Cost-effectiveness analysis of pregabalin in the treatment of central neuropathic pain

Karbusická M1, Kolek M1, Duba J1, Vothová P2, Dolečková J1

1OAKS Consulting s.r.o., Prague 9, Czech Republic, 2Pfizer, spol. s r.o., Prague 5, Czech Republic

Objectives

The aim of the pharmaco-economic evaluation was to assess costs and benefits of treatment of central neuropathic pain (CNP) with pregabalin compared to placebo as there were no data proving efficacy of other treatments of CNP available and also no treatment is paid by healthcare payers in the Czech Republic.

The pharmaco-economic evaluation was performed from the perspective of the public healthcare payer and only the costs that affect the utilization of public health insurance resources were included.

Methods

Health-economic model
A de novo micro-simulation model was developed in MS Excel 2013 comparing pregabalin treatment of CNP versus placebo. The pharmaco-economic evaluation was performed as cost-utility analysis (CUA).

The improvement of patients' pain intensity expressed as the decrease in VAS (Visual Analogue Scale 0 - 100 mm) score was modelled using one week cycle over the 24 week time horizon.

Population
Baseline characteristics of the whole population (pregabalin and placebo) were modelled individually for each patient according to the data from randomized multicenter 12-week-placebo-controlled clinical trial (1) using normal distribution. Baseline mean age and VAS score was 50.55 (standard deviation (SD): 14.25) and 71.15 (SD: 14.20) respectively. Proportion of men according to the clinical trial (1) was 82.71 %. Baseline characteristic and efficacy was analyzed for participants with at least one visit after screening (n = 133).

Efficacy
The percentage changes of VAS score were estimated for each intervention using a regression function of time and the baseline VAS score of the patient, intercept and beta parameters of regression function.

The regression function of decrease of VAS score for each patient was estimated as follows:

\[ 1 - \text{VAS} \text{t} / \text{BASELINE} = \text{Intercept} + \beta \ln (t), \]

where t is time (weeks), VAS is VAS score in time t, BASELINE is baseline VAS score of the patient, intercept and beta are parameters of regression function.

Quality of life
A systematic literature review was performed to include information on quality of life (QoL) for patients with CNP which was not measured in Siddall, et al. 2006 (1). The trial Vranken, et al. 2008 compared pregabalin to placebo using a similar pain VAS scale and measured QoL using the EQ-5D (2). Based on these data, a regression equation describing dependence of utility values on actual VAS score was estimated as follows:

\[ \text{Utility} = 1 - 0.0101 \cdot \text{VAS} \]

Costs
From the payer’s perspective drug cost, administration, monitoring, concomitant medications and costs of treatment of adverse events were considered. The cost analysis was based on the current list of reimbursed drugs (3) and medical examinations (4) in the Czech Republic.

When calculating drug costs, costs of average daily drug dosage (387.6 mg/day) were calculated according to the clinical trial (1), as well as the proportion of patients suffering of adverse events (AE). Patients experienced AE (somnolence, dizziness, edema, asthenia… (1)) in both treatment arms.

Based on expert feedback and real world prescribing, (5) concomitant medications (opioids, tricyclic antidepressants, NSAIDs) were assumed to be co-prescribed with pregabalin and with placebo according to the clinical trial (1) and cost in the Czech Republic.

Results
The base case result is shown in the table below. Incremental cost-effectiveness ratio (ICER) per QALY gained reached 8,335.22 € which is situated far below the willingness to pay threshold (WTP = 39,876.74 €).