Cost-effectiveness of ticagrelor in patients with type 2 diabetes and coronary artery disease with a history of PCI: an economic evaluation of THEMIS-PCI using a Swedish healthcare perpective

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On behalf of THEMIS Investigators

Funding Acknowledgement: Type of funding source: Private company. Main funding source(s): AstraZeneca

Background: The Effect of Ticagrelor on Health Outcomes in diabEtes Mellitus patients Intervention Study (THEMIS) evaluated ticagrelor compared to placebo for the prevention of myocardial infarction (MI), stroke and cardiovascular (CV) death in 19 220 patients with type 2 diabetes (T2DM) and stable coronary artery disease (CAD) with no prior myocardial infarction (MI) or stroke. THEMIS-PCI was a pre-specified subgroup of 11 154 patients who had a history of percutaneous coronary intervention (PCI) when entering the study. In THEMIS, ticagrelor reduced CV death, MI or stroke, although with an increase in major bleeding compared to aspirin alone, and there was a significant interaction between a prior history of PCI and the net benefit of ticagrelor. In the THEMIS-PCI population, ticagrelor plus aspirin provided a favourable net clinical benefit with a significant 15% reduction in all-cause death, MI, stroke, fatal bleed, or intracranial haemorrhage.

Objective: The objective of this analysis was to estimate the cost-effectiveness of ticagrelor for the prevention of CV events based on the results of the THEMIS-PCI population using a lifetime horizon from a Swedish healthcare perspective.

Methods: A lifetime Markov state transition model was developed with health states aligned to the THEMIS trial endpoints. Health state transitions were informed by parametric survival equations fitted to patient level data from THEMIS-PCI population. Treatment discontinuation rates were informed by the THEMIS-PCI population, with all patients assumed to discontinue treatment with ticagrelor after four years. The incidence of bleeding and dyspnoea were modelled as adverse events. Costs (2019 Euros) and utility data were derived from the published literature and the THEMIS-PCI population, respectively, and discounted at 3.0% annually. Probabilistic (PSA) and deterministic sensitivity analysis (DSA) were conducted to quantify uncertainty of key input parameters.

Results: Treatment with ticagrelor plus aspirin over four years resulted in estimated Quality Adjusted Life Year (QALY) gains of 0.09 at an incremental cost of €1,891 compared to aspirin alone. The estimated incremental cost-effectiveness ratio (ICER) was €19,959/QALY. PSA indicated that ticagrelor was cost-effective in 93% of simulations using a willingness-to-pay threshold of €47,000/QALY and DSA showed that cost-effectiveness was robust to changes in key input parameters (ICER range: €16,504 to €25,012/QALY).

Conclusion: Based on the results of the THEMIS trial, dual antiplatelet therapy with ticagrelor plus aspirin is likely to be a cost-effective treatment compared with aspirin alone for the prevention of CV events in patients with T2DM and CAD with a history of PCI.