Coronary artery bypass grafting using a bifurcating radial artery

Hisashi Sakaguchi*, Ryuji Kunitomo, Shigeyuki Tsurusaki, Michio Kawasuji

Department of Cardiovascular Surgery, Graduate School of Medical and Pharmaceutical sciences, Kumamoto University, 1-1-1 Honjo, Kumamoto 860-8556, Japan

Received 21 April 2003; received in revised form 1 July 2003; accepted 7 July 2003

Abstract

A 61-year-old man with angina pectoris was admitted for elective coronary artery bypass grafting. The left anterior descending artery, and the two posterolateral branches (PLA1 and PLA2) of the circumflex artery required bypass grafting. At operation, the distal portion of the left radial artery was found to bifurcate, both branches having an equal size. We decided to use the bifurcating radial artery as a conduit for bypass grafting to the branches of the left circumflex artery. One distal end of the radial artery was subsequently anastomosed to the PLA1 branch and the other distal end was anastomosed to PLA2. Postoperative coronary angiography showed both branches of the radial artery to have good patency.

Keywords: Coronary artery bypass grafting; Bifurcating radial artery

1. Introduction

Arterial grafts are the preferred conduits for coronary artery bypass grafting (CABG), with the radial artery increasingly being used in this procedure. Bifurcating radial artery is a rare anomaly. This paper reports the case of a patient who successfully underwent CABG using a bifurcating radial artery as a Y-graft.

2. Case report

A 61-year-old man with angina pectoris was admitted for elective CABG. Prior to the operation, the pulsation of both radial and ulnar arteries in the left forearm was good and Allen’s test was normal. At operation, the left radial artery was carefully dissected using an ultrasonic scalpel (Harmonic Scalpel; Ethicon Endo-Surgery, CVG, Cincinnati, OH) and was found to bifurcate at the distal portion, both branches having an equal size. The decision was made to harvest both branches of the radial artery. The left internal thoracic artery was anastomosed to the left anterior descending artery (LAD). One distal end of the radial artery was then joined to the posterolateral branch (PLA1) and the other distal end was anastomosed to another posterolateral branch (PLA2) of the circumflex artery. The proximal end of the radial artery was subsequently joined to the ascending aorta. The intraoperative mean flow of the radial graft was measured at 93 ml/min by the medical volume flowmeters (Transonic Systems Inc., Ithaca, NY). The patient made an uneventful recovery and became free of angina, with no episodes of hand ischemia occurring after the operation. Postoperative coronary angiography revealed both branches of the radial artery as well as the left internal thoracic artery to have good patency (Fig. 1).

3. Comments

The radial artery is often used as an arterial conduit for myocardial revascularization [1]. In many cases, this artery is used as a composite graft, forming part of a Y-graft or T-graft. In a previously reported case, the decision was made to sacrifice one of the branches of a bifurcating radial artery because no other suitable coronary artery was available for bypass grafting [2]. In cases such as the one presented here, involving bifurcation of the radial artery, the possibility of using the artery as a natural Y-graft exists. One would imagine that this natural Y-graft would excel over the composite Y-graft in terms of antithrombotic properties. Preoperative radial arterial ultrasound is useful in determining the suitability of the radial artery for harvest prior to CABG [3] and in detecting the existence of such anomalies.
References


Appendix A. ICVTS on-line discussion

Author: Dr. Hitoshi Hirose, MD, Cleveland Clinical Foundation, Department of Thoracic and Cardiovascular Surgery, 2300 Overlook Road #312, Cleveland, OH 44106, USA

Date: 29-Jul-2003

Message: The paper concerns coronary artery bypass grafting (CABG) using a bifurcating radial artery. We have occasionally seen the distal radial artery bifurcated when we harvest it. Most of these bifurcating portions were discarded because of several reasons:

1. the distal radial artery is very prone to vasospasm and sometimes it is difficult to reverse it;
2. the distal radial artery may have injured by the previous catheterization or placement of the arterial line;
3. the calcification or the atherosclerosis is more often present in distal portion in the radial artery;
4. skeletonized harvest of the radial artery can provide enough length and diameter for sequential bypass;
5. preoperative estimation of the bifurcating radial artery is difficult and in most cases the graft materials are sufficient for bypass because other grafts have been harvested simultaneously.

We have done 3 cases of CABG using the bifurcated radial artery at Shin-Tokyo Hospital Group in Japan (Fig. 1). All of them were incidental bifurcated radial arteries and we used them for additional bypass to the distal coronary artery. At mean follow-up period of 3.5 years, no cardiac events have occurred in these patients.

We believe that the bifurcating radial arteries are totally incidental finding and its utilities are limited. However, once it is used to bypass, the graft behaves similar to the other radial grafts.

Fig. 1. Postoperative angiography showing good patency of the radial artery graft.