Cost-effectiveness of Denosumab vs. brand or generic Zoledronic Acid in patients with prostate cancer in Kazakhstan

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Introduction

Bone mass loss (BML) is one of the adverse effects of oncological chemotherapy especially in cases of hormonal types of cancer such as a prostate cancer (PC).1-3 BML is strongly associated with skeletal-related events (SREs).4,5 Therefore decreases the quality of patient’s life and increases the economic burden for healthcare facilities. 6 Denosumab is a fully human monoclonal antibody (IgG2) that specifically binds to human RANKL. Like osteoprotegerin, this prevents binding of RANKL to RANK on osteoclasts and inhibits the downstream signalling that induces osteoclast activation, leading to reduction of bone resorption and disruption of the vicious circle of bone metastases. It showed an advantage over zoledronic acid (ZA) in delaying the first-onset and subsequent SREs in adults with PC in several phase III clinical trials. Since recently generated, this paper’s purpose of present study was to access the cost-effectiveness of denosumab compared to brand or generic ZA in the prevention of SREs in Kazakhstani patients with PC.

Objectives: A phase III clinical trial demonstrated the advantage of denosumab over zoledronic acid (ZA) in delaying the first-on-set and subsequent skeletal-related events (SRE) in patients with prostate cancer (PC). Recent paper’s purpose of present study was to examine the cost-effectiveness of denosumab vs. brand or generic ZA in the prevention of SREs in Kazakhstani patients with PC.

Methods: An excel-based Markov model was constructed with 4-week model cycles to analyze the cost-effectiveness of the treatments from the perspective of Ministry of Health with a 10-year time horizon for PC cohort. Direct costs in 2014 tenge (tg) included costs of drug, adverse event and SRE (pathologic fracture, surgery to bone, radiation to bone, spinal cord compression) treatment. A discount rate of 3% per year was applied. Effectiveness was appraised based on the number of SREs. The health states were defined according to SRE occurrence, SRE history and death. The model assumed that a maximum of 1 SRE could occur in each cycle, Transition probabilities were derived from the relevant phase III trials. Results were present in the incremental total cost per SRE avoided. One-way sensitivity analyses were performed to examine the robustness of the model.

Results: Over 10-year period, denosumab incurred 10391 tg higher costs than generic ZA, 671133 tg higher costs than generic ZA, 0.58 fewer SREs per PC patient. The estimated incremental total direct costs per SRE avoided with the use of denosumab was 177743 tenge (instead of brand ZA) and 1167470 tenge (instead of generic ZA). Results were robust to one-way sensitivity analyses.

Conclusions: The incremental direct cost, brand and generic ZA are equally effective, denosumab seems to be superior alternative for brand ZA (magnificent difference in costs), and costly alternative for generic ZA from a perspective of Ministry of Health of Republic of Kazakhstan.

References


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