

# Microvascular Coronary Artery Repair and Grafting in Infancy and Early Childhood

Joseph Catapano, MD<sup>\*,‡</sup>, Ronald Zuker, MD<sup>\*,‡</sup>, Osami Honjo, MD, PhD<sup>\*,†</sup>, and Gregory Borschel, MD<sup>\*,‡</sup>

Pediatric coronary bypass grafting requires special technical consideration and microsurgical techniques, including appropriately fine instruments, 10-0 or 11-0 microsutures, and repair under an operating microscope. At The Hospital for Sick Children, the Divisions of Cardiac and Plastic and Reconstructive Surgery have utilized the expertise of both specialties to address technical concerns during pediatric coronary bypass grafting. We anastomose the left internal mammary artery to the left anterior descending artery with the use of an operating microscope and 10-0 Nylon sutures. Here we describe our surgical technique as well as our perioperative, and postoperative protocols. Patients must be monitored closely postoperatively for edema, thrombosis, infection, and bleeding, which can compromise the patency of the anastomosis.

Operative Techniques in Thoracic and Cardiovascular Surgery 20:148-161 © 2015 Elsevier Inc. All rights reserved.

**KEYWORDS** Microsurgery, Pediatric coronary artery bypass graft, Internal mammary artery

## Introduction

Pediatric coronary bypass grafting (PCABG) is an uncommon procedure, with Kawasaki disease and anomalous coronary vasculature being the most common indications.<sup>1-5</sup> While autologous saphenous vein grafts have been used in the past, the use of the left internal mammary artery (LIMA) has been widely adopted and is now used more frequently because of documented angiographic and clinical superiority with improved long-term patency rates and growth potential.<sup>5-7</sup> PCABG is associated with serious complications and presents unique challenges, including the origin, position, and distribution of the coronary vasculature. Technical challenges associated with operating on small vessels in pediatric patients have previously limited surgeons from achieving complete surgical revascularization.

Pediatric microsurgery is often required for the reconstruction of complex congenital and traumatic defects with free flaps.<sup>8-10</sup> Pediatric patients require special technical consideration compared to adults, as smaller vessels and

morphologic differences in the vessel wall require appropriately fine instruments, 10-0 or 11-0 microsutures, and repair under an operating microscope.<sup>11</sup> Surgeons with expertise in microvascular surgery have been found to improve outcomes and reduce technical complications in pediatric patients undergoing living-donor liver-heart transplantation.<sup>12</sup> At our institution, collaborative efforts between the Divisions of Cardiac and Plastic and Reconstructive Surgery have utilized the expertise of both specialties to improve outcomes following PCABG and reduce technical complications by applying the plastic surgeons' expertise in microvascular anastomosis. To date, we have operated on 5 patients and coronary bypass was indicated for both primary and secondary cardiac problems. Average age and weight of patients were 8.7 kg and 19 months, with the youngest patient a 3-month-old child weighing 4.6 kg.

## Postoperative Management

Patients must be monitored closely postoperatively as microsurgical anastomoses are susceptible to compromise by several factors, including thrombosis, edema, infection, or bleeding at the site of anastomosis. A low to standard dose of milrinone (0.25-0.5 µg/kg/min) is routinely administered during the operation and in the first 24 hours. Low-dose epinephrine is used in cases of low cardiac output. For anticoagulation, unfractionated heparin is started at 6-12

---

\*Division of Plastic and Reconstructive Surgery, The Hospital for Sick Children and University of Toronto, Toronto, Canada

†Division of Cardiothoracic Surgery, The Hospital for Sick Children and University of Toronto, Toronto, Canada

‡Department of Surgery, University of Toronto, Toronto, Canada

Address reprint requests to Gregory Borschel, MD, Division of Plastic and Reconstructive Surgery, Hospital for Sick Children, 555 University Ave, Toronto, Ontario, Canada. E-mail: gregory.borschel@sickkids.ca

hours after operation, and it is transitioned either to low-molecular-weight heparin or aspirin before patients are discharged home. PCABG presents a unique challenge in monitoring the microsurgical repair as the cardiac perfusion cannot be visualized directly and therefore assessment relies on surrogate markers of cardiac viability, including ischemic symptoms, significant electrocardiographic changes, hemodynamic instability, or ventricular arrhythmia. If there is

concern for anastomotic thrombosis then angiography may be performed to assess the site of anastomosis. To date, we have not had any thrombotic complications at the site of anastomosis that required returning the patient to the operating room. Drains are placed intraoperatively and are removed when the drainage is  $<2$  mL/kg/day. Patients without postoperative complications are discharged from hospital within 1 week (Figs. 1-11).

Download English Version:

<https://daneshyari.com/en/article/3004723>

Download Persian Version:

<https://daneshyari.com/article/3004723>

[Daneshyari.com](https://daneshyari.com)