

How I Do It

A Multipurpose Arterial Graft Holder for Coronary Artery Bypass Grafting

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ABSTRACT

A multipurpose arterial graft holder designed for use during coronary artery bypass grafting is described. This new holder is atraumatic and holds the arterial grafts and saphenous vein graft securely during anastomosis. The use of this instrument facilitates the use of multiple arterial grafts for coronary artery bypass grafting.

INTRODUCTION

Arterial grafts, including internal thoracic artery (ITA), right gastroepiploic artery (RGEA), and radial artery (RA), have been widely used with excellent long-term results in coronary artery bypass grafting [Suma 2000, Tatoulis 2004]. It is well known that skeletonization of arterial grafts has great benefits such as increased graft length and its free flow [Taggart 2001], and this procedure has become popular for the harvesting of ITA and RGEA. However, some skilled assistance is required when performing distal coronary anastomosis using an arterial graft. Forceps are commonly used to hold the open end of the arterial graft. However, the forceps technique can cause endothelial injury or cut the artery, and the arterial pedicle easily slips from its position during the anastomosis. This technique can also result in suboptimal exposure and prolonged anastomosis time. In this report, we describe a new instrument, the multipurpose graft holder, that securely holds the open end of arterial grafts, as well as saphenous vein grafts, during anastomosis.

TECHNIQUE

The multipurpose graft holder consists of a flexible arm and an atraumatic clip for holding an arterial graft. We

designed both clip blades to have rectangular openings measuring 8×15 mm on the sides, and one blade to have a central U-shaped opening and the other a C-shaped opening on each surface (Figure 1). When the clip holds the pedicled arterial graft, the U-shaped blade can be positioned to straddle the graft (Figure 2A). The arterial graft will then bulge through the U-shaped rectangular opening, providing excellent exposure. When the arterial graft is skeletonized, the C-shaped blade can hold the graft (Figure 2B). Also, this C-shaped blade is applicable for sequential grafting because it can expose the side hole of a conduit and provide an excellent bloodless field (Figure 2C).

The arterial graft is then properly trimmed, and the multipurpose graft holder is positioned adjacent to the coronary arteriotomy. In our institute, distal anastomosis is started at the heel using a single polypropylene suture with double-ended needles. A continuous row of loose sutures is placed on each side of the anastomosis. After the arterial graft is approximated and both ends of the suture are pulled tight, the multipurpose graft holder is released. The anastomosis is then completed.

For the saphenous vein graft, one of the U-blade arms is inserted into the opening in the vein graft. The apex of the vein graft is held by the blade (Figure 2D).

DISCUSSION

Various saphenous vein holders have been designed to facilitate coronary artery bypass grafting [Mobin-Uddin 1986, Suma 1987] and have been used extensively. However, few graft holders for arterial conduits have been designed to facilitate coronary artery bypass grafting. Recently, more and more surgeons try to use arterial grafts because of their long-term patency. Moreover, skeletonization of arterial grafts has been gaining popularity, simply because it can make the grafts longer, increase the free flow, and make composite grafts easier. Therefore, it may be essential for today's surgeons to become friendly with arterial grafts in coronary artery bypass surgery.

Conversely, there are some disadvantages to arterial revascularization. One disadvantage is that it is difficult for inexperienced surgeons to handle arterial grafts delicately, and

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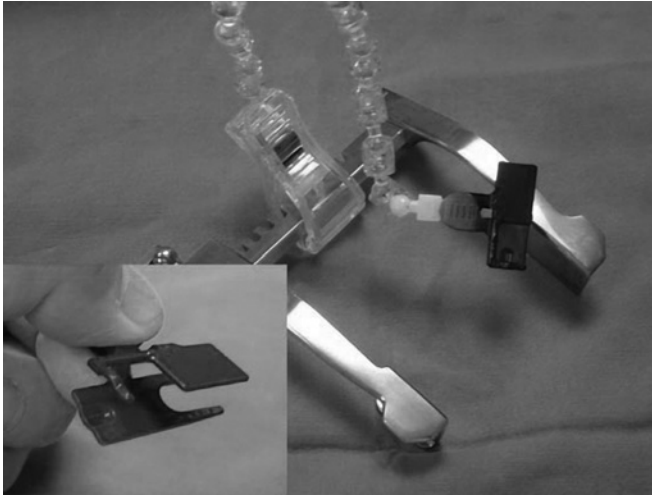


Figure 1. The multipurpose graft holder consists of a flexible arm and an atraumatic clip for holding grafts. This atraumatic clip has rectangular openings on both sides, a central U-shaped opening, and a C-shaped opening at the end of each surface.

mishandling can result in endothelial injury or laceration of arterial grafts. In that case, using an arterial graft holder might be a better choice.

This new instrument that we have developed securely holds and suspends the arterial graft atraumatically during coronary artery anastomosis. In addition, because of its versatility, there are a lot of ways this instrument can hold arterial grafts, such as for sequential grafting or making composite grafts.

This simple and easy-to-handle multipurpose arterial holder provides excellent exposure of the anastomotic site, prevents traumatic injury, and does not require a skillful assistant. This novel instrument is highly recommended for today's surgeons who should be familiar with arterial revascularization.

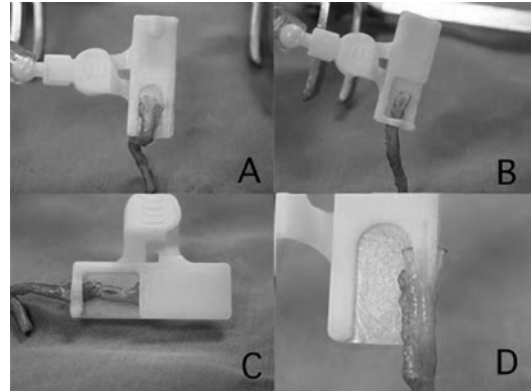


Figure 2. The U-shaped blade can hold the pedicled arterial graft and be positioned to straddle the graft. The arterial graft will then bulge through the U-shaped opening (A). For the skeletonized arterial graft, the C-shaped blade can be useful to hold the graft (B). The C-shaped blade is also applicable for sequential grafting because it can expose the side hole of the conduit and provide an excellent bloodless field (C). As a vein holder, one of the U-blade arms has been inserted into the lumen of the vein graft to hold the incision open (D).

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