

Feasible Pericardiectomy for Off-pump Coronary Artery Bypass

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Pericardiectomy is the first essential step for the exposure of the coronary artery in off-pump coronary artery bypass (OPCAB) via a median sternotomy. After the dissection of the pericardium from the pleura, a longitudinal pericardiectomy from the apex to the aortic reflection was employed. The pericardiectomy was extended transversely to make a trapezoidal flap. By the traction of the left pericardium, anterior vessels were well exposed. For the closure, a trapezoidal pericardial flap was useful. (Ann Thorac Cardiovasc Surg 2003; 9: 279–80)

Key words: pericardiectomy, off-pump coronary artery bypass (OPCAB)

Introduction

In off-pump coronary artery bypass (OPCAB), excellent exposure, stable stabilization, and a blood less operative field are essential steps for achievement of complete revascularization. A suction device, deep pericardial stitches, or sponges is used for an excellent exposure of the target artery¹⁻⁴⁾ and pericardiectomy is the first essential step. Nevertheless, there is no report on pericardiectomy for bettering coronary artery bypass surgery via a median sternotomy. In this article, we describe a simple and useful technique of pericardiectomy to obtain an excellent operative field in OPCAB surgery.

Technique

Under general anesthesia, a full median sternotomy was performed and the internal thoracic artery was harvested. The pleura was dissected from the pericardium starting from the midline toward the bilateral phrenic nerves using a Harmonic Scalpel (Ethicon Endo-Surgery Inc., Cincinnati, OH, USA). The pleura with pericardial fat was dissected by the blunt backside of the Harmonic Scalpel

without any difficulty. The dissection proceeded superiorly to the pericardial reflection of the aorta, inferiorly to the diaphragm. As the dissection proceeded, the left anterior descending artery (LAD) could be usually found through the pericardium. A longitudinal pericardiectomy was employed on the left side of the LAD. Pericardiectomy was extended inferiorly to the cardiac apex and superiorly to the aortic reflection. Then, the pericardiectomy was developed transversely to the right phrenic nerve. Finally, we could obtain a trapezoidal pericardial flap (Fig. 1). By gentle traction only of the left side pericardium, the LAD, and even the diagonal branch were displaced to the center of the operative field without any hemodynamic instability (Fig. 2). We usually performed revascularization of the anterior wall at first with the Octopus stabilizers (Medtronic, Inc., Minneapolis, MN, USA). After the revascularization of the anterior wall, we set deep pericardial stitches or the starfish heart positioner (Medtronic, Inc.) for exposure and performed revascularization of other regions. Following every anastomosis, intraoperative assessment of the patency of the graft using a transmit-time flow meter (Transonic probe, Transonic Systems Inc., Ithaca, NY, USA) was performed. For the closure of the pericardial cavity following complete revascularization, we could easily cover the anterior wall of the heart with the trapezoidal pericardial flap.

Discussion

For the exposure of the anterior wall of the heart in

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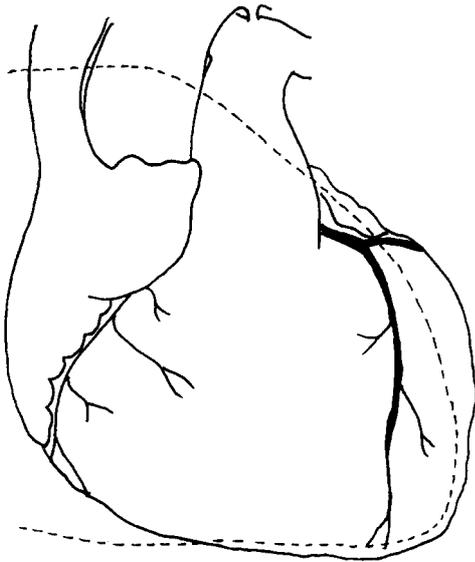


Fig. 1. Schematic representation of the trapezoidal pericardiotomy (dotted line: pericardial incision).



Fig. 2. Following the dissection of the pericardium from the pleura, a trapezoidal pericardiotomy was performed [white arrow: left anterior descending artery(LAD)].

OPCAB, traction of the left side pericardium has been employed. However, left side pericardial traction following the midline pericardiotomy is almost always insufficient to expose the anterior wall, and therefore, deep pericardial stitches or sponges or a suction device has to be applied with cardiac manipulation before revascularization.¹⁻⁴⁾ The application of deep pericardial stitches or a suction device may frequently cause hemodynamic instability, especially before revascularization.²⁾ Following the dissection between the pericardium and the pleura using the Harmonic Scalpel, pericardiotomy proceed laterally to the bilateral phrenic nerves without any damage to the pleura. It took only 10 minutes in 110 cases [number of distal anastomosis: 3.0 ± 1.1 (range, 1-6) per patient]. The right side pericardiotomy makes enough pericardial space to avoid compression of the right atrium and ventricle during the exposure of target vessels. We can safely expose the anterior wall with minimal manipulation of the heart and revascularize this area at first. Following revascularization of the LAD, the incidence of hemodynamic collapse by the application of elevation and displacement of the heart can be reduced. In the flow assessment, satisfactory graft flow characteristics were obtained in almost all grafts (graft to LAD system: 100%, graft to circumflex coronary system: 99%, graft to right coronary system: 98%).⁵⁾ There was no disadvantage of

this technique for the graft patency. After complete revascularization, we can easily cover the heart with a trapezoidal pericardial flap in preparation for the redo surgery in the future. We believe our pericardiotomy is a simple and useful technique for OPCAB via a median sternotomy.

References

1. Paulis RD, Colagrande L, Cotiis MD, Chiariello L. Heart positioner: a device to easily expose all coronary arteries during beating heart operations. *Ann Thorac Surg* 2000; **70**: 2169-70.
2. Ricci M, Karamanoukian HL, D'Ancona G, Bergsland J, Salerno TA. Exposure and mechanical stabilization in off-pump coronary artery bypass grafting via sternotomy. *Ann Thorac Surg* 2000; **70**: 1736-40.
3. Shennib H, Bastawisy A. Coronary artery bypass grafting on the beating heart: a simple technique for sublaxating the heart. *Ann Thorac Surg* 1999; **67**: 870-1.
4. Dullum MKC, Resano FG. Xpose: a new device that provides reproducible and easy access for multivessel beating heart bypass grafting. *Heart Surg Forum* 2000; **3**: 113-8.
5. Takami Y, Ina H. Relation of intraoperation flow measurement with postoperative quantitative angiographic assessment of coronary artery bypass grafting. *Ann Thorac Surg* 2001; **72**: 1270-4.