

The use of a self-expanding ring to facilitate distal anastomosis in total arch replacement

Total ark replasmanında distal anastomozu kolaylaştırmak için kendiliğinden genişleyen halka kullanımı

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ABSTRACT

Providing exposure for distal anastomosis is sometimes challenging in total arch replacement via median sternotomy. A new self-expanding ring, which is contracted in diameter by catching two holes in the ring with a long curved-clamp, may provide better exposure, and facilitate the procedure. This contraction creates the tension needed for the ring to expand once delivered to the distal anastomosis when the clamp is removed. This ring can be placed easily, even in a deep surgical field, and can maintain free space around distal aortic stump.

Keywords: Distal anastomosis; self-expanding ring; total arch replacement.

When we perform total arch replacement through a median sternotomy, the distal anastomosis site is deep in the surgical field, making it difficult to maintain good exposure. Troublesome bleeding can also occur at that location. In addition, it is mandatory that the distal anastomosis be performed without injuring the surrounding organs, such as the esophagus or lungs. We previously described a simple method for exposing the distal anastomosis site using a ring-shaped, small, malleable retractor.^[1] Although this method provided excellent exposure, we found that it was not always easy to insert and adjust the retractor to obtain optimal exposure in the deep surgical field. Therefore, we developed a self-expanding steel ring that is easier to handle and deliver to the anastomotic site.

ÖZ

Median sternotomi ile total ark replasmanında distal anastomoz için görüş sağlamak bazen zordur. Halkadaki iki deliğin uzun, kıvrık ağızlı bir klemp ile yakalanmasıyla çapı daraltılan, kendiliğinden genişleyen yeni bir halka daha iyi görüş sağlayıp işlemi kolaylaştırabilir. Bu daralma klemp çıkarıldığında halkanın distal anastomoza bırakıldığında genişlemek için gereksinim duyduğu gerilimi oluşturur. Bu halka derin bir cerrahi alanda bile kolaylıkla yerleştirilebilir ve distal aortik güdük çevresinde boş alan sağlayabilir.

Anahtar sözcükler: Distal anastomoz; kendiliğinden genişleyen halka; total ark replasmanı.

TECHNIQUE

The new 1.5 cm wide ring is not malleable. It is cylindrical in shape and made of stainless steel. Thus far, we have three ring sizes which when fully expanded measure 4.0 cm, 4.5 cm, and 5.0 cm in diameter (T-T Ring, Matsuda Ika Kogyo Co., Ltd., Tokyo, Japan and Senko Medical Trading Co., Tokyo, Japan). Each of the rings can be reduced approximately 1.0 cm in diameter by using a long, curved clamp to grasp two holes in the ring (Figure 1a). Moreover, the ring has a narrow part (one-fourth of its circumference) so that it can be easily contracted via the same clamp. The compression created by the clamp produces the tension needed for the ring to expand once it is



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Figure 1. (a) The diameter of the ring is contracted by grasping two holes with a curved clamp. (b) The ring can be expanded by releasing the curved clamp.

delivered to the site of the distal anastomosis after the clamp is removed (Figure 1b). This self-expanding ring can be placed more easily, even in a deep surgical field, than the malleable retractor, and they are similar in size. With the ring expanded to its original size, it is possible to maintain free space around the distal stump of the aorta, which facilitates the procedure (Figure 2). After completing the distal anastomosis, the ring can then be easily removed along with the graft.

Even though thoracic endovascular aortic repair and open stent-grafting techniques have recently become popular,^[2,3] total arch replacement is still necessary for patients with an arch aneurysm or type A aortic dissection. Several techniques for performing this procedure have previously been documented.^[4-6] Performing a precise distal anastomosis is critical in total arch replacement surgery because of the difficulty in controlling the bleeding from this site and the risk of a potentially fatal infection if there is an injury to the nearby esophagus or lung. While the malleable ring is still useful in some cases, we were challenged to develop an alternative because it was difficult to insert and make adjustments in the size. Hence, our new self-expanding ring addresses these drawbacks with its contractibility for ease of placement and self-expandability once delivered to the anastomotic site.



Figure 2. A surgical view of the self-expanding ring around the distal stump of the total arch replacement. The free space around the distal stump of the aorta facilitated the distal anastomosis.

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