IS THE COST OF COMPUTED TOMOGRAPHIC ANGIOGRAPHY JUSTIFIED IN THE SETTING OF REOPERATIVE CORONARY ARTERY BYPASS GRAFTING? A DECISION-ANALYTIC MODEL

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Background: Risks of repeat thoracotomy can be reduced if thoracic computed tomographic angiography (CTA) is used to guide preventive surgical strategies (PSS) such as peripheral cardiopulmonary bypass, circulatory arrest and non-median sternotomy. We sought to define the cost-effectiveness of CTA using a Markov model.

Methods: We studied outcomes & costs of CTA & non-CTA strategies in a modeled cohort of 10,000 patients undergoing redo coronary artery bypass grafting (CABG). PSS were anticipated to follow identification of risk by CTA. Transitions, costs & utilities were informed by our experience & the literature. Sensitivity analyses included testing a range of costs of CTA & PSS on model outcome.

Results: In the reference case, cost & QALYs accrued with the use of CTA ($74,869, 4.63 QALYs) were slightly higher than non-use ($73,471, 4.59 QALYs), yielding an incremental cost-effectiveness ratio (ICER) of $34,950/QALY. Cost of PSS (equipment & operating time) is the most significant determinant of ICER, with a threshold of $12,000. In the reference case (cost of CTA ~$300), identification & avoidance of potential procedural difficulties with CTA rendered it cost-effective if the cost of PSS was <$12,000. Cost of CTA did not adversely influence outcomes across a broad range of imputed values (see Figure).

Conclusion: The cost of CTA is justified in the setting of redo CABG, as it aids in appropriate selection of PSS. Cost-effectiveness is more influenced by the costs of subsequent PSS than by the cost of CTA.

Figure – Two-way sensitivity analysis comparing net monetary benefits from the cost of preventive surgical strategy versus cost of thoracic computed tomographic angiography (CTA). Variation across a broad range of CTA cost does not significantly impact model outcome.