

Double passage from Teflon felt strip to achieve hemostatic aortic anastomosis

Hemostatik aort anastomozu elde etmek için Teflon feltten çift geçiş

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ABSTRACT

Bleeding and associated complications are mostly encountered problems of the ascending aortic surgery. Several surgical techniques have been developed to achieve hemostasis. In this article, we present a simple and effective modification technique in which the Teflon felt is wrapped onto the anastomosis. In this approach, over and over running suturing technique is used via double row from the felt over the suture line.

Keywords: Anastomosis; hemostasis; thoracic aorta.

Dacron tube graft replacement is commonly used procedure for aneurysm surgery of the ascending aorta.^[1] Bleeding and associated complications, such as pseudoaneurysm and dissection, are the most commonly encountered suture line complications.^[1] The rate of postoperative early reoperation due to bleeding ranges from 3% to 6.8% and pseudoaneurysm arising from the suture line is the main cause of late re-do surgery following elective aortic surgery.^[2,3] Different anastomotic techniques have been developed to reduce the risk of these adverse outcomes, such as doubled-felt anastomosis, backstitch, inverting anastomosis, and turn-up techniques.^[4] However, each technique carries some advantages and disadvantages and it is essential to implement the optimal anastomosis technique which is preferably simple and practical. Herein, we describe

ÖZ

Çıkan aort cerrahisinde kanama ve kanamayla ilişkili komplikasyonlar, en sık rastlanan sorunlardır. Hemostaz sağlamak için çeşitli cerrahi teknikler geliştirilmiştir. Bu yazıda, anastomoz üzerine Teflon feltin sarıldığı basit ve etkili bir modifikasyon tekniği sunuldu. Bu yaklaşımda dikiş hattı üzerinde feltten çift geçiş yapılarak, devamlı dikiş tekniği kullanılır.

Anahtar sözcükler: Anastomoz; hemostaz; torasik aort.

a simplified technique which involves wrapping of the Teflon felt strip on the suture line and reinforcing it by double-row from the strip.

SURGICAL TECHNIQUE

Between February 2011 and December 2012, six patients with a non-dissecting aneurysm of ascending aorta were operated using this type of anastomosis technique. They were all true aneurysms. The same technique was used for both distal and proximal anastomoses.

The technique was performed in the ascending aorta with the use of cardiopulmonary bypass in each patient. After general anesthesia and median sternotomy, cardiopulmonary bypass was established



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with a two-stage venous cannula and arterial cannula. Myocardial protection is provided with antegrade cold-blood cardioplegia. The aortic graft and aorta are positioned as an end-to-end fashion and 1 cm Teflon strip was wrapped outside of the intersection line. The posterior half of the anastomosis was sewn primarily to avoid possible difficulties in exposure. The first suture was placed on the Teflon felt. Subsequent sutures were placed on the graft and aorta, respectively, as an end-to-end fashion with 3-0 prolene sutures. The second row from the Teflon felt completed the first loop (Figure 1). The next stitch was placed 4 to 6 mm distance away from the previous one. All three materials were sutured with a constant distance. After 5 to 6 stitches, prolene suture was pulled gently to merge the end of the graft and aorta. The loose parts of the suture were tightened via hooking. The anterior part of the aorta was sewn using the same needle in the same

fashion. The other needle was used to complete the anastomosis. The loose knots were tightened via hooking from the posterior to anterior before tying the suture.

The mean cross-clamp time, which indirectly represents anastomosis time, is extended about 20 minutes more with this technique than the simple suturing technique. However, the mean cardiopulmonary bypass time and operation time were shorter than the simple running suture (83.8 ± 20.4 min, 25, and 126.5 ± 23.7 , respectively). During the operation, we did not observe any suture line bleeding and, therefore, we did not need to put reinforcing sutures or tissue adhesives. The amount of total drainage ranged from 250 to 600 mL (416 ± 172 mL) without the need of any transfusion of packed red blood cell or fresh frozen plasma. Reoperation for bleeding was not needed during follow-up (range, 32 to 46 months). A written informed consent was obtained from each patient.

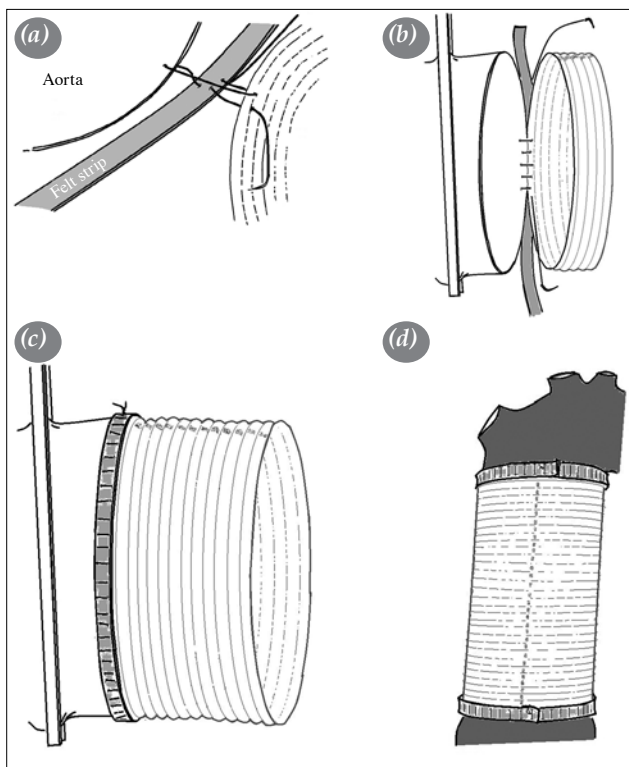


Figure 1. (a) A Teflon felt strip is placed externally and a 3-0 prolene suture (double-needle, one half circle) goes through in order of; 1- from the external surface to the graftic face of the felt, 2- from the outside to the luminal surface of the graft, 3- from the luminal surface to the outside of the aorta and 4- from the aortic face to the external surface of the felt strip. (b) Two arms of the prolene are pulled to bring the aorta and graft closer. (c) The felt strip fairly covers anastomosis. (d) Final appearance of the felt strips lying over the suture line.

DISCUSSION

One of the major challenges in the ascending aortic surgery is to achieve a hemostatic anastomosis.^[2] Aortic wall structure and surgical experience are critical factors to yield satisfactory outcomes. However, a safe and reliable anastomosis also depends on the suturing technique.^[4] To date, various techniques have been described in the literature for secure anastomosis.^[4] On the other hand, our technique has some unique advantages. While using simple running suturing technique, prolene suture may create excessive tension which may cause a cutting effect on the suture line. On the other hand, prolene suture slides over externally, supporting the Teflon felt and preventing the transmission of tension directly on the aorta. Bleeding form back wall of the anastomosis is troublesome and it may be difficult to put a reinforcing suture due to the limited exposure. This technique enables aorta and the graft to be on the same plane (Figure 2). Therefore, a smooth blood flow can be

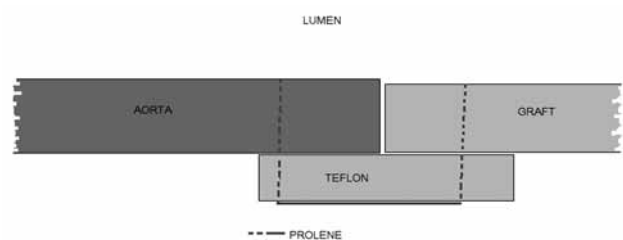


Figure 2. The alignment of the graft and the aorta. The felt serves as a barrier at the anastomosis.

achieved at the luminal surface, avoiding potential endothelial damages caused by the turbulence on the distal aorta.

The felt strip which covers the intersection between the aorta and graft serves as a barrier for blood escaping through it. Irregular microscopic surface of the felt triggers coagulation by the blood trapped between the graft, aorta, and felt. The clot organized in this dead space also acts as a sealant. The felt strip covers the suture holes and potential sites of bleeding on both the aorta and graft. We believe that double-row from the felt strengthens the anastomosis, thereby, preventing postoperative pseudoaneurysms or dissection during the long-term follow-up. Although we used this modification of Teflon felt wrapping only in isolated ascending aortic surgery, it seems safe in other segments and major branches of the aorta.

In conclusion, we consider that this modification is a safe, reliable, and easily applicable anastomotic technique for aortic surgery patients.

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