Valve sparing ascending and transverse aorta aneurysm repair with mild hypothermia in Takayasu arteritis

Takayasu arteritte hafif hipotermik koşullarda aort kökü tamiri ve arkus aorta replasmanı

Aortic valve sparing procedures are designed to restore aortic valve competence by excising the dilated aortic root, replacing it with an appropriately sized cylindrical polyester graft, sutured either below the valve annulus or above the leaflet attachments as well as reimplantation of the coronary ostia (1, 2). The goal of these demanding and geometrically difficult procedures is to preserve the native valve, avoid life-long anticoagulation, and restore normal valve function by recreating the normal anatomic root environment.

A 28-year-old female patient was diagnosed with Takayasu arteritis for 9 years with aneurysm of the ascending and transverse aorta and $^3/_4$ degree aortic regurgitation whose native aortic valve was spared. Aortic root, ascending aorta and hemi arch replacement was performed through median sternotomy using cardiopulmonary bypass (CPB). Modified David's technique, with the creation of a neosinus (2) using greater Dacron tube size was used as described in the literature (Fig. 1).

A 32^{o}C mild hypothermia (MH) as a new concept for brain protection was used to avoid the negative side effects of deep hypothermia for aortic arch repair (4). The postoperative course was uneventful. The patient was extubated after 2 hours and had chest tube drain of 450 ml/24 hours. The postoperative TEE and transthoracic echocardiography at the 1-year follow up showed no regurgitation of the aortic valve. The mean valve gradient amounted to 2.6 mmHg.

Classic aortic valve sparing procedure, also called "David's" technique, maintains valve competence by downsizing the sinotubular junction and sinuses, allowing the aortic cusps to centrally coapt (1). The disadvantages of this technique are cusp abrasion to the Dacron graft, abnormal stress of the cusps during opening and closing due to lack of Valsalva sinuses and systolic elastic expansion of the aortic root (2). As published in the literature, greater physiological valve opening and closure times can be found using our neosinus technique, which may result in decreased leaflet stress and abrasion between leaflet and tube wall avoided (2).

The extensive cooling and rewarming periods for aortic arch repair in deep hypothermia, not only extend the already long CPB and operative times but also increase CPB related negative side-effects (hemolysis, platelet dysfunction, coagulation disorder, impaired cerebral autoregulation and brain edema (4,5). The advent of antegrade cerebral perfusion (ACP) provides physiologic antegrade blood supply to the brain. With adequately preserved cerebral blood flow, it is possible to perform proximal arch reconstructions with a more physiologic temperature level, so that the advantage of ACP is not attenuated by the drawbacks of the deep hypothermia. A 32^{o}C MH management was used in this case for hemiarch replacement and the pressure of left radial artery continuously monitored during cerebral perfusion, showing that sufficient pressure is provided at the contralateral side of the brain by clamping all supraortic vessels due to open collateral arterial system in MH conditions (5). In particular with Takayasu disease it may be more important to use MH management during arch repair, because of the inability of the intracranial vessels to adapt to cooling and rewarming or hypo and hypertension. The brain's autoregulation may be severely impaired due to cooling because of reduced vessel wall compliance, stenosis and dilation, even in the same vessel territory (3). These factors necessitate the performance of such operations under more improved conditions, and thus we used the previously described management technique in this case.

Bentall's procedure in combination with deep hypothermia for this procedure would be used generally by cardiac surgeons worldwide. In our opinion, this case is an example, which shows the tendency to perform more reconstructive surgery of the aortic valve and new trends in the management of brain protection for the surgery of the aortic arch even in complex cases.

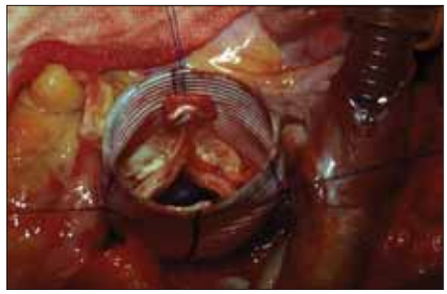

Figure 1. Operative situs after insertion of the Dacron tube and resuspension of the aortic valve before implantation of the coronary ostia

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Düzeltme / Erratum

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