Economic Evaluation of disease modifying treatments in patients with relapsing remitting Multiple Sclerosis in Germany: long term analysis and cost effectiveness of Natalizumab, interferon-beta and glatiramer acetate

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Method

Model Framework & Patient cohort

- Decision-analytic model:
  - A Microsoft Excel®-based Markov model was constructed to compare the costs and outcomes of Natalizumab (Nb), Interferon-beta (IFN-b), glatiramer acetate (GA) and best supportive care (BSC).

- Model Type: Markov, stage-transition model

-Time horizon: 30 years

- Cycle length: 3 months

- Perspective: Societal perspective

- Patient starting age: 35 years

- Gender distribution: 72.50% females, 27.50% males

- Annual discount rate: 3%

- Clinical Trials and published literature were used to derive the model parameters:
  - Efficacy and withdrawal rates were derived from trials (Nb) or published meta analysis (IFN-b and GA).
  - Costs and utilities were taken from a published retrospective analysis of cost associated with MS in Germany (Nb).
  - Side effects inclusive progressive multifocal leukoencephalopathy (PML) are reflected in costs and utilities.
  - An univariate sensitivity analysis of multiple model parameters was performed

Model structure:

- The mutually exclusive Markov states are defined by the Expanded Disability Status Scale (EDSS) stages and the course of treatment (Figure 1).

- The model transitions are defined by disease progression. Patients can switch medication or withdraw from treatment at all within each cycle.

- Cost-effectiveness was measured as incremental cost per quality-adjusted life-year (QALY) gained.

Results of real life data collection

- Overall real life data supported the model assumptions.
- Risk for progression and relapse were constant for all EDSS stages.
- After 12 months no mean progression could be detected, (-0.07; CI -0.13 - 0.01). A possible explanation for the minimal overall improvement is the recovery from prior relapses.

German real-life data collection:

- A real-life data collection was conducted in 2010 to evaluate model parameters and to validate model assumptions.
- Data from 554 patients treated with DMTs for RRMS within the last 2 years were collected retrospectively.
- Data sources: Universitätsklinikum Essen, Neurologische Klinik Köln, Kantonsspital St. Gallen and NeuroTransData (one large network of office based neurologists).

Results of model

- Model results indicate that patients managed by best supportive care experience an average 15 relapses within 30 years.

Results of model (cont.)

- Overall real life data supported the model assumptions.
- Risk for progression and relapse were constant for all EDSS stages.
- After 12 months no mean progression could be detected, (-0.07; CI -0.13 - 0.01). A possible explanation for the minimal overall improvement is the recovery from prior relapses.

- The incremental cost-effectiveness (ICER) of Nb versus other DMT is € 37,552 per QALY.
- The patient distribution after 30 years suggests a slower progression for patients under DMT.

- Treatment with DMT improves the situation of patients, with Nb showing the highest efficacy and best cost-effectiveness ratio.
- The ICER of Nb is € 33,664 per QALY using real life data as an alternative setting.

Conclusion

- Treatment with DMT improves the situation of patients, with Nb showing the highest efficacy and best cost-effectiveness ratio.
- The ICER suggests that the additional cost per QALY are in an acceptable range with € 37,552.

References

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