Graft Intussusception Technique of Vascular Anastomosis

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We report our experience with the continuous mattress suture technique taught to surgical residents by Dr Peter C. Pairolero during his 30-plus years at Mayo Clinic. Similar techniques have been described by others.

End-to-end vascular anastomoses are commonly performed in cardiovascular surgery. A meticulous suturing technique is mandatory to achieve hemostasis and allow proper healing of the anastomosis. Two common techniques use a continuous suture line and include an over-and-over suture (ie, whip stitch, baseball stitch) and a mattress evertting suture [1, 2]. Herein, we report our experience with the continuous mattress suture technique taught to surgical residents by Dr Peter C. Pairolero during his 30-plus year career at Mayo Clinic. Similar techniques have been described by Rylski and associates [2, 3] and Tamura and colleagues [4]. The present technique represents a simple and safe option.

Technique

The technique places the graft inside the artery and a felt strip outside the artery. Both ends of a monofilament, polypropylene suture (usually 3-0 for aorta) are passed from inside to outside the graft and then from inside to outside the aorta, and then through the felt strip as a horizontal mattress suture (Fig 1A, steps 1 to 4). The two ends of this suture are tied to each other, keeping the lengths of the two ends of the suture equal (Fig 1B).

The suture technique moves along in an oblique mattress orientation. One end of the suture is passed from outside to inside the felt and then the aorta, about 5 mm from the felt and artery edges (Fig 2A, step 5). The advancing end of this suture is then brought from outside to inside the graft, about 5 mm from the graft edge (Fig 2A, step 6). Next, a circumferential advance of 2 mm to 3 mm along the artery is made, and the suture is passed from inside to outside the lumen of the artery and the felt, approximately 1 cm from the artery and felt edges (Fig 2A, step 7). The technique then repeats.
itself to create a running suture line (Fig 2A, steps 8 to 12). The first few throws of the sutures are kept loose initially to facilitate exposure. The far side of the suture line is completed first before changing over to the near side. The whole circumference of the anastomosis is completed in a similar fashion (Fig 1D).

The technique appears to be efficient, effective, and safe. The most recent 111 aortic operations with circulatory arrest done since 2008 required a mean of 20.6 ± 6.6 minutes (median 19; interquartile range, 16 to 23) of circulatory arrest time; 12 of the cases were acute (n = 11 ascending aorta dissection) with similar median and interquartile range circulatory arrest times. There were 6 patients (5.4%) who returned to the operating room for mediastinal hemorrhage, but none was related to the aortic anastomosis and none was in patients with acute ascending aorta dissection.

Comment

The described technique combines the speediness of a continuous suture with the buttress effect of a mattress suture, plus the graft is intussuscepted inside the lumen of the native vessel, creating a polyester sandwich around the artery. We have found this technique to be useful for vascular anastomoses of the aorta affected by all conditions including aortic dissection. We recommend the technique for any aorta to graft anastomosis.

References