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Use of bilateral internal thoracic artery during coronary artery bypass graft surgery in Canada: The bilateral internal thoracic artery survey

Stefano Mastrobuoni, MD, Nada Gawad, BS, Joel Price, MD, Vincent Chan, MD, Marc Ruel, MD, Thierry G. Mesana, MD, and Fraser D. Rubens, MD

Objective: The internal thoracic artery is the gold standard conduit in coronary artery bypass grafting. Although the right and left internal thoracic arteries are excellent conduits, the use of the bilateral internal thoracic artery is not widespread. A recent report of the Society of Thoracic Surgery revealed that only a small percentage of patients receive a bilateral internal thoracic artery in North America. The aim of this study was to determine the current use of the bilateral internal thoracic artery during coronary artery bypass grafting among cardiac surgeons in Canada and identify the main concerns that limit the use of these conduits.

Methods: We developed an online survey with 17 questions about the use of the bilateral internal thoracic artery in different clinical scenarios. An invitation to participate was sent to all the adult cardiac surgeons currently in practice in Canada.

Results: A total of 101 surgeons (69%) of 147 currently in practice across 27 different hospitals completed the survey. Forty percent of surgeons use the bilateral internal thoracic artery only sometimes (6%–25% of cases), 37% of surgeons use the bilateral internal thoracic artery very infrequently (<5% cases), 16% of surgeons use the bilateral internal thoracic artery often (26%–50%), and only 7% of surgeons use the bilateral internal thoracic artery very often (>50%). The most common concerns in the use of the bilateral internal thoracic artery are the risk of sternal wound infection and the unknown superiority of the right internal thoracic artery over other conduits.

Conclusions: The majority of Canadian cardiac surgeons consider few clinical features, such as insulin-dependent diabetes mellitus or morbid obesity, as contraindications to the use of bilateral internal thoracic artery. However, the reported use of the bilateral internal thoracic artery is low. A wider diffusion of this technique is warranted to improve the results of coronary surgery. (J Thorac Cardiovasc Surg 2012;144:874-9)

The internal thoracic artery (ITA) is considered the gold standard conduit in coronary artery bypass grafting (CABG). The use of the left internal thoracic artery (LITA) to bypass the left anterior descending artery has been associated with improved survival at 10 years and a reduced incidence of myocardial infarction, cardiac events, and reoperation compared with the use of vein grafts alone.[1,2] Surgeons have proposed that the use of bilateral internal thoracic arteries (BITAs) would further improve the long-term outcomes of coronary revascularization. This hypothesis has been supported by recent clinical studies demonstrating improved survival and decreased reintervention with BITA grafting compared with single ITA use.[3-5] Moreover, angiographic studies have revealed a long-term patency rate of the right ITA (RITA) to be equivalent to the LITA and superior to the radial artery and the saphenous vein grafts.[6] However, this strategy has not been universally accepted because of skepticism of the degree of the incremental benefit and the perceived increased risks of BITA grafting, such as sternal wound complications.[7-10] A recent analysis of the Society of Thoracic Surgeons Database revealed that BITA grafting is used in a small percentage of patients undergoing CABG in the United States.[11] In Great Britain, BITA use seems to be only slightly more common.[12]

We discuss the current use of BITA grafting among cardiac surgeons in Canada during CABG surgery and identify the main concerns and perceptions that limit the use of this strategy.

MATERIAL AND METHODS

A questionnaire was developed to assess the use of BITAs during CABG among Canadian cardiac surgeons. The survey consisted of 17 questions relating to the use of BITAs in different clinical scenarios. Surgeons were asked to indicate how often they use BITAs and to identify concerns and limiting factors to a widespread use of these arterial conduits. The text of the questionnaire is available in the Appendix.

From the Division of Cardiac Surgery, University of Ottawa Heart Institute, Ottawa, Ontario, Canada.

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Address for reprints: Fraser D. Rubens, MD, Professor of Surgery, Division of Cardiac Surgery, University of Ottawa Heart Institute, 40 Ruskin Street, K1Y 4W7, Ottawa, Canada (E-mail: frubens@ottawaheart.ca).

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Abbreviations and Acronyms

BITA = bilateral internal thoracic artery
BMI = body mass index
CABG = coronary artery bypass graft
COPD = chronic obstructive pulmonary disease
ITA = internal thoracic artery
LITA = left internal thoracic artery
RITA = right internal thoracic artery

A list of all cardiac surgeons practicing in Canada was developed. The accuracy of the list was confirmed by cross-referencing it to online databases such as CTSNet, university and hospital websites, and e-mails to program directors and division chiefs. The final list consisted of 147 surgeons.

The survey was developed as an online tool in a user-friendly format. A link to the online survey was e-mailed to all practicing cardiac surgeons in Canada. Pediatric cardiac surgeons were excluded from the study. Each surgeon was assigned a unique log-in that allowed completing the survey only once. The survey was completed online through a secure Web page. Statistical analysis was performed using chi-square tests to compare frequencies of categoric variables.

RESULTS

A total of 147 surgeons received the invitation to participate in our survey. To increase the response rate, surgeons who did not complete the survey within 1 month from the first e-mail were contacted again by e-mail, fax, or telephone. Eighty-five surgeons received a second invitation, 84 surgeons received a third invitation, 73 surgeons received a fourth invitation, and 69 surgeons received a fifth invitation. Thirty-eight surgeons were also contacted by phone 1 time, 24 surgeons were contacted by phone 2 times, 23 surgeons were contacted by phone 3 times, and 21 surgeons were contacted by phone 4 times. Finally, 101 surgeons (69%) of 147 adult cardiac surgeons currently in practice in Canada across 27 different cardiac surgery units completed the survey. Thirty-nine percent of respondents were in practice less than 10 years, 33% of respondents were in practice for 11 to 20 years, and 28% of respondents were in practice for more than 20 years.

The reported use of BITAs in isolated multivessel CABG operations is shown in Figure 1. There was no difference in the routine use of BITAs between young surgeons (in practice < 10 years, group A) and senior surgeons (in practice > 10 years, group B): Some 77% of group A use BITAs only sometimes or infrequently (infrequent users < 25% or < 5% of cases) versus 71% of group B, and 23% use BITAs often or very frequently (frequent users > 25% or > 50% of cases) in group A versus 29% of group B ($P = .64$).

The single main factor influencing BITA use was the risk of sternal wound infection in 35% of surgeons, the limited length of the RITA in 28% of surgeons, the perceived lack of confidence of the superiority of the RITA over saphenous vein or radial artery in terms of long-term outcome in 30% of surgeons, and increased operative time or bleeding in 6% of surgeons. The 2 groups of surgeons showed significantly different ($P = .01$) main concerns to the use of BITAs (Table 1), with sternal wound infection the most common concern for group A, whereas the unknown long-term superiority of RITA over other conduits is most common in group B. However, there was a similar prevalence of main concerns to the use of these conduits between frequent and infrequent users of BITAs ($P = .35$). The distribution of frequent users and infrequent users according to each hospital is shown in Figure 2.

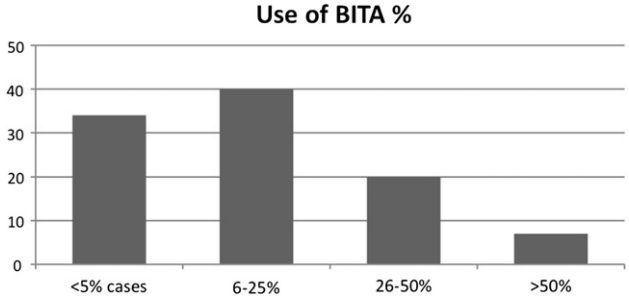

FIGURE 1. Stratification of responding surgeons according to the percentage of cases in which they use BITAs. *BITA,* Bilateral internal thoracic artery.

We then presented a clinical scenario with a hypothetical patient undergoing CABG varying the clinical conditions to isolate perceptions related to specific patient variables as they related to BITA use. When asked about the age cutoff to BITA use, there was no statistically significant difference between frequent users and infrequent users for male patients but a trend toward the use of BITAs even in elderly patients among frequent users ($P = .09$). There was no statistically significant difference for the age cutoff to the use of BITAs for female patients between infrequent and frequent users ($P = .19$).

The majority (80%) of respondents did not consider active smoking a limiting factor for the use of BITAs. Half of the respondents did not consider diabetes a limiting factor, 29% of the respondents considered insulin-dependent diabetes a contraindication, and 21% of the respondents did not consider any form of diabetes a contraindication. A significantly higher proportion of frequent users (55%) did not consider diabetes a limitation to the use of BITAs compared with infrequent users (47%) ($P < .05$). Furthermore, 60% of surgeons would not consider the use of BITAs in patients with a body mass index (BMI) more than 30, whereas 27% did not consider obesity a limiting factor. Among frequent users, 35% did not consider obesity a limiting factor, whereas 20% of infrequent users did; however, this difference was not statistically significant ($P = .25$).

Ninety percent of surgeons would consider BITAs in the setting of a recent (<2 weeks) acute coronary syndrome, but