ELSEVIER

European Journal of Cardio-thoracic Surgery 26 (2004) 873–874

EUROPEAN JOURNAL OF CARDIO-THORACIC SURGERY

www.elsevier.com/locate/ejcts

Editorial

Direct percutaneous valve replacement: the next step?☆

Percutaneous valve replacement has been advocated for quite some time and a PubMed search with the term 'percutaneous valve replacement' provides at the time of writing 356 hits out of which about 25 focus on this procedure [1–3,5,6]. Various routes for delivery of the valved devices have been proposed mainly in function of the target position of the implant [4]. In the clinical setting, these include remote access through peripheral arteries or veins for both, right (1) and left (2) sides. However, those of us who are involved in endovascular aneurysm repair (EVAR) know very well, that peripheral vascular access is a major issue for insertion of larger introducer systems. Although there are ways around the limited size admitted for insertion through peripheral vessels, like trans-aortic insertion [3] or in situ introducer sheath dilatation [7], remote access has a number of other limitations. As a matter of fact, valved stents inserted from the groin, have to travel over a long endo-vascular path in order to reach the target zone. The latter is preferably at the level of the annulus of the native or prosthetic valve, which has to be replaced, in order to achieve good sealing.

Long delivery systems, are not only cumbersome to handle, but must be relatively flexible for steerability. This in turn limits their resistance to torque, increases the risk of kinking, provides more resistance to unloading, and makes it delicate to keep the tip with the valved stent at a certain position in reliable fashion if the blood streams at full flow. Additional hurdles to percutaneous valve replacement with remote access can be expected in the presence of access vessel tortuosity and peripheral vascular disease, which are frequent in elderly patients who might benefit most from an expeditious procedure.

Of course orthotopic implantation of valved stents with direct access to the heart is also feasible. Full sternotomy, working heart, and trans-apical access have been used for insertion of valved stents in pulmonary as well as aortic positions. Direct access to the heart has a number of advantages over remote access, including shorter delivery systems, which accept almost any device diameter. This in turn allows for implantation of superior devices (less need for extremely thinned out components) as well as superior delivery system tip control, improved precision of device positioning, and overall ease of implantation.

On page 1044 of this issue, Malgorzata Pawelec-Wojtalik and colleagues report on a hybrid approach for percutaneous valve replacement based on trans-apical insertion of a valved stent which can be realized either through an epigastric or a thoracic mini-incision [8]. The innovative step in their approach is not just a smaller skin incision to access the apex of the heart through which a sutureless valve can be delivered, but the concept of using a closure device for sealing the orifice created in the wall of the heart.

There are a number of issues to be resolved prior to routine clinical application of the proposed approach. These include per-procedural troubleshooting, determination of device blow-out pressures, quantification and limitation of blood-loss, back-up procedures, etc. However, direct access percutaneous valve replacement may well be the next step, in this rapidly evolving field of care.

References

[1] Bonhoeffer P, Boudjemline Y, Saliba Z, Merckx J, Aggoun Y, Bonnet D, Acar P, Le Bidois J, Sidi D, Kachaner J. Percutaneous valve replacement of pulmonary valve in a right-ventricle to pulmonary artery prosthetic conduit with valve dysfunction. Lancet 2000;356:1403–5.

[2] Cribier A, Eltchaninoff H, Bash A, Borenstein N, Tron C, Bauer F, Derumeaux G, Anselme F, Laborde F, Leon MB. Percutaneous transcatheter implantation of an aortic valve prosthesis for calcific aortic stenosis: first human case description. Circulation 2002;106:3006–8.

[3] Lutter G, Kuklinski D, Berg G, von Samson P, Martin J, Handke M, Uhrmeister P, Beyersdorf F. Percutaneous aortic valve replacement: an experimental study. I. Studies on implantation. J Thorac Cardiovasc Surg 2002;123:768–76.

[4] Corno F, Zhou J, Tozzi P, von Segesser LK. Off-bypass implantation of a self-expandable valved stent between inferior vena cava and right atrium. Interact Cardiovasc Thorac Surg 2003;2:166–9.

☆ Please read the corresponding How-to-do-it article on pp. 1044–6 of this issue, to which this Editorial refers.

1010-7940/$ - see front matter
doi:10.1016/j.ejcts.2004.09.002

[5] Zhou JQ, Corno AF, Huber CH, von Segesser LK. Self-expandable valved stent of large size: off-bypass implantation in pulmonary position. Eur J Cardiothorac Surg 2003;24:212–6.
[6] Huber CH, Tozzi P, Corno AF, Marty B, Ruchat P, Gersbach P, Nasratulla M, von Segesser LK. Do valved stents compromise coronary flow? Eur J Cardiothorac Surg 2004;25:754–9.
[7] von Segesser LK, Marty B, Tozzi PG, Corno A. In situ introducer sheath dilatation for complex aortic access. Eur J Cardiothorac Surg 2002;22:316–8.
[8] Pawelec-Wojtalik M, Anatosik P, Wasiatycz G, Wojtalik M. Use of muscular VSD Amplatzer occluder for closing right ventricular free wall perforation after hybrid procedure. Eur J Cardiothorac Surg 2004; 26:1044–6.

Ludwig K. von Segesser*
Department of Cardiovascular Surgery, Centre Hospitalier Universitaire Vaudois, CHUV, Rue du Bugnon 46, CH-1011 Lausanne, Switzerland

*Tel.: +41 21 314 2279; fax: +41 21 314 2278.
E-mail address: ludwig.von-segesser@chuv.hospvd.ch;
Web address: www.cardiovasc.net