Multiple myeloma (MM) is the second most common hematologic malignancy accounting for 10% of all new cases, and 20% of all hematologic cancers. It has an estimated incidence of 85,704 new cases and 62,535 deaths worldwide. South Korea is expected to have a prevalent population of 2,464 MM patients.

Currently, no cure has yet been found for MM. Therefore, drugs’ goals are to postpone disease progression, relieve symptoms, increase patients’ life span and maintain high-quality remission for as long as possible.1,4

In this study a comprehensive assessment of the cost-effectiveness of lenalidomide plus dexamethasone (LEN/DEX) compared to dexamethasone (DEX), as second-line or greater than second-line therapy in relapsed/refractory multiple myeloma (r/RMM) patients was performed, from the perspective of the South Korean National Health System.

**METHODS**

Two parallel, randomized, double-blind, placebo-controlled phase III trials4,5 compared LEN/DEX (25mg/40mg) with placebo plus DEX (40mg) in r/RMM patients who had received at least one prior therapy (MM-009/010). Both studies demonstrated superior efficacy of LEN/DEX in comparison to DEX, in terms of overall response rate, progression-free-survival (PFS) and overall survival (OS)5,6. The results of these clinical trials allowed for the parameterization of a 3-state Markov-type stochastic process (Figure 1), with a 4 week cycle and time dependent transition probabilities, designed to assess long-term costs and effectiveness.

![Figure 1: Markov state-transition diagram for rMM](image1)

State transition probabilities, depending on the efficacy of the treatments with respect to PFS were estimated through a survival analysis of patient-level data (Celgene data on file). Due to the potential of crossover/subsequent treatment options induced bias, OS was estimated using a quantitative relationship between PFS and OS from a censored normal weighted Tobit regression model, based on 153 MM studies containing 230 treatment arms. In this study, Félix et al (2013) estimated that a 2.5 month (95% confidence interval, 1.7–3.2) increment in median OS is expected for each additional month in median PFS (Table 1).

![Figure 2: Survival analysis PFS and OS](image2)

For this population LEN/DEX is estimated to add substantial benefits to DEX, with expected gains of 1.83QALY and 2.50LY, offset by a mean incremental cost of $55,387. Corresponding incremental cost-effectiveness ratios (ICER) are estimated at $30,195/QALY and $22,148/LY (Table 3). PSA revealed >95% probability of LEN/DEX being cost-effective in comparison to DEX at a $40,000 threshold. These results are robust against sensitivity analyses in turns of alternative crossover correction techniques and patient sub-populations (Table 3).

![Table 3: Cost effectiveness results for different subpopulations and crossover correction techniques](image3)

**CONCLUSIONS**

Lenalidomide is expected to substantially increase the life expectancy and the quality of life of relapsed/refractory multiple myeloma patients at an acceptable incremental cost. Lenalidomide plus dexamethasone can be regarded a valuable treatment option for second or greater line therapy in multiple myeloma patients.

**REFERENCES**

4. Félix J, et al. A cost–effectiveness analysis of lenalidomide and dexamethasone compared to dexamethasone in Europe. 17th Annual Meeting of The European Society for Medical Oncology (ESMO). 2012; München, Deutschland. jorge.felix@exigoconsultores.com

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