

Off-Pump Myocardial Revascularization. The Single-Suture Technique: How to Avoid Any Complication

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To achieve a good exposure of coronary arteries, the single-suture technique allows a good exposure of the circumflex territory. This suture may injure the organs situated behind the pericardium. We suggest placing a single suture of silk in the oblique sinus to allow a good elevation of the posterior pericardium before placing the single suture. This simple and inexpensive method avoids any damage to the structures behind the pericardium.



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The exposure of coronary arteries in the circumflex territory has been described by Ricardo Lima from Brazil. He described a series of four sutures on the pericardium, which allowed a good exposure of such surgically difficult territory. Tomas Salerno simplified the "Lima sutures" with a technique using a single suture placed in the oblique sinus of the posterior pericardium, which allowed a good exposure of the circumflex territory and less heart manipulation. [Bergsland 1997, Salerno 1999, Ricci 2000].

This deep pericardial suture may injure the organs situated just behind the pericardium, such as the esophagus and thoracic aorta [Ricci 2000], and several complications have been reported in literature: injury of the left lower pulmonary vein has resulted in post-operative bleeding and dangerous hematoma behind the left atrium [Fukui 2002]; and subcutaneous emphysema has been detected in several cases in our experience.

We report a different way to pose the single lima suture in order to avoid any damage to the structures behind the posterior pericardium.

INTRODUCTION

Coronary artery bypass grafting without cardiopulmonary bypass (CPB) is now an accepted technique of complete myocardial revascularization. The technique was originally described by Kolesov [Kolesov 1967] and later abandoned when the CPB became the gold standard for cardiac operations on the arrested heart.

In the late 1980s off-pump coronary grafting was reintroduced by Benetti and Buffolo with very encouraging results, especially for high-risk patients [Benetti 1985, Buffolo 1996].

This technique was limited to the grafting of left anterior descending (LAD) coronary artery and sometimes to the right coronary artery (RCA) [Benetti 1985, Buffolo 1996].

In recent years, technical advantages in coronary exposure and mechanical stabilization have come from the industry, leading to the possibility of a complete off-pump myocardial revascularization.

TECHNIQUE

The heart is approached by median sternotomy and two pericardial stay-sutures are applied on the left, fixed to the drapes. The surgeon lifts the heart and places a superficial suture of a 3/0 silk (Ethicon, Sommerville, NJ, USA) in the oblique sinus of the posterior pericardium and drops the heart back into the pericardial sac. The silk suture is pulled caudally in the midline and clamped to the drapes to allow a good elevation of the posterior pericardium (Figure 1). The surgeon once again lifts the heart and places a heavy suture (n. 1 Ethibond, Ethicon, Sommerville, NJ, USA) into the oblique sinus of the posterior pericardium, completely separated from the structures behind it by the silk stitch (Figure 2). After that, the silk stitch is pulled away. The suture is passed through a folded 15-inch vaginal tape. The suture is snared down, bringing the folded end of the vaginal tape in contact with the posterior pericardium. The operation goes on in accord with the surgical off-pump technique described by Tomas Salerno [Bergsland 1997, Ricci 2000]. Our proposed variation of the single suture technique is useful, and separating the posterior pericardium from all structures behind it makes the pericardial stitch totally safe. Due to the pericardial bite, we performed the last 80 off-pump coronary grafting in our institution without any complication.

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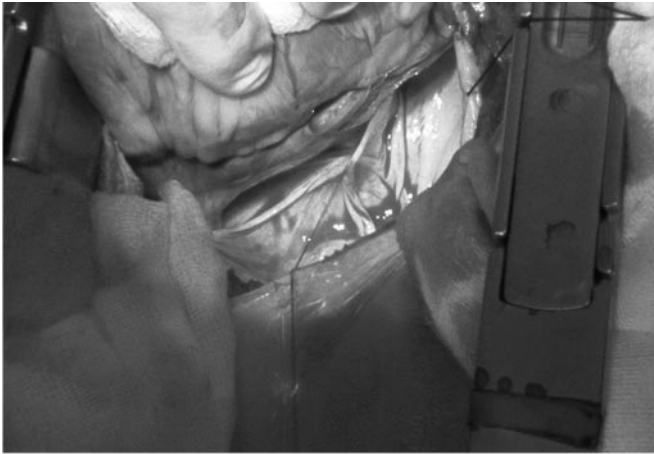


Figure 1. A single suture of a 3/0 silk in the oblique sinus allows a good elevation of the posterior pericardium.

COMMENT

Total myocardial off-pump revascularization has remained elusive for many years. The main obstacle has been the difficulty in exposing coronary arteries located on the lateral and inferior wall of the heart. The strategy of using the single-suture technique to obtain exposure, in combination with a coronary stabilizer (suction device), has proved to be safe and effective in accomplishing off-pump grafting of all coronary territories.

The deep pericardial suture may injure the organs situated just behind the posterior pericardium and several complications have been described. In order to avoid those complications, we proposed a simple “light suture” (3/0 silk) on the oblique sinus, which elevates the posterior pericardium from the structures behind it. It takes only a few (3–4) minutes and avoids any pericardial stitch damage.

We consider this technique easy, safe, inexpensive, and not time-consuming, and we recommend it for a safe totally off-pump myocardial revascularization.

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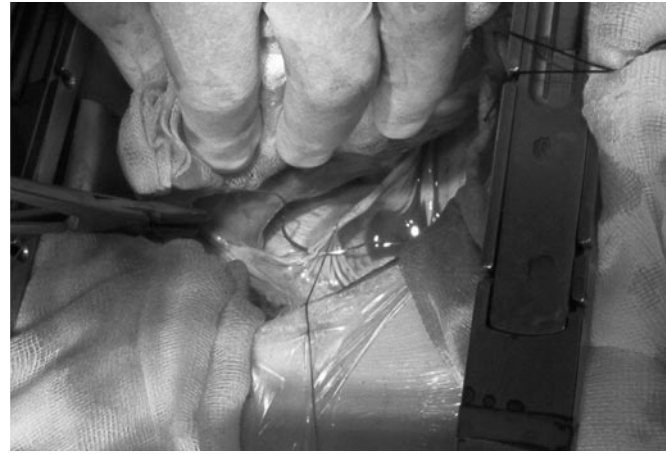


Figure 2. The surgeon once again lifts the heart and places a heavy suture n. 1 Ethibond into the oblique sinus of the posterior pericardium, completely separated from the structures behind it by the silk stitch.

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