

MEDICAL PHILATELY

Percutaneous Heart Valve Implantation

Jayant Pai-Dhungat



Self-expanding nitinol frame and three cusps of aortic valve. Top shows catheter based delivery system. Stamp Israel 2013

Efforts to develop and refine percutaneous catheter-based procedures for cardiac valve repair and replacement have advanced over the past several years. Such clinical strategies were initiated as early as in the 1950s with the introduction of simple catheter devices for treating pulmonary stenosis. Treatment of stenotic lesions matured in the early 1980s with the advent of balloon valvuloplasty, which became the predominant therapy for pulmonary, mitral and aortic stenotic lesions. However, percutaneous balloon valvuloplasties yielded largely unfavorable results and are now seldom performed because of their short-lived benefits. But these techniques also showed that it is possible to reach the heart valves from both the antegrade and retrograde direction, and that one can use different balloon systems mounted on one or two guide-wires, double balloons, or special types of balloon.

Catheter valve procedure for aortic stenosis was developed in France, initially performed in 2002 on April 16 by



Cadaver Dural valve for replacement by open heart surgery invented in Brazil, Brazil-2004

Prof. Alain Cribier in Hospital Charles Nicolle, at the University of Rouen. It is now approved in more than 50 countries and is effective in improving functioning in the patients with severe aortic stenosis. Percutaneous valve implantation is mainly a development of a foldable heart valve that can be mounted on an expandable stent, delivered percutaneously through standard catheter-based techniques and implanted within a diseased valve annulus (see Israel stamp). In cases with severe aortic stenosis the diseased valve has to be pre-dilated. It is imperative that an implant has a fixed and stable intraluminal position, that provides adequate hemodynamics, and in the case of an aortic valve, that it does not compromise coronary arteries.

Percutaneous valve replacement and repair in valvular heart disease is now one of the fastest developing areas of cardiology. Transcatheter aortic and pulmonary valve replacement

and a variety of mitral valve therapy approaches have been successfully performed in hundreds of patients. A number of problems encountered with the technique or with specific devices are being solved. So far these procedures have been shown to be safe; the risk of embolization is low, and complications arising from catheter use (dissection, perforation, tears, dislocation and bleeding) are uncommon.

A catheter-based valve implant as an alternative to surgery could significantly reduce morbidity and mortality. Recent reports indicate that endovascular procedures may provide an alternative to open heart operations. In addition, a less invasive therapy might permit treatment of valvular heart disease at an earlier stage and thereby prevent early onset of ventricular dysfunction. Patients also show a strong preference for minimally invasive therapies in general. Hence successful use of percutaneous approaches to valve replacement and repair could have a substantial positive economic impact, by virtue of the associated reductions in ICU and hospital stays. Potential benefits of these innovations may result in a paradigm shift, challenging surgical treatment for valvular heart diseases. However, valve durability remains unknown and long term follow-up to show the safety and effectiveness of this new treatment modality is absolutely necessary.