



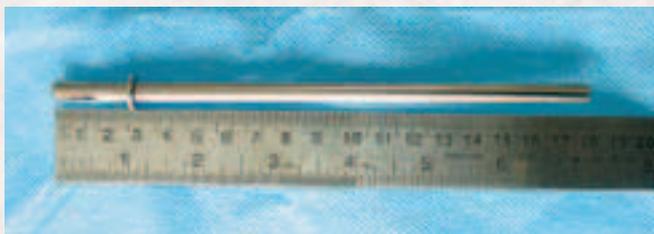
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VETTATH'S ANASTAMOTIC OBTURATOR

OUR EXPERIENCE OF 269 PROXIMAL ANASTOMOSES

INTRODUCTION

With the advent of beating heart surgery, more than 50% of coronary artery bypass graft surgeries are performed in most coronary centers in India without the use of heart-lung machine. But the neurologic problems caused by side clamping the aorta in performing the proximal anastomoses still remain. Hence, there has been a great deal of research to find an effective alternative to avoid side clamping the aorta. A couple of anastamotic devices have already arrived in the market, but since the costs of these devices are prohibitive, we designed our own device for proximal anastomoses.



PATIENTS AND METHODS

From July 2002 to July 2003, we performed 235 coronary artery bypass graft surgeries on the beating heart with 177 of these procedures performed off-pump and 58 of them carried out with pump assistance. Initially, proximal anastomoses of vein grafts were performed with aortic side clamp. Of late, all our top ends are being performed with VAO. 177 patients have had their proximal Saphenous Vein Graft (SVG) anastomoses performed with our VAO.

Before VAO was used on patients, it was tried for anastomosing vein grafts on the aortas and pulmonary arteries of various perfused animal heart models. The aortic and pulmonary artery pressures were maintained at 110 to 120 mm Hg systolic while these anastomoses were being performed. These conduits were then explanted and examined for suture placement to see if all the aortic layers were included.

VETTATH'S ANASTAMOTIC OBTURATOR (VAO)

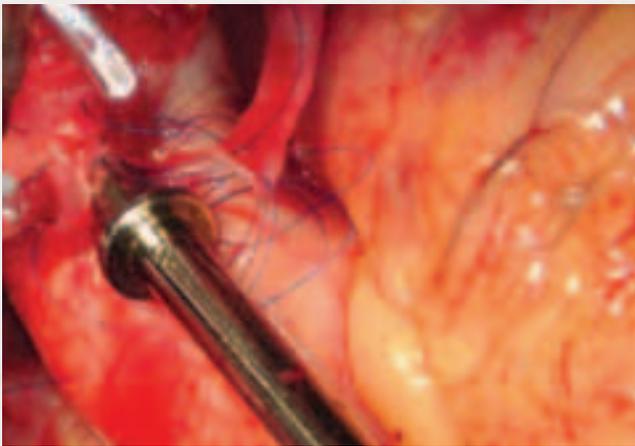
This metallic instrument is made of solid steel (Figure 1). It is 18 cm long and comes in small and medium sizes (5 mm and 6 mm in diameter respectively). The holding part is smooth. The inserting bit has a ridge 2.5 cm from the end (Figure 2). This 2mm ridge projects perpendicularly from the steel rod. There are 3 equidistant grooves in the inserting end that are 1 mm deep a 1.5 cm long.

The ridge helps to prevent blood from spurting directly into the eye. The grooves allow the needle to pass through the rod and thereby include the aortic intima in the suture.

SURGICAL TECHNIQUE

VAO allows us to anastomose the proximal ends of the vein grafts, before or after the distal anastomoses. The aortic site proposed for anastomosis marked with diathermy. Two 3-0 polypropylene purse-string sutures are applied 1 cm away from the site. The aorta is stabbed with a No.11 blade knife, and punched with 4mm or 4.5mm aortic punch (for 5-mm or 6-mm VAO), respectively. The punch hole is blocked with the left index finger. VAO is introduced and purse strings are tightened just enough to prevent excessive bleeding. Once the obturator is in and the snares are tightened, the proximal vein anastomoses is performed as usual with 5.0 or 6.0 polypropylene suture.





The sutures in the vein have to be inside out, and in the aorta, they have to be outside in. The aortic sutures are placed so that the needle passes through the aortic wall, goes into the groove of the Obturator, and comes out between the aorta and the metal, thus taking the intima. The sutures are placed all around the aortic punch hole and are loosely held. Once the suturing is complete, the obturator is removed, and the left index finger is positioned on the aortic punch hole to prevent bleeding. The loose sutures are pulled and tightened with a nerve hook. The assistant holds the two ends of the sutures firmly with controlled traction during this procedure. Once all of the sutures are in place, the two ends are tied snugly. The two snares on the purse string are removed, and they are tied in place with care, so as to avoid a purse string effect.

RESULTS

We have performed 269 proximal anastomoses on 177 patients. Initially, most were performed with proximal anastomosis first so that the flow in the vein grafts could be fully assessed. But with experience, we now do distal anastomosis first. We have had no postoperative ischemia, or perioperative infarction in any of our patients. We have had no perioperative mortality in our coronary patients. One patient presented with angina after 12 weeks, and check angiogram results showed a perfectly patent graft. We are planning to follow up these patients and to repeat coronary angiography after one year to assess the patencies of their grafts.

DISCUSSION

With the present-day degree of myocardial protection and refinement in surgical technique, the mortality and morbidity of coronary artery surgery is related more to the co morbidities of patients than to cardiac function and the complexity of the surgical procedure [Mohan 1992].

Avoiding cardiopulmonary bypass [Moshkovitz 1995] has further contributed to the reduction of mortality and morbidity in high-risk patients, such as those with post infarction angina and a low ejection fraction.

Off-Pump coronary artery bypass grafting avoids extra corporeal circulation and has shown to reduce the clinically relevant morbidity, especially with regard to neurologic complications. Manipulating the ascending aorta by side-clamping is a definite risk factor and VAO helps us to get rid of this.

Surgeon's skill is an important factor in performing proximal anastomoses with VAO. One advantage here is that we can perform either the proximal or the distal anastomosis first, an option that is not possible with the recently described sutureless anastomotic device [Calafiore 2001].

VAO device is made of steel, is reusable, and costs only US\$ 10 to fabricate it. Side-clamping of the aorta can be avoided, and hence there is no need to bring down the systolic pressure below 100 mm Hg. There is no injury to the vein intima, because nothing is introduced into the vein. The suturing procedure takes not more than 10 minutes, and the learning curve is very short or negligible. VAO can also be used in calcified aortas if a small island of normal tissue is available. Our clinical results are excellent; we are now waiting of the one-year postoperative angiographic studies of our patients in this series, to confirm their long-term patency.

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