Cost-effectiveness analysis of PCI in focal and diffuse coronary artery disease

D.M. Munhoz¹, M. Hlatky², D. Collison³, C. Berry⁴, K. Oldroyd², T. Mizukami⁵, K. Sakai⁶, T. Storozhenko¹, R. Seki¹, F. Bouisset¹, J. Sonck¹, B. De Bruyne¹, C. Collet¹

¹Cardiovascular Research Center Aalst, Aalst, Belgium
²Stanford University School of Medicine, Stanford, United States of America
³Golden Jubilee National Hospital, West of Scotland Regional Heart & Lung Centre, Clydebank, United Kingdom of Great Britain & Northern Ireland
⁴University of Glasgow, Glasgow, United Kingdom of Great Britain & Northern Ireland
⁵Showa University, Tokyo, Japan

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Aims: The pattern of CAD predicts angina relief after PCI. Our aim was to evaluate the cost-effectiveness of PCI in diffuse coronary artery disease (CAD) to deferral from PCI in these patients.

Methods: This is a sub-analysis of the TARGET-FFR randomized clinical trial (NCT03259815). The pullback pressure gradient (PPG) was calculated to differentiate focal from diffuse CAD.

Healthcare resource use associated with the index hospitalization and with follow-up outpatient visits, medications, was recorded prospectively. We did not discount costs because of the limited follow-up period. Costs of procedures and follow-up consultations were derived from Healthcare Resource Group reference costs and drug costs from the National Health Service (NHS).

Quality-adjusted life-years (QALYs) were derived from health-related quality of life and survival during the 3-month time horizon of the trial. Quality-of-life indexes (utilities) were evaluated at baseline and 3 months with the European Quality of Life–5 Dimensions (EQ-5D) instrument with UK weights scaled from 0 (death) to 1 (perfect health). The overall QALYs for each patient were estimated as the area under the curve determined by the utility values at baseline and 3 months. We computed confidence intervals for differences in costs and QALYs and in the incremental cost-effectiveness rate (ICER) using the bootstrap technique with the percentile method with 10,000 replications. A Markov model was used to simulate deferral of diffuse disease from PCI and not using PPG to select treatment. Probabilistic sensitivity analysis was undertaken to test the robustness of results to parameter uncertainty.

Results: Patients who underwent PCI for focal CAD had higher EQ-5D index values at follow-up (0.89 ± 0.18 vs 0.76 ± 0.28, p=0.004) and higher QALYs after 3 months follow-up (0.19 ± 0.06 vs 0.21 ± 0.04, p=0.022). Mean cumulative costs were £1574.3 ± 230.5 and significantly higher in patients treated with diffuse CAD as compared to patients treated for focal CAD (£1697 ± 293.4 vs £1393 ± 264.3; p<0.001). The ICER was £7746/QALY (95% CI 5024 – 11007). PCI in focal CAD saved £1522.2/QALY when compared to PCI in diffuse CAD (£7009.2 ± 1919.4/QALY vs £8531.4 ± 2753.4 /QALY, p<0.001). Deferring 30% of the diffuse CAD patients from PCI to optimized medical therapy would save £673.8/QALY (£7072.2 ± 1730.147 /QALY vs. £7746 ± 1943.5/QALY, p<0.001).

Conclusion: PCI is more cost-effective in focal than diffuse CAD. Treatment of diffuse CAD results in worst QALYs and costlier procedures. Every 5% of the diffuse CAD patients that were deferred from PCI saved approximately £100/QALY. Further trials are needed to determine if the cost-effectiveness of PCI can be improved by deferring patients with diffuse CAD.

Quality of life in focal and diffuse CAD
Cost-effectiveness focal vs diffuse CAD