

# Ten-year outcomes of the Arterial Revascularisation Trial revealed today

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The ten-year outcomes of the Arterial Revascularisation Trial (ART) are presented today in a Hot Line Session at ESC Congress 2018.

Coronary artery bypass graft (CABG) surgery is indicated in patients with angina and advanced [coronary artery disease](#). With about one million operations per year globally, it is one of the most common major surgical procedures undertaken worldwide. Establishing the best methods for CABG is therefore a key element of successful management of patients with advanced coronary artery disease, who have narrowed coronary arteries and are at higher risk of limited exercise capacity due to angina (chest pain on exertion), myocardial infarction (heart attack), and death.

While it is firmly established that the use of one internal thoracic artery (arteries that supply the inner part of the chest wall) can improve life expectancy compared to vein grafts it is not known if there are additional benefits with the use of a second artery. ART tested whether routine use of two internal thoracic arteries, compared to the standard single internal thoracic artery, could reduce the risk of dying over a ten-year period in patients undergoing CABG surgery.

Between 2004 and 2007, the trial enrolled 3,102 patients with symptomatic coronary disease scheduled to undergo CABG at 28 centres in seven countries (UK, Poland, Australia, India, Brazil, Austria and Italy). A total of 1,548 patients were randomly allocated to bilateral and 1,554 patients to single internal thoracic artery grafts. Additional arterial

or vein grafts were used at the discretion of the responsible surgeon. The primary outcome was death from any cause at ten years. The secondary outcome was a composite of death from any cause, myocardial infarction, or stroke.

The average age of participants was 64 years and 24% were women. In the bilateral graft group, 14% actually received a single internal thoracic artery graft, while 22% in the single internal thoracic artery group also received an additional radial artery graft.

At ten years 315 (20.4%) and 329 (21.2%) patients died in the bilateral and single graft groups, respectively (hazard ratio [HR] 0.96, 95% confidence interval [CI] 0.82-1.12,  $p=0.58$ ). The secondary outcome occurred in 385 (24.9%) and 425 (27.4%) patients in the bilateral and single graft groups, respectively (HR 0.90, 95% CI 0.78-1.03,  $p=0.12$ ). Results appeared to be more favourable in patients who had bilateral graft surgery done by surgeons who performed more operations in the trial.

In an exploratory analysis, patients who received any two arterial grafts (internal thoracic or radial) appeared to have a lower mortality (HR 0.79, 95% CI 0.64-0.97) and composite of death, myocardial infarction or stroke (HR 0.80, 95% CI 0.69-0.93) compared to those who received a single arterial graft. Although these findings are relevant they are not a randomised comparison and require confirmation in future trials.

Overall ART was not able to confirm that a strategy of routine bilateral internal thoracic artery grafting was superior to routine single internal thoracic artery grafting for patients undergoing CABG. Possible explanations include the high rate of patients who were randomised to receive a bilateral internal thoracic artery but actually received a single internal thoracic artery and in those assigned a single internal thoracic artery graft about one fifth actually received an additional arterial graft

in the form of a radial artery. Both factors could have reduced the true efficacy of bilateral [internal thoracic artery](#) grafts. Furthermore, a high use of guideline directed medical therapy, including aspirin, statins, beta-blockers and angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, in both groups may have narrowed any potential differences between the groups.

Professor David Taggart, Chief Investigator and Professor of Cardiac Surgery at the University of Oxford, UK, said: "ART is one the largest trials with the longest duration of follow-up ever undertaken in cardiac surgery to guide future practice with regards to conduit selection for CABG. While the trial did not show that using two internal thoracic [arteries](#) is superior to one, it raises the possibility that any two arterial grafts (internal thoracic or radial) may provide better outcomes than a single [graft](#) for [patients](#) undergoing CABG surgery."

**More information:** "ART - Randomised comparison of bilateral versus single internal thoracic coronary artery bypass graft surgery: effects on mortality at ten years follow-up in the Arterial Revascularisation Trial (ART)" ESC Congress 2018.

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