Dikmengil Technique for Proximal Anastomosis of Saphenous Vein to Aorta Using Hegar Dilator Without Clamping

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ABSTRACT

Manipulation of aorta, such as side clamping of the ascending aorta, is known as a possible cause of the increased incidence of perioperative cerebrovascular accidents during myocardial revascularization. We describe an easy and cheap alternative technique for proximal anastomosis of saphenous vein to aorta using a Hegar dilator without clamping in off-pump coronary artery bypass procedures.

INTRODUCTION

Manipulation of the aorta, such as side clamping of the ascending aorta, is known as a possible cause for the increased incidence of perioperative cerebrovascular accidents during myocardial revascularization.[1] As a result, several devices were designed to reduce aortic manipulation during surgical myocardial revascularization.[2] Here, we present an easy and cheap alternative technique for the proximal anastomosis of saphenous vein to aorta in off-pump coronary artery bypass procedures.

SURGICAL TECHNIQUE

Creation of an anastomosis between the aorta and a saphenous vein graft using a Hegar dilator was conducted on an in vitro perfusion system using bovine aorta. Pressure of 100 mm Hg was provided inside the system.

Proximal anastomosis using a Hegar dilator has very few steps: 1) Preparation of the saphenous vein and insertion of the Hegar dilator inside the saphenous vein. 2) Preparation of the hole in the aorta. 3) Insertion of the Hegar dilator loaded with saphenous vein into the prepared aortic hole. 4) Completing the proximal anastomosis in conventional style.

Preparation of Saphenous Vein and Insertion of the Hegar Dilator

The diameter selection of the Hegar dilator is oriented according to the diameter of saphenous vein. We observed that 13, 14, 15 CH diameters of Hegar (Aesculap) are suitable for a 4 mm aortic hole.

In the first method, a partial incision that allows the insertion of a Hegar dilator is made 3 to 5 cm below the proximal orifice of the saphenous vein, then the Hegar dilator is advanced

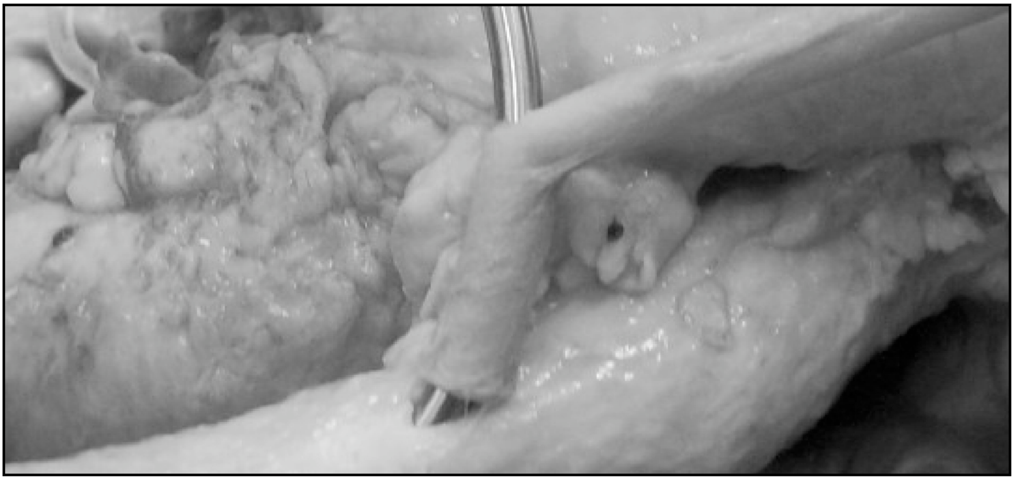

Figure 1. End to side anastomosis by using partial incision on saphenous vein.

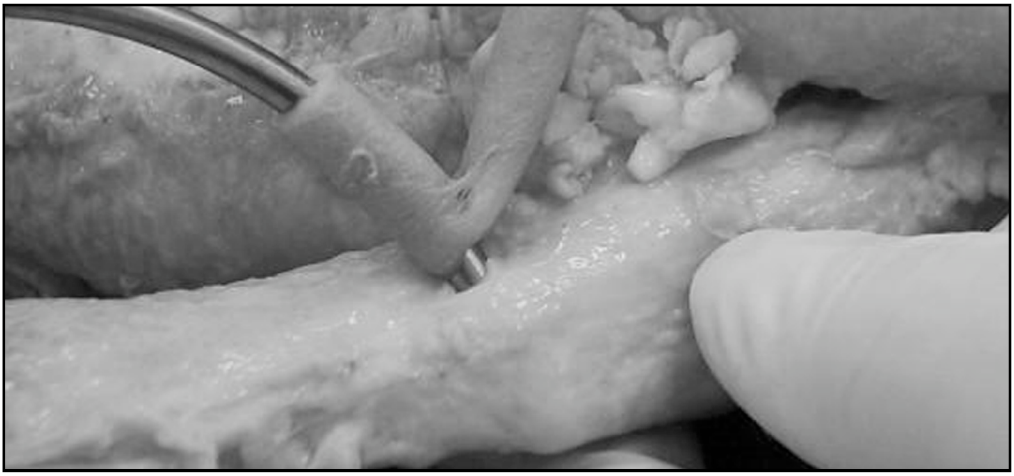

Figure 2. Side-to-side anastomosis of saphenous vein to aorta.

proximally by perforating saphenous vein valves; if there are any (Figure 1).

In the second method, the aim is to perform a "horseshoe" side-to-side anastomosis between a conduit and the aorta. Hence, the Hegar dilator is inserted through a proximal orifice and advanced 3 cm proximally. At that point, a partial incision of 4 to 5 mm is made to the lateral wall of the saphenous vein and the dilator is passed out from here (Figure 2). The open end of the proximal saphenous vein can be used for the anastomosis of another graft or can be tied off.

Preparation of Hole in Aorta and Insertion of Hegar Dilator

The aorta punctured with a scalpel (no. 11) and extravasations from the hole are controlled by pressing in with forefinger, then a 4-mm punch (Genzyme) was introduced into the hole and punctured quickly to prevent pressurized saline leak and controlled again by the finger. The tip of the Hegar dilator loaded with the saphenous vein is inserted into the prepared hole.

Proximal Anastomotic Technique

Anastomosis performed in conventional

style by placing the dilator on the opposite side of the suturing area. We prefer a 6-0 Prolene with a half-circle needle suture (W8815, Ethicon, Somerville, NJ). Because the distance between the edge of the Hegar dilator and the outer part of the aortic hole is approximately 0.5 cm, the half-circle needle is easier to manipulate.

COMMENTS

Cerebrovascular events are the most devastating complications following coronary bypass surgery.[3] This complication is encountered occasionally in younger patients, but most often in elderly patients. Aortic clamping presents a very strong risk of an adverse neurological outcome, in particular, stroke.

The search for an ideal surgical technique or device that can prevent embolization and facilitate vascular anastomosis is not new. Over the years many authors have designed and used many techniques, both experimentally and clinically, to anastomose blood vessels of different sizes. Stapling, clipping, and laser welding have been used, without completely acceptable results.[4]

The best way to improve the outcome of patients can be done by the identification of diseased and risky aorta pre- and intraoperatively, and then adapting surgery to the individual patient.

In this technique, we minimize manipulation of the aorta and the anastomosis and the procedure took no longer than our conventional side clamp method. As an alternative, the use of anastomotic devices can provide an additional benefit to a coronary artery bypass procedure by reducing the anastomotic time. All proximal anastomotic devices increase the total cost of the operation, but in this technique, no additional expense is incurred.

There have also been reports of aortic dissection related to beating heart surgery with placement of a partial occlusion clamp.[5] Presumably, this risk is eliminated with this technique.

There are a few limitations to this method depending on the technique: in technique one, an additional incision is necessary on the lateral wall of the saphenous vein thus breaking the integrity of the vein intima; in technique two, after completion of side-to-side anastomosis, a death space might remain between the proximal orifice of the vein and the anastomosis if not used for an other graft connection.

Different biocompatible materials are being used in the anastomotic devices but their long-term results are not clear. But in this technique, a well-known material, polypropylene, is used for the anastomosis and no endovascular material is being left. We propose our method as an alternative technique for the proximal anastomosis of saphenous vein to aorta in off-pump coronary artery bypass procedures.

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