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3159

Impact of adverse events on quality of life and hospital costs in secondary cardiovascular disease prevention

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Background and purpose: People with atherosclerotic vascular disease remain at high risk of cardiovascular (CVD) events despite effective risk factor management 1. There is little research on impacts of adverse events on quality of life (QoL) and hospital cost to inform evaluations of novel interventions in this population. We estimate QoL and annual hospital costs associated with a range of adverse events of interests using the individual participant data from the Randomized Evaluation of the Effects of Anacetrapib through Lipid Modification (REVEAL) trial.

Methods: Data from the 30,449 participants with atherosclerotic vascular disease receiving effective statin therapy in REVEAL, were used to estimate regression models for participants' hospital costs and QoL using participants' characteristics at entry (socio-demographic, clinical, prior diseases and treatments) and time-updated adverse events. We estimate costs and QoL in the year of an event, and in subsequent years, using stepwise covariate selection (p-value <0.01). Standard errors were adjusted for clustering of participant annual costs.

Hospital episodes were costed (2019 UK£) using the UK Healthcare Resource Groups reference costs 2. One- and two-part generalized linear regression models (GLMs) for annual hospital costs (part 1: logistic model for estimating probability of incurring cost, part 2: GLM with Gaussian, Poisson or Gamma distributions with identity or log links for estimating costs, conditional on incurring any) were compared.

EQ-5D-5L questionnaires, completed by study participants at entry and final follow-up visits in the study, were mapped into QoL utility scores 3. QoL utility at final follow-up was used to estimate QoL decrements of adverse events using GLM linear model and adjusting for QoL at entry in addition to other participants characteristics.

Results: The two-part model with gamma distribution and identity link, indicated by specification tests and model fit statistics, was selected for modelling annual hospital costs (Figure 1). Non-haemorrhagic stroke, noncoronary revascularization, coronary revascularization and incident cancer were associated with highest hospital costs. The QoL model (Figure 2) indicated large QoL decrements associated with non-fatal nonhaemorrhagic stroke, heart failure hospitalization, incident cancer and noncoronary revascularization, and comparatively small QoL decrement associated with experiencing non-fatal myocardial infarction.

Conclusion: These cost and QoL models in a well-managed contemporary high CVD risk patient population would assist in assessments of longterm net effects and cost-effectiveness of novel interventions to reduce cardiovascular risk.
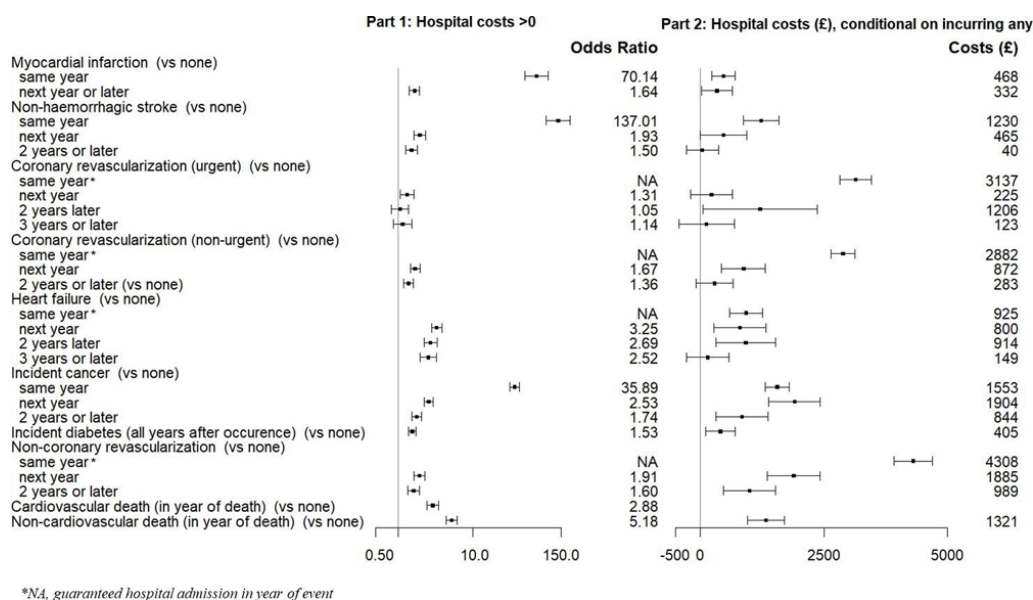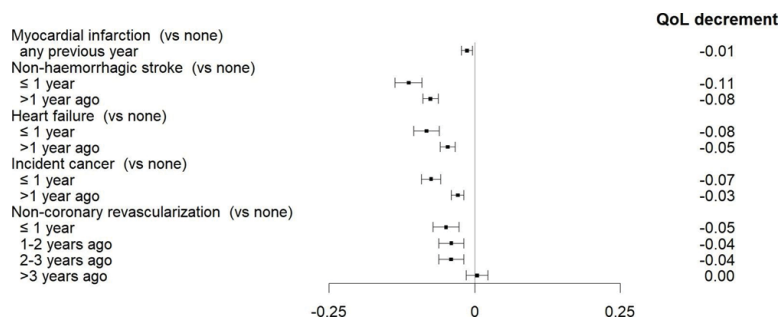
Figure 1

Figure 2