

EXTRA-AORTIC

Contributed by Valerio Valentini

If Depeche Mode was being piped through the OR speakers while you were a resident you probably witnessed the adoption of a standardized method for mitral valve surgery, popularized by Dr Alain F. Carpentier. Most would agree that the efforts to make mitral valve repair available to the cardiac surgeon population at large also made the treatment of mitral valve disease available to a patient population much larger than ever before. Aortic annuloplasty has the possibility of doing to aortic valve repair today that which was done to mitral valve repair 20 to 30 years ago.

The experience obtained in mitral valve repair over the last 30 years has made mitral valve sparing surgery the treatment of choice for dystrophic mitral insufficiencies. The attraction to this technique lies simply in the possibility for the patient to avoid anti-coagulants and the reduction of the risk of complications due to thromboembolic events and endocarditis associated with the implantation of a prosthetic valve. The key to valvuloplasty

The key to the widespread adoption of mitral valvuloplasty was the mitral annuloplasty ring. With its creation surgeons were introduced to a method of patient selection, valve performance assessment, prosthetic ring choice and implantation that effectively standardized the surgical technique, thus making it accessible to surgeons all over the world, in first and third-world nations alike. Now, the success of mitral valve repair and recent gains in the understanding of aortic valve dynamics has renewed interest in aortic valve sparing techniques for dystrophic diseases of the aortic root and/or aortic valve.

The dystrophic disease of the aorta at the aortic valve could be divided into two convenient categories. The first category is characterized by an aneurysm of the sino-tubular junction, the sinuses of Valsalva, and a dilation of the aortic root causing an aortic insufficiency. The second category is characterized by isolated dilations of the sino-tubular junction and the aortic root without dilation of the sinuses of Valsalva. These classifications are selected simply for the manner in which they are treated. In rough terms, the first case will see the replacement of the aneurysmal tissue with a prosthetic aortic conduit and the second will not.

It becomes immediately evident that whereas in the first category the dystrophic diameters of the aortic valve can be corrected say, if one were to do a DAVID procedure (except the DAVID 2), the second category will suffer from the lack of equally positive controls for the critical aortic diameters that are the aortic root and sino-tubular junction. Additional shortcomings creep in when we remember that currently available woven PET aortic conduits have an exceedingly high stiffness and do not match the natural expansion and contraction of native aortic and aorto-ventricular tissue. For these reasons (among many others) we introduce the external aortic annuloplasty ring, the CORONEO EXTRA-AORTIC. External aortic support

The EXTRA-AORTIC annuloplasty ring supports dystrophic aortic tissue by being mounted on the outside diameter of the aorta, around the dilated aortic diameters. The ring is elastic and thus allows the tissues to expand about 10% between diastole and systole. The rings were designed and carefully analysed using numerical methods and are made available in 6 sizes representing the installed, normal diastolic pressure diameters 23, 25, 27, 29, 31 and 33 mm. In-vivo testing has demonstrated that the ring maintains its elasticity long after tissue ingrowth into the PET fibers of the expansible sheath around the elastic cores of the annuloplasty ring.

The EXTRA-AORTIC annuloplasty ring is mounted on the outer wall of the dilated aorta as a hoop and, unlike similar devices mounted in the bloodstream, supports the aortic pressure directly and not through the attachment sutures. This presents a tremendous advantage by reducing the stress concentrations in the aortic wall and supporting it through intimate contact. Since the attachment sutures do not carry any significant load you need only apply a sufficient number to prevent migration of the ring. Aneurysmal root or isolated dystrophy

The EXTRA-AORTIC annuloplasty ring is available in two different styles suited to either a remodelling style procedure for aneurysmal roots or a double annuloplasty procedure for isolated dystrophy of the STJ and the aortic base. For the remodelling procedure the annuloplasty ring is a full hoop with no junction that can be installed once the coronaries are detached from the sinuses of Valsalva. For isolated dystrophic disease the coronaries are not detached during surgery so the ring comes in the form of a band that can be joined after being slipped through the dissected space under the coronaries.

A very detailed account of the standardized surgical technique being used a randomized prospective clinical trial CAVIAAR can be found on the MMCTS website.

The CAVIAAR trial seeks to compare the outcome aortic valve repair against the outcome of its replacement by a mechanical bileaflet valve. The clinical trial is currently underway in France, although there is interest in expanding the trial outside of France. If your medical center is interested in participating in the CAVIAAR clinical trial, please contact the

promoter.

The Extra-Aortic Ring has received CE Mark approval, however is currently not available in the United States of America.