Research Fellowship Scheme

F4 - The Cost-effectiveness of Prostate Health Index for Prostate Cancer Detection in Chinese Men

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Introduction and Project Objectives: Prostate-specific antigen (PSA) and prostate health index (PHI) have been used as biomarkers for prostate cancer detection. In this study, we aimed to evaluate the cost-effectiveness of PHI for prostate cancer detection in Chinese men.

Method: We developed a Markov model for Chinese male patient aged 50-75 years old. The PSA strategy was to offer TRUS-PB for all patients with elevated PSA of 4-10 ng/mL. The PHI strategy was to offer PHI for patients with elevated PSA of 4-10 ng/mL. TRUS-PB would only be offered for patients with PHI >35.0. Model inputs were extracted from local data when available. The cost per quality-adjusted life years gained for both strategies were calculated. The incremental cost-effectiveness ratios in relation to the willingness-to-pay (WTP) threshold were compared. One-way sensitivity analysis and probabilistic sensitivity analysis were performed. Cost-effectiveness acceptability curves were also constructed.

Results: With a Markov model of 25 screening cycles from age 50 to 75 years, the mean total costs per man were estimated to be USD 27,439 in the PSA strategy and USD 22,877 in the PHI strategy. The estimated effects were estimated to be 15.70 in the PSA strategy and 16.05 in the PHI strategy. The PHI strategy was associated with an expected decrease in cost of USD 4562 and an expected gain of 0.35 QALY, resulting in an ICER of USD -13056.56. The results were shown to be robust upon one-way sensitivity analysis. Upon Monte Carlo simulation, the PHI strategy was more cost-effective for 100% of the iterations. The PHI strategy demonstrated dominance over the PSA strategy regardless of what WTP threshold we use.

Conclusion: A PHI-based screening strategy may be more cost-effective than a PSA-based strategy for prostate cancer detection in Chinese men. These results support consideration of a PHI-based approach for prostate cancer in Hong Kong.

Discussion: Our study showed that the PHI strategy could reduce the need of prostate biopsy, prostate biopsy-related complications, and was much more cost-effective than the PSA strategy. The study results had huge implications in the management of patients with elevated PSA in Hong Kong. Currently, PHI has been adopted for routine use by urology specialists in the public system in Hong Kong.

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