

Coronary bypass grafting with bilateral internal thoracic arteries

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In 1999, a seminal paper from the Cleveland Clinic demonstrated that patients treated with two versus one internal thoracic artery (ITA) coronary grafts have better long-term survival and freedom from reoperation.¹ This finding was later confirmed in a systematic review² and in a number of more recent studies.^{3–5} Puskas and colleagues³ have reported an impressive (35%) reduction in the long-term hazard of death in patients with and without diabetes undergoing bilateral internal thoracic artery (BITA) grafting. In a propensity-matched analysis of 1856 patients Grau *et al*⁴ showed a 10% survival benefit at 10 years, and 18% at 15 years for BITA grafting. Glineur *et al*⁵ showed that the survival benefit following BITA grafting is sustained up to 25 years. The available data consistently show better survival with two ITA grafts, especially when the second graft is placed on the circumflex artery. The definitive answer to the question as to whether two ITA are better than only the left ITA will most likely be provided by the Arterial Revascularisation Trial (ART), which randomly assigned 3102 patients to single versus BITA grafting. That trial demonstrated excellent outcomes for contemporary coronary artery bypass grafting but did not show a survival difference at 1 year.⁶ This is perhaps not surprising as survival curves in previous studies have typically diverged only after 2–3 years of follow-up.

The current evidence in favour of BITA grafting is reflected by unequivocal guideline recommendations in both Europe (complete revascularisation with arterial grafts to non-left anterior descending artery coronary systems in patients with reasonable life expectancy in addition to left internal thoracic artery (LITA) left anterior descending artery: class IA) and the USA (bilateral internal mammary arteries use: class IIA). Despite these recommendations, BITA grafting use remains strikingly low, averaging approximately 20% in Europe and less than 5% in the USA. This may be an example of cognitive dissonance, as it appears that a large number of cardiac surgeons disregard the evidence and the recommendations of

national/international guidelines. An argument often brought forward is that of an increased risk of deep sternal wound infections (DSWI) following BITA grafting, particularly in patients with diabetes. This argument is responsible for the inertia surrounding the uptake of BITA grafting over the past two decades and is challenged by the paper by Itagaki *et al*⁷ published by *Heart*. The authors analysed an impressive series of 1 526 360 patients included in a US-based nationwide inpatient sample from 2002 to 2008 who underwent isolated coronary artery bypass grafting with at least one internal mammary artery. BITA grafting use was not found to be an independent predictor of DSWI except for those patients who had already manifested chronic complications of diabetes. Notwithstanding the small number of patients (<5%) who received BITA grafting, the study found that the strongest independent predictors of BITA grafting use were male gender, Caucasian ethnicity, and higher household incomes, but not the absence of diabetes. The interpretation of these interesting findings deserves further attention.

Deo *et al*⁸ published a meta-analysis this year that included data from the ART trial as well as 10 observational studies totalling 126 235 patients with diabetes of whom 122 465 underwent LITA and 3770 BITA grafting. In that study, DSWI was more frequent following BITA (3.1%) than LITA grafting (1.6%), in contrast to the findings of Itagaki *et al*⁷ who reported an increased risk of DSWI only in patients with chronic complications of diabetes. Interestingly, in the study by Deo *et al*,⁸ the difference disappeared when analysis was restricted to patients who underwent skeletonised BITA harvest. Now we have the paper by Popovic *et al* published by *Heart* providing an insight into contemporary practice in European centres. In their report, the 1000 patients who underwent BITA grafting represented 24% of coronary artery bypass grafting cases during the study period, slightly above the average European rate. BITA grafting was performed in relatively young patients (mean age 60±15 years) with a lower incidence of diabetes mellitus (27.1%) and peripheral artery disease as compared to patients who underwent single ITA grafting.⁹ Similar to the ART trial, the incidence of DSWI was

slightly higher with BITA grafting (2.2% of cases), and 45% of these were patients with diabetes. In this series, the ITA were harvested as a pedicle, possibly partly accounting for the higher rate of infection.

Putting the somewhat conflicting evidence together, it seems that the risk of DSWI can be minimised by meticulous harvesting techniques and should not be used as an argument to deny patients (including those with diabetes) the benefit of improved long-term survival associated with the use of BITA grafting.

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