Bilateral and Unilateral Use of Internal Thoracic Artery for Myocardial Revascularization*

Comparison of Extubation Outcome and Duration of Hospital Stay

Piotr Knapił, MD; Thomas J. Spyt, MD; James B. Richardson, MD; and Ian McLellan, MB

The left internal thoracic artery is usually used as arterial conduit for myocardial revascularization; however, there is an increasing popularity of bilateral use of this artery for grafting. We examined 180 patients with both types of arterial conduits to answer whether bilateral use of the internal thoracic artery makes the difference in postoperative extubation outcome and duration of hospital stay in comparison to the unilateral use of this conduit. Ninety-three patients with bilateral conduit and 87 patients with unilateral conduit, with comparable age, cardiopulmonary bypass, and aortic cross-clamp time have been studied. On the basis of statistical and retrospective analysis, we conclude that bilateral use of internal thoracic artery for myocardial revascularization prolongs required postoperative respiratory support (12.0 h against 7.6 h) not affecting the duration of the mean hospital stay. (CHEST 1996; 109:1231-33)

Key words: internal thoracic artery; myocardial revascularization; postoperative ventilation

Coronary artery surgery is usually associated with the use of arterial conduits and conventional vein grafts.1-3 Arterial conduits became very popular in recent years, partially due to numerous studies confirming that vein grafts generally fail to prolong a patient’s survival when compared with nonsurgical methods except lesions of left main coronary artery stem and its equivalents.1,4-6 Apart from that, arterial conduits are the only solution left in some patients, due to the technical difficulties in finding the appropriate vein for grafting.7,8 Therefore, the left internal thoracic artery is usually used; however, there is an increasing popularity of bilateral use of this artery for grafting.

Isolation of the internal thoracic artery from the internal chest wall is associated with remarkable damage to the lung, because of the lung compression, usual opening of pleura, and postoperative pleural effusions on the side of preparation.9-14 Significant impairment of gas exchange after unilateral internal thoracic artery grafting has been found in patients’ oxygen saturations and blood gas analyses even 7 days after surgery.10 Taking into account the obvious advantages of bilateral conduits, this study aims to answer whether bilateral use of the internal thoracic artery makes a difference to the postoperative extubation outcome and duration of hospital stay in comparison to the unilateral use of this arterial conduit.

Materials and Methods

One hundred eighty patients who underwent coronary artery bypass surgery with bilateral or unilateral use of arterial conduit from the internal thoracic artery were studied postoperatively and retrospectively. Patients were divided into two groups. Group 1 (93 patients) consisted of patients with bilateral internal thoracic artery grafting, while group 2 (87 patients) consisted of patients with unilateral internal thoracic artery grafting.

Patients were found consecutively by the computer storing basic informations about all the department patients. These patients were anesthetized by different anesthetists using different anesthetic techniques, however, with the exclusion of high-dose opioid technique. Decision regarding extubation was undertaken also by different anesthetists, however, on the basis of unified conventional criteria with clinical evaluation that consisted of assessment of the degree of sedation together with the exclusion of abnormal PaO2 and PaCO2 as a safeguard against the danger of impaired gas exchange. In other words, a patient able to maintain proper blood gas values during a trial of spontaneous ventilation on simple breathing circuit and who was clinically ready was extubated. Patients were discharged home when their postoperative chest radiographs were considered as normal and in general no abnormalities were found on physical examination.

Statistical analysis of numerous variables within groups and be.
between groups was performed by analysis of variance using statistical software (Minitab).

Analyzed variables were as follows: age; presence of preoperative chronic obstructive airway disease; cardiopulmonary bypass time; aortic cross-clamp time; duration of postoperative respiratory support; and number of days of ICU and hospital stay.

A p value less than 0.05 was considered significant.

RESULTS

Results of the study are summarized in Table 1. Patients for bilateral thoracic artery grafting were found to be significantly younger; however, their mean postoperative intubation period was significantly longer (12.0 h against 7.6 h). Therefore, the mean ICU stay was also significantly longer in this group. It is also important that the mean cardiopulmonary bypass and aortic cross-clamp time did not differ significantly between groups as well as the incidence of the chronic obstructive airway disease. Mean hospital stay was slightly longer in group 1 (8.4 against 7.5 days); however, the difference was not statistically significant.

DISCUSSION

Results of this study are not surprising taking into account the fact that bilateral internal thoracic artery grafting is associated with the surgical intervention on both sides of the chest. Our extubation criteria were based mainly on oxygen tensions in postoperative arterial samples. Therefore, logically, one could expect that impairment of gas exchange might be more significant, resulting in prolonged respiratory support in group 1. Similar cardiopulmonary bypass time and aortic cross-clamp times were predictable, because bilateral internal thoracic artery grafting is associated with prolonged prebypass time rather than any extension of grafting time.

Difference in age is quite easy to explain because multiple arterial conduits are planned in relatively young patients. This gives them a chance of longer survival, taking graft patency into account.\(^1, 5, 6, 15\)

It is surprising, however, that number of days of the hospital stay was similar in both groups. This fact is very important and indicates that bilateral use of the internal thoracic artery and increased impairment of postoperative gas exchange makes a practical difference in slightly prolonged respiratory support only, not affecting the duration of hospital stay. Younger age of patients for bilateral internal mammary grafting may be an explanation of this observation. Younger patients were probably ventilated longer, because an initial impairment of gas exchange was significant, but in the postoperative period, they were able to restore the lung function quicker and therefore an average hospital stay was found to be similar to the older group.

CONCLUSIONS

Bilateral use of the internal thoracic artery for myocardial revascularization significantly prolongs required postoperative respiratory support. Bilateral use of the internal thoracic artery for myocardial revascularization does not affect the duration of hospital stay in younger patients.

REFERENCES

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