

A Simple Method of Creating LVAD Outflow Tract Aortic Anastomosis

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ABSTRACT

Left ventricular assist device (LVAD) implantation is frequently complicated by intraoperative and postoperative bleeding, particularly at the aortic anastomosis site. Many modifications of the anastomosis have been attempted. We describe a simple method to anastomose the LVAD outflow tract to the ascending aorta with minimal bleeding and a short anastomosis time.

INTRODUCTION

Implantation of left ventricular assist devices (LVADs) has significantly improved the care of heart failure patients awaiting heart transplantation. However, excessive bleeding remains a problem in one third of LVAD patients [Hsu 2000, Piccione 2000, Schmid 2000]. One of the common sites of bleeding at implantation is the anastomosis between the LVAD outflow tract and the aorta. We describe a simple and quick technique that decreases the amount of bleeding from the outflow graft/aorta anastomotic site.

TECHNIQUE

The overall procedure and placement of the LVAD is the same as previously described. Prior to heparinization the LVAD pocket is created, and after the sternum is opened, the driveline is passed through its tract and out of the skin in the right upper quadrant of the abdomen. If the patient's hemodynamic status allows, we prefer to do off-pump aortic anastomosis first, with the use of a side-biting clamp to minimize bypass time. After full heparinization, we measure the length of the graft. Once the graft is measured and trimmed, a side-biting aortic clamp is applied and an ellipticolongitudinal aor-

totomy is created using a 5-mm punch on both the toe and the heel of the aortotomy (Figure 1). During suturing of tissue, the eversion of the suture line is known to provide good tissue approximation. Therefore, we place 4 interrupted 4-0 prolene mattress sutures: 1 at the toe, 1 at the heel, and 1 on each side of the opening approximately midway between the toe and heel (Figure 2). The graft is brought down into place on the aorta, all 4 sutures are tied, and the tails of all the sutures are left intact. These sutures divide the aortic anastomosis into 4 straight segments. Each segment is subsequently anastomosed using continuous running suture from one mattress stitch to another. This procedure can be easily done without looking into the lumen, thus minimizing aortic tissue injury by the needle. No pledgets are used during the anastomosis. The mattress sutures evert the aortic tissue and the graft along the 4 segments thus creating an easy approximation of tissue that minimizes the risk of incorporating the back wall in the stitch. After the 4 segments are anastomosed with the running suture, BioGlue (CryoLife, Kennesaw, GA, USA) is generously applied over the entire anastomosis line.

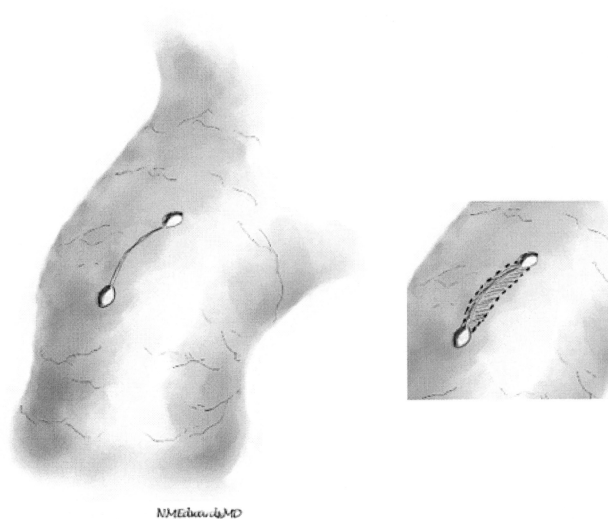


Figure 1. After the graft is measured and trimmed, a side-biting aortic clamp is applied and an ellipticolongitudinal aortotomy is created using a 5-mm punch on both the toe and the heel of the aortotomy.

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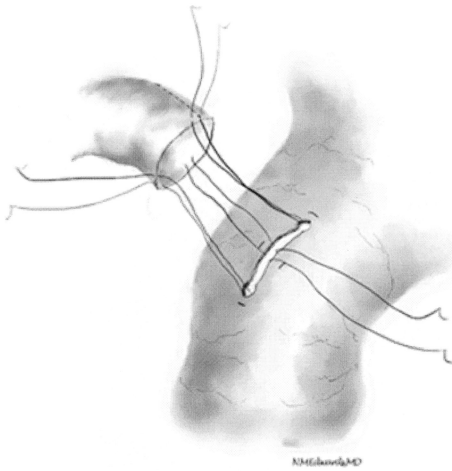


Figure 2. During suturing of tissue, the eversion of the suture line provides good tissue approximation. Four interrupted 4-0 prolene mattress sutures are placed: 1 at the toe, 1 at the heel, and 1 on each side of the opening approximately midway between the toe and heel.

We put the patient on bypass and lower the aortic pressure prior to releasing the aortic side clamp to minimize the bleeding associated with high pressure. We check for bleeding immediately after releasing the clamp. The remainder of the implantation continues as previously described, with placement of the inflow cannula, venting of the LVAD, and taking the patient off bypass.

COMMENT

This technique has been established at our center after many years of continuing modification in an attempt to decrease the amount of bleeding post-LVAD placement. Our technique has evolved from the initial use of continuous running suture buttressed with bovine pericardium to the subsequent use of interrupted mattress sutures buttressed with Teflon pledgets. Later the technique was modified to include the use of semicontinuous suture with a Teflon strip inserted as a washer under the suture prior to setting the graft. With each modification we noted decreased bleeding, but in many cases the complexity and time required to complete the anastomosis increased. The current technique allows not only minimal bleeding but also a quick anastomosis. The 4 mattress sutures evert the approximated tissue in such a way as to allow easy running sutures to be placed without the worry of incorporating the back wall during anastomosis. We have used this technique on our last 20 patients and have noted a significantly reduced postoperative bleeding rate.

REFERENCES

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