OPERATIVE TECHNIQUES IN THORACIC AND CARDIOVASCULAR SURGERY
A COMPARATIVE ATLAS

Mitral Annuloplasty Using A Biodegradable Annuloplasty Ring

Sanjay Cherian, MBBS, MS, FRCS, PhD, MBA*, Mustafa Cikirikcioglu, MD, PhD, FETCS, Burak Can Depboylu, MD, Jalal Jolou, MD, Afksendiyos Kalangos, MD, PhD, FETCS, DSci(Hon)
Division of Cardiovascular Surgery, University Hospital and Medical Faculty of Geneva, Geneva, Switzerland

Open Archive PlumX Metrics

DOI: https://doi.org/10.1053/j.optechstcvs.2011.09.005

Article Outline

Keywords:
Annuloplasty ring, biodegradable, mitral annulplasty

With the advent of several valve repair techniques, mitral valve repair is now preferred over mitral valve replacement as the treatment of choice for several mitral pathologic conditions. Because annular dilation is a vital component in most cases of chronic mitral regurgitation (MR), annular support is necessary to provide adequate repair and optimum long-term results.[1] Annular reinforcement permits shrinking of the dilated annulus, allowing adequate coaptation of the valve leaflets, thereby preventing recurrent dilation.[2]

It is vital to bear in mind that the mitral annulus is a dynamic structure that is flexible and changes shape throughout the cardiac cycle,[3] assuming a 3-dimensional "saddle-shape"[4] that reduces mechanical stress on the leaflets. Although for surgical purposes, the mitral annulus is considered the area of attachment of the valve leaflets to the atrial muscle, the firmest site of support for the mitral valve is in the region of the fibrous continuity between the aortic and mitral valves, the extent of which is delineated by the right and left fibrous trigones.[5]

Although traditionally available rigid, semirigid, and flexible rings meet the demands in adults, they do no permit growth of the native mitral annulus in children.[6] Furthermore, anticoagulation is required following annuloplasty with the conventional rings to prevent thromboembolic complications.[7]

Recent advances in biotechnology have enabled the development of a novel biodegradable annuloplasty ring made of 1,4-polydioxanone polymer that undergoes degradation by hydrolysis over a period of 6 months, triggering a controlled inflammatory response that induces the formation of fibrous scar tissue.[8]

Our group had earlier published experimental findings of this new biodegradable Kalangos annuloplasty ring (Parvulus, Lonay, Switzerland) (Fig. 1).*,[9] Following approval for clinical application, these rings were implanted in patients with MR secondary to various mitral pathologic conditions.[6, 9] Unlike conventional annuloplasty rings that are sutured directly "onto" the mitral annulus, this biodegradable ring is inserted "into" the annulus within the subendocardial plane. In addition to providing annular support in the immediate postoperative period owing to its