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Reoperative Cardiac Surgery in Jehovah's Witness Patients with Patent Internal Thoracic Artery Grafts: How Far Can We Push the Envelope?

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ABSTRACT

Reoperative cardiac surgery in Jehovah's Witness (JW) patients with patent internal mammary arteries is a formidable surgical challenge. We have successfully performed 2 such cases using creative approaches. The first patient, a morbidly obese woman, presented with an acute coronary syndrome 4 years after off-pump coronary artery bypass grafting (CABG) with a hemoglobin of 10 gm/dL. She was stabilized with stenting of the culprit vessel; erythropoietin therapy was performed to increase her hemoglobin, and surgery was performed electively. The internal thoracic artery (ITA) was dissected and clamped, and intermittent cardioplegia was used for myocardial protection. The second patient needed aortic valve replacement 3 years after a previous CABG using an ITA. Limited dissection was used at redo operation without exposing the ITA. Aortic valve replacement was performed under cold fibrillatory arrest with an open ITA. Successful reoperative cardiac surgery in JW patients requires preoperative preparation using a multidisciplinary team approach and flexible operative planning.

INTRODUCTION

Reoperative cardiac surgery in Jehovah's Witness (JW) patients is a formidable surgical challenge because of their religious conviction not to accept blood or blood product transfusions. The challenge is even greater in the presence of a patent internal thoracic artery (ITA) from a previous operation. The reported mortality for injury to an ITA is very high [Gillinov 1999; Teoh 2002]. Injury may result in operative mortality during reoperative sternotomy and dissection because blood loss cannot be replaced. We report 2 such cases performed successfully at our referral center for JW patients.

The first patient was a 65-year-old obese woman who presented with an acute coronary syndrome, pulmonary edema requiring intubation, a hemoglobin of 10 gm/dL, a left main bifurcation stenosis, and occluded saphenous vein grafts from an off-pump coronary artery bypass grafting (CABG) performed 4 years ago. The ITA from the previous operation was patent to the left anterior descending coronary artery (LAD). She was managed with "bare metal" stenting of the right and left circumflex coronary arteries, and an intraaortic balloon pump was placed. During cardiac catheterization, "true lateral" and "true anteroposterior" views of the selective internal thoracic artery injections were obtained to delineate its relationship to the sternum. The patient was eventually discharged home in stable condition, with Plavix therapy for 8 weeks. Outpatient erythropoietin and iron were administered to increase the hemoglobin to 16 gm/dL. Plavix was held for 10 days. She then underwent elective reoperative median sternotomy, with meticulous dissection of the internal thoracic artery. It was clamped and vein grafts to right coronary artery (RCA), obtuse marginal coronary artery (OM), and diagonal branches were performed using cold cardioplegic arrest. She had an uneventful postoperative course and was discharged with a hemoglobin of 12 gm/dL.

The second patient was a 73-year-old male with CABG x3 done 3 years ago who presented with symptomatic critical aortic stenosis. Of note, the patient had moderate aortic stenosis at his prior operation. At surgery, a median sternotomy was performed with limited dissection. No attempt was made to visualize the left internal thoracic artery. After dissecting the right atrium and aorta, cardiopulmonary bypass was established and the patient was cooled down to 26°C. The aorta was cross-clamped, and aortic valve replacement was performed under fibrillatory arrest. Postoperatively, he had delayed extubation secondary to possible air embolism during the insertion of the left ventricular vent. His mental status returned rapidly to baseline and he was ultimately discharged home in excellent condition with a hemoglobin of 11 gm/dL.

Comment

Reoperative cardiac surgery in JW patients has an inherent risk of sudden cardiac death in the event of injury during the sternotomy and dissection [Ott 1997; Jovanovic 2000]. Substantial blood loss can not be replaced and can result in significant anemia that may not be compatible with life. Injury to the ITA during dissection can result in high operative mortality in addition to significant bleeding. In these 2 cases,

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we managed the ITA using 2 different methods. The traditional technique of dissecting the ITA, clamping and intermittent cardioplegia, is well established in terms of myocardial protection. However, the risk of dissecting the ITA is substantial in a JW patient. Injury to ITA could result in bleeding, ischemia, and the need for emergent institution of bypass. Deep hypothermia with ventricular fibrillation has been used during mitral and aortic valve surgery with proven benefit [Gazmuri 2002; Imanaka 2002]. Avoiding ITA dissection in a JW patient may be a critical factor in enhancing the probability of patient survival. We adapted this technique successfully in the second patient.

Of the 55 JW patients who underwent cardiac surgery at our institution during the past 5 years, 4 received reopertions, including the 2 cases reported here. There was 1 mortality in an 82-year-old patient who underwent combined CABG and aortic valve replacement because of hypoxemia secondary to intrapulmonary hemorrhage, but without evidence of significant surgical or mediastinal blood loss. A multidisciplinary team, consisting of the "Bloodless Medicine Team" (ie, hematologist, coordinators, cardiologist, surgeon, and nurse practioners), is essential for preoperative preparation. Stabilization of the patient during an acute coronary syndrome using percutaneous interventions helps in allowing time to increase the hemoglobin level using erythropoietin and iron therapy so that surgery can be performed on an elective basis [Doughtery 1997]. Intraoperative use of full-dose Aprotinin, low prime bypass circuits, antegrade and retrograde priming of the circuit, autologous normovolemic hemodilution, and meticulous surgical technique are important components of a multimodality blood conservation program. This was described recently in a comprehensive guideline published by the Society of Thoracic Surgeons Workforce on Evidence Based Surgery, in conjunction with the Society of Cardiovascular Anesthesiologists [Ferraris 2007].

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