Economic Evaluation of CYP2C19 Genotype-Guided Antiplatelet Therapy Compared to Universal Use of Ticagrelor or Clopidogrel in Qatar

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Background

- Patients having CYP2C19*2 and *3 loss-of-function alleles and receiving clopidogrel are at higher risk of adverse cardiovascular outcomes
- Ticagrelor is a more effective and expensive antiplatelet that is unaffected by the CYP2C19 polymorphism
- Genotype-guided antiplatelet therapy (GGAT) allows the identification of CYP2C19*2 and *3 carrier status which can help guide the selection between ticagrelor and clopidogrel
- To date, there are no economic evaluations that compares GGAT to universal use ticagrelor or clopidogrel after percutaneous coronary intervention (PCI) in patients with acute coronary syndrome (ACS) in Qatar

Methods ...

- Design
  - One-year decision-analytic simulation model (Fig. 1) and lifetime Markov model (Fig. 2)
  - This was based on a multivariate analysis, using Monte Carlo simulation

- Data source
  - The probabilities of the clinical outcomes and utility values were obtained from recent meta analysis and sub-studies of the PLATO trial
  - Mutation prevalence was derived from a local observational study

- Cost calculations
  - Cost of resources, in Qatari Riyal (QAR, 2019/20), was obtained from the hospital perspective of Hamad Medical Corporation

- Outcome measures
  - Incremental cost-effectiveness ratios (ICERs)
  - Incremental cost-utility ratios (ICURs)

- Sensitivity analyses
  - One-way and multivariate analyses were conducted

Fig. 1. One-year economic decision-analytic model of the antiplatelet strategies

Fig. 2. Long-term Markov model

Results

GGAT versus universal ticagrelor
- In the one-year model: GGAT was dominant in 60% of cases with the mean cost-saving of QAR 1,511
- In the Markov model: GGAT was cost-effective in 96% of cases, with a mean ICUR of 5,036 per QALY

GGAT versus universal clopidogrel
- In the one-year model: GGAT was dominant in 85% of cases with a mean ICER of 22,216 per case of success
- In the Markov model: GGAT was dominant in 100% of the cases with a mean cost-saving of QAR 1,813

Universal clopidogrel versus universal ticagrelor
- In the one-year: Universal clopidogrel was dominant in 63% of cases with the mean cost-saving of QAR 2,137
- In the Markov model: Universal clopidogrel was cost-effective in 99% of cases with a mean ICER of 38,650 per case of success

- Sensitivity analyses
  - The model outcomes are robust, whereby, the superiority of an antiplatelet strategy versus another was not sensitive to any uncertainty

Conclusion

- Based on the current economic evaluations in the literature, implementing CYP2C19 genotype-guided therapy is a cost-effective approach in guiding the selection of medication in patients with ACS post-PCI

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References