Long-term prediction of mortality and comparative treatment benefit following percutaneous or surgical revascularization

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Background: The SYNTAX score II 2020 (SSII-2020), which was derived and externally validated from randomized trials, was designed to predict death following percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG) in patients with three-vessel disease and/or left main disease. We aimed to investigate its value in identifying the safest modality of revascularization in a non-randomized setting.

Methods: Five-year mortality was assessed in 7362 patients with three-vessel disease and/or left main disease enrolled in a Japanese PCI/CABG registry. New-generation drug eluting stents and imaging guidance became the default PCI strategy during enrolment of the last cohort. The discriminative ability of the SSII-2020 for 5-year mortality was assessed using Harrell's C statistic (C-index). Agreement between observed and predicted rates of all-cause mortality following either PCI or CABG and treatment benefit (absolute risk difference) for this outcome were assessed by calibration plots.

Results: The SSII-2020 had helpful discrimination (C-index = 0.72) and good calibration (intercept = –0.11, slope = 0.92) for 5-year mortality. The absolute risk difference in mortality between CABG and PCI (treatment benefit) was well calibrated when the whole population was grouped into quarters according to the predicted absolute risk difference of 5-year mortality. The observed differences in survival in favor of CABG were 4.2% (0.1 to 8.2%, log-rank p=0.05) and 8.5% (3.8 to 13.2%, log-rank p<0.01) in the respective third and fourth quarters. In contrast, the observed differences in survival were not significantly different in either the first (3.0% [–0.8 to 6.8%, log-rank p=0.12]) or the second quarter (1.3% [–2.4 to 5.1%, log-rank p=0.39]).

Conclusions: The SSII-2020 is well able to predict death at 5 years – and the mortality difference between PCI and CABG, and therefore has the potential to support decision making on revascularization in patients with three-vessel disease and/or left main coronary artery disease.