients were followed up to 12.9 years from diagnosis. A semi-Markov model with 6-month cycles was constructed with states defined by cognitive status (MCI/dementia, MMSE score) and accommodation (ordinary home vs nursing home or other institution). Hazard rates for disease progression, institutionalization and mortality were estimated using semiparametric survival models. Costs by disease state were estimated from resource utilization data on formal medical (inpatient, specialist outpatient care) and community care (home help, institutional care). Health utility values by disease state were derived from previous observational studies in Sweden [3,4].
Disease-modifying therapy was assumed to decrease transitions to more severe states by 31% [5]. Treatment was continued for up to 3 years or until progression to severe dementia, and results were simulated over a 10-year time horizon. Costs and quality-adjusted life years (QALYs) were discounted at 1.5% annually. Results are presented in Swedish Krona (1 USD ≈ 11 SEK).

RESULTS & DISCUSSION

3 years of amyloid-targeting therapy was estimated to increase time in mild cognitive impairment (MCI) by about 6 months, reduced time in moderate or severe dementia and increased overall survival. Time in institution and total costs of care were only marginally reduced. The threshold intervention cost (maximum cost at which treatment is cost-effective) was estimated to 158,000 SEK. This needs to cover costs for the drug, eligibility assessment, monitoring and managing adverse events.

In a sensitivity analysis, assuming treatment has no indirect effect on mortality, QALY gains were reduced by almost half, cost savings more than doubled and the threshold intervention cost was 188,000 SEK.
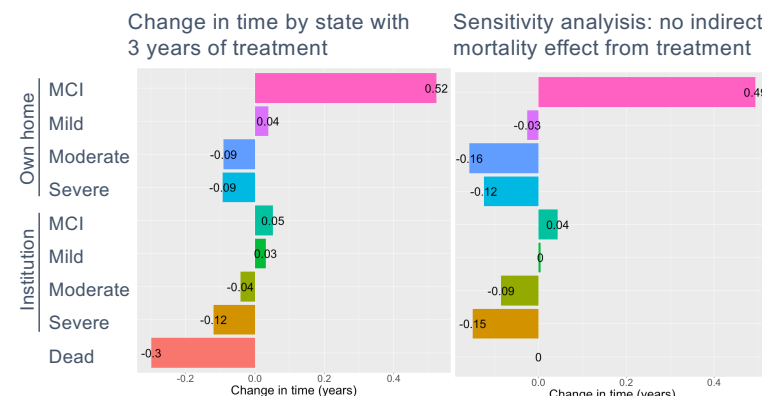
Cost-effectiveness anaysis: 3 years of treatment with amyloid-targeting therapy

	No treatment	Treatment	Difference
Costs of care (SEK)	4,061,998	3,933,991	-128,007
QALYs	4.40	4.74	0.34
Life Years (undisc.)	7.69	7.98	0.29
Time in institution	1.60	1.52	-0.08
Years on treatment	0.00	2.98	2.98
Threshold intervention cost (SEK per year)			158178

Sensitivity analysis: no indirect mortality effect from treatment

	No treatment	Treatment	Difference
Costs of care (SEK)	4,061,998	3,697,974	-364,023
QALYs	4.40	4.59	0.19
Life Years (undisc.)	7.69	7.69	0.00
Time in institution	1.60	1.41	-0.19
Years on treatment	0.00	2.95	2.95
Threshold intervention cost (SEK per year)			188839

Threshold intervention cost: the maximum intervention cost per year at which treatment is cost-effective at a willingness-to-pay per QALY of 1 million SEK

Change in time by state with 3 years of treatment

Sensitivity analyisis: no indirect mortality effect from treatment