COST-EFFECTIVENESS OF BUDESONIDE ORODISPERSIBLE TABLETS IN TREATMENT OF EOSINOPHILIC ESOPHAGITIS IN THE CZECH REPUBLIC

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Results

In the base case scenario, the incremental cost-effectiveness ratio (ICER) of budesonide compared to placebo reached 10 515,75 EUR/QALY. QALYs gained on budesonide treatment reached 0,829 whereas patients on placebo gained only 0,778 over a 60week time horizon. Presented ICER lies well below willingness to pay threshold (46 720 EUR/ QALY) and therefore budesonide is highly cost-effective intervention. Sensitivity and scenario analyses verified model robustness and stability of results. Probabilistic sensitivity analysis resulted in ICER below willingness to pay (WTP) threshold in 61.5% iterations.

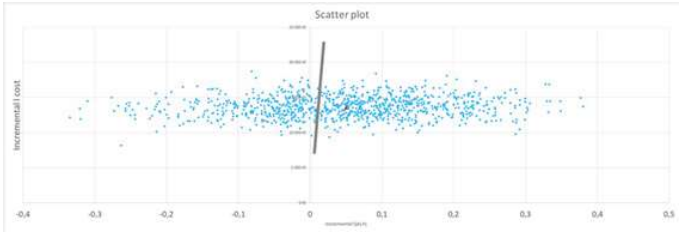

Figure 6 Results - Scatter plot

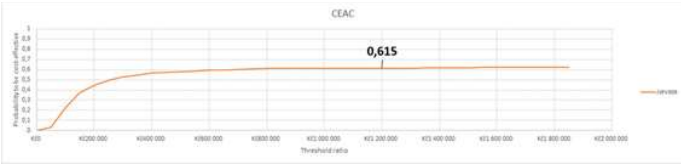

Figure 7 Results - CEAC

Conclusion

Based on the results orodispersible formulation of budesonide improves quality of life in eosinophilic esophagitis patients. Moreover, budesonide is also highly cost-effective intervention as the ICER is well below WTP threshold in the Czech Republic.

Objectives

Budesonide is an anti-inflammatory drug (corticosteroid hormone) and in orodispersible formulation is an effective treatment of eosinophilic esophagitis. In the 6-week induction treatment 57.6% patients achieved both clinical and histological remission [1]. There is no reimbursed treatment for patients with eosinophilic esophagitis in the Czech Republic. The aim of the analysis was to compare costs and effectiveness of orodispersible formulation budesonide in comparison with placebo in adult patients with eosinophilic esophagitis. The analysis was conducted from the perspective of the public healthcare payer in the Czech Republic.

Methods

Health-economic model

To assess on cost-utility of budesonide, a Markov model was developed in Microsoft Excel. The analysis was focused on induction of both clinical and histological remission in adult patient with active eosinophilic esophagitis. Budesonide was compared to placebo as currently there is no reimbursed alternative in the Czech Republic. For the base-case a 60-week time horizon using 12-week cycles was chosen to compare budesonid with placebo. Primary endpoint of the analysis was incremental cost-effectiveness ratio (ICER) measured in terms of costs per quality-adjusted life year (QALY). All costs and outcomes were discounted at 3 % as required by national authority in the Czech Republic. The following structure of health states was designed:

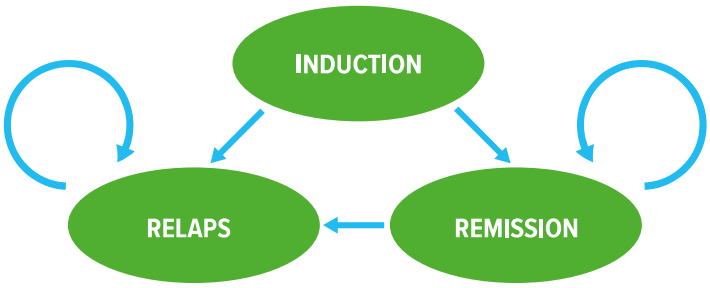

Figure 1 Health model - health states

Efficacy

Transition probabilities between the individual states are modelled based on H2H study of budesonide and placebo [1], a study aimed to assess efficacy and safety of budesonide in adults with eosinophilic esophagitis compared to placebo, during the 6week double blinded Induction phase, 57.6 % of patients achieved both clinical and histological remission. Remission rate after up to 12 weeks of treatment budesonid was 84.7 % in the 12-week open label trial [1].
Probability of maintaining the remission is adopted from [2] – clinical trial aimed on outcomes of long-term budesonide therapy for maintenance of clinical remission compared to placebo. Study assessing the longterm efficacy and safety continued the induction phase study [1], therefore the model fully describes patient flow in the studies.
Mortality was not considered in the analysis as eosinophilic does not affect survival of patients, an average age in the study [1] was 37 years and considerably short time horizon of the analysis.

Budesonid	INDUCTION	REMISSION	RELAPS
INDUCTION	0%	85%	15%
REMISSION	0%	54%	46%
RELAPS	0%	0%	100%

Figure 2 Transition probabilites - budesonid

Placebo	INDUCTION	REMISSION	RELAPS
INDUCTION	100%	0%	15%
REMISSION	0%	0%	0%
RELAPS	0%	0%	0%

Figure 3 Transition probabilites - placebo

Quality of life

There are no utility values published for eosinophilic, therefore it was assumed that the utility during active disease is the same as the utility of GERD (Gastroesophageal reflux disease) with heartburn [3], for the remission utility values for general population were used [4].

Health state	Utility value	SD
INDUCTION	0,69	0,24
REMISSION	0,84	0,2
RELAPS	0,69	0,24

Figure 4 Utility values [3,4].

Costs

All costs relevant from health care payer are included. Utilisation of healthcare regarding management of adverse events and disease management was obtained from panel of experts and List of reimbursed drugs [5] and List of Medical Interventions [6]. Drug costs, management costs, and adverse events costs specific for the Czech healthcare system are assumed as follows (August 2019):

Intervention	No. Packages (90 TBL)	Drug cost per day	Drug cost per cycle
Budesonid (6week induction)	1	9,47 €	397,77 €
Budesonid (12week induction)	2	9,47 €	795,54 €
Placebo	-	- €	- €

Figure 5 Drug costs

It was assumed that 57,6 % of patients would receive the study drug only for 6 weeks (half of cycle) and 42,4 % for 12 weeks. Management costs reach 35.9 EUR per cycle in patient with active disease and 12.1 EUR per cycle for patient in remission. Costs related to adverse events are negligible, they were not assumed in the placebo arm.

References

1. *Figure 5 Drug costs*
2. Lucendo, A.J., Miehlke, S., Schlag, C., Vieth, M., von Arnim, U., Molina-Infante, J., Hartmann, D., Bredenoord, A.J., Ciriza de los Ríos, C., Schubert, S., Brückner, S., Madisch, A., Hayat, J., Tack, J., Attwood, S., Mueller, R., Greinwald, R., Schoepfer, A., Straumann, A., 2019. Efficacy of Budesonide Orodispersible Tablets as Induction Therapy for Eosinophilic Esophagitis in a Randomized Placebo-controlled Trial. Gastroenterology. https://doi.org/10.1053/j.gastro.2019.03.025
3. Lucendo, A., Miehlke, S., Vieth, M., Schlag, C., Biedermann, L., Santander, C., de los Ríos, C.C., Hartmann, D., Madisch, A., Hruz, P., Hayat, J.O., von Arnim, U., Bredenoord, A.J., Schubert, S., Attwood, S.E., Mueller, R., Greinwald, R., Schoepfer, A.M., Straumann, A., 2019. Budesonide Orodispersible Tablets are Highly Effective to Maintain Clinico-Histological Remission in Adult Patients with Eosinophilic Esophagitis: Results from the 48-Weeks, Double-Blind, Placebo-Controlled, Pivotal EOS-2 Trial. Gastroenterology 156, S-1509. https://doi.org/10.1016/S0016-5085(19)40852
4. Kartman, B., Galz, G., Johannesson, M., 2004. Health State Utilities in Gastroesophageal Reflux Disease Patients with Heartburn: A Study in Germany and Sweden. Med. Decis. Making 24, 40–52. https://doi.org/10.1177/0272989X03261563
5. Eriksson, E., Nordlund, A., 2002. Health and Health Related Quality of Life as measured by the EQ-5D and the SF-36 in South East Sweden: Results from Two Population Surveys.
6. SÚKL, „The list of reimbursed medicines 1/8/2019" State Institute for Drug Control, www.sukl.cz, 2019.
7. List of medical interventions, https://szv.mzcr.cz/, 2019.

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