Suture less aortic bio prostheses a reliable tool for AVR in high risk patients

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Background: Surgical aortic valve replacement whether mechanical or biological valves is the treatment of choice in patients with severe symptomatic aortic valve stenosis (< or equal to 0.61 cm(2)/m(2)) or with left ventricular dysfunction, advanced age with severe comorbidities. As a matter of fact, bioprosthesis of both types, Sutured and Sutureless aortic valve, last is a new prosthesis and promising tool because it provides excellent early and long-term clinical outcomes in terms of potential hemodynamics, valve durability, and freedom from valve-related complications. Theses valves were designed to be less obstructive, and thus result in a lower transvalvular gradient. Technically the implantations of these valves are more demanding resulting in longer cross clamp and bypass times. Sutureless aortic bioprosthetic valves, introduced in clinical practice in 2009. Suture technique is of two types, contrary to the conventional surgical technique for implantation (conventional interrupted or continuous sutures, after thorough annular decalcification). Numerous advantages such as simple, quick, and effective with regard of continuous. However, important comorbid conditions in elderly patients referred for aortic valve replacement require alternative treatment options with possible reductions of the extracorporeal bypass time and reliable hemodynamic features. In order to comply with these requirements, percutaneous valves and sutureless surgical valves have been developed. The percutaneous technique has the advantage of being performed without circulatory bypass but leaving the aortic calcifications in place, thereby resulting in a high degree of paravalvular insufficiency, atrioventricular block and strokes. However, it requires cardiopulmonary bypass. In addition, it can be performed with a lower mortality (<3% in isolated aortic replacement, even in older patients). This article reviews the various techniques, strength and limitations of these sutureless valves implanted in the aortic position.

Methods: Comparing intraoperative data, postoperative clinical outcomes, and echocardiographic results from patients receiving 3f Enable, Perceval S and Intuity, randomized study trials showed a hemodynamic advantage for stentless valves, but several could not reach a significant level three devices are currently available. The 3f Enable (ATS, Minneapolis, USA) and the Perceval S (Sorin Group, Saluggia, Italy) have a CE mark, whereas the intuity (Edwards Lifesciences, Irvine, California) is still under investigation. We present the above valves, focusing on the Perceval S. The Sorin Perceval S is a biologic pericardial aortic valve assembled in a metal super elastic alloy stent and implanted in the aortic root without the need of suturing. The design of stentless valve prostheses is intended to achieve a more physiological flow pattern and superior hemodynamics in comparison to stented valves.

Results: Between January 2010 to June 2010, 134 patients with aortic valve stenosis underwent aortic valve replacement alone or with other concomitant cardiac procedures including mitral valve surgery in our hospital. Baseline patient characteristics were similar in both groups. The patients were randomly divided into two groups: Ninety-Seven patients (67%) in the P group and 37 patients (59.5%) in the E group (P = 0.24) underwent minimally invasive AVR with either minirsternotomy or right anterior minithoracotomy approach. There were no statistical differences between two groups in age, sex, body surface area, concomitant cardiac procedures, blood loss, and postoperative extubation time., aortic cross-clamp time was 31 ± 12 minutes in the P group and 53 ± 25 minutes in the E group (P < 0.0015), survival was 97% (one death in the P group). In five patients (P group = 1, E group = 4), a moderate paravalvular leak was present.

Conclusions: This new technology may offer improved results. Cost-effectiveness and fine-tuning of patient selection are two aspects that future investigation should address. The sutureless Perceval S aortic valve is hemodynamically excellent and a safe prosthesis in selected patients due to a simple and fast implantation technique. Aortic valve replacement with sutureless aortic bioprosthesis is feasible, also with a minimally invasive approach. The Perceval S showed lower operative times and moderate paravalvular leaks and lower mean transvalvular gradients than did the 3f Enable, related to the larger diameter of the Perceval S implanted. Both prostheses showed an excellent hemodynamic performance. This new technology needs long-term follow-up.

Biography
Hatem Al-Masri is a cardiac critical care intensivist and consultant of cardiac surgery. Dr. Al-Masri completed his medical degree (M.D.-doctorate) at Charles University – Faculty of Medicine, holds a degree in biochemistry from the University of Waterloo - Canada, completed his residency training in Germany (Leading Facharzt) and holds training fellowships in Cardiovascular Surgery from IJN KL Malaysia, Switzerland, and Canada. Dr. Al-Masri is the author of an award-winning medical research paper titled “Hemodynamic Support Requires Integrated Approach Comparing pl.VAD vs. IABP in Patients Experiencing Left Ventricular Failure” (Best Paper of Young Cardiac Surgeon) at the 8th International Congress of Update in Cardiology and Cardiovascular Surgery (UCCVS 2012) awarded by European Society for Cardiovascular Surgery, World Society of Arrhythmias (WSA ) and the Society of Cardiology and the International Academic of Vascular and Endovascular Surgery (ISCP). Dr. Al-Masri is a member of the Medical German Association, Malaysian Medical Association and the Saudi Medical Council.