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INNOVATION

Retractor in retractor technique

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Abstract
Placing retractor and stabilization devices during open heart surgery can be difficult in obese patients due to extremely short neck and excessive breast tissue. Off-pump coronary bypass operations in these patients can be particularly technically demanding. To overcome this difficulty, we have used two retractors concomitantly. The first retractor is placed to the edges of sternum and the second one is placed into this first retractor. This maneuver ensures an extra height, and placing stabilization devices in this second retractor is relatively easy. Thus, we suggest that adding this maneuver will facilitate off-pump coronary bypass operations.

Keywords Retractor · Short neck · Off-pump

Introduction

Today, beating heart off-pump coronary artery bypass surgery is being used by many cardiac surgery centers [1]. Several stabilization equipment have been developed to use during beating heart surgery. Tissue stabilizers and heart positioners are commonly used during off-pump coronary bypass surgery. Extremely short neck and excessive breast tissue may impede attachment of these stabilization devices to the retractor. We have used a different maneuver to ease attachment of these stabilization devices.

Technique

The distal anastomosis were completed with the use of tissue stabilizers (Octopus Tissue Stabilizers (Medtronic, Inc., Minneapolis, MN, USA) or OPVAC Synergy II (Estech-Least Invasive Cardiac Surgery, Danville, California, USA)) for immobilization of the myocardial surface at the site of the target coronary artery. The heart was positioned with heart positioners (Starfish (Medtronic, Inc., Minneapolis, MN, USA) or Estech Pyramid Positioner (Estech-Least Invasive Cardiac Surgery, Danville, California, USA)) for accessing hard-to-reach lateral and posterior vessels. To obtain a bloodless field, two or single silastic sutures were used to temporarily occlude the coronary artery on either side of the anastomosis site. Extremely short neck and excessive breast tissue in obese patients impede not only position of retractor but also placement of adjunctive stabilization and positioner devices during off-pump coronary bypass surgery. In that case, we use a second retractor and position it into the first retractor. This maneuver gives us extra height to attach stabilization devices to the second retractor. We then can easily perform complete coronary revascularization without difficulty. Figure 1 demonstrates that both mechanical stabilization devices are placed on the second retractor, and posterior descending coronary artery was than successfully bypassed.

Discussion

Off-pump coronary bypass surgery is performed by many cardiac surgery centers. Hemodynamic variations in off-pump coronary artery by-pass (OPCAB) may be due to mobilization and stabilization of the heart or myocardial ischemia occurring during coronary occlusion [2]. There are some maneuvers to overcome these hemodynamic changes: deep pericardial traction sutures are helpful for further elevation and rightward rotation of the heart during the exposure of the left coronary artery territories [3, 4]. Rotation of the table to the right side and opening of the right pleural space allowing the heart to

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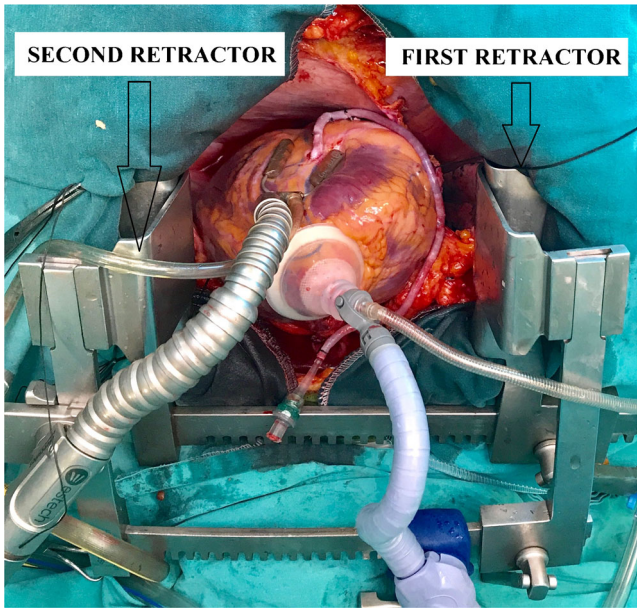

Fig. 1 Two retractors are used during distal anastomosis to posterior descendent coronary artery. The first retractor placed to edges of sternum and the second is positioned into the first retractor. First and second retractors are labeled in the figure. Both mechanical stabilization devices are attached to the second retractor

rotate towards the right pleural cavity improves exposure of the circumflex territory. Apical suction device is useful both for exposure of circumflex and posterior descendent artery (PDA) territories. Ninety-degree displacement of the heart is well tolerated if the maneuver is performed in a stepwise manner. The help of apical suction device during the exposure of the posterior descendent artery territory lessens the compressive effect of the stabilizer foot and provides better exposure with better hemodynamic parameters. Both with excessive breast tissue and short neck may cause difficulty to place retractor in extremely obese patients. First retractor can barely be placed with traction on median sternotomy. However, stabilization devices cannot be attached to first retractor easily due to short neck and excessive breast tissue. We have placed second retractor into the first retractor to overcome this problem. We have placed the shaft of stabilization devices to the second retractor which also improve surgical exposure. Thus, coronary bypass surgery could be performed comfortably. Both mechanical stabilization devices should be used concomitantly during distal anastomosis to posterolateral and posterior descendent coronary arteries. We do not open either of the retractors widely; hence, we have not experienced complications, such as sternal wound infection, sternal wound dehiscence, and injury to the brachial plexus any more than usual. There was no significant increase in pain or incidence of rib fracture.

We have been using abovementioned maneuver since 2010 (43 patients), and this modification ensures us technical comfort and ease during distal anastomosis to lateral and inferior wall coronary arteries. We think that retractor in retractor technique should be in surgical armamentarium of cardiac surgeons.

Compliance with ethical standards

Conflict to interest The authors declare that they have no conflict of interest.

Informed consent Informed consent was obtained from all individual participants included in the study.

Ethical approval Lokman Hekim University has approved our technique since 2012 (Ap number: 2012/23-16).

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