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Titre et résumé de la thèse – Title and abstract of the thesis

Invasive Cardiology and Valvular Heart Disease – The Evolution of an Alternative Treatment Approach

Although less common in industrialized countries than coronary artery disease, heart failure, or hypertension, valvular heart disease (VHD) is frequent and of utmost clinical relevance since it often requires intervention as only effective treatment option. Aortic stenosis (AS) and mitral regurgitation (MR) are the most prevalent valve diseases of the elderly. Tricuspid regurgitation (TR) is the second most common valvular regurgitation after MR. Decision-making for intervention is complex, since VHD is often seen at an older age and, as a consequence, there is a higher frequency of comorbidity, contributing to an increased risk of intervention. In fact, in the past many patients with symptomatic VHD have been denied open heart surgery for their high surgical risk based on advanced age and comorbidities. During the last two decades, new transcatheter interventional techniques have been developed to provide effective treatment to VHD patients, offering a minimal-invasive procedure at lower risk than surgery. The introduction of transcatheter aortic valve replacement (TAVR), percutaneous mitral valve repair (PMVR) as well as transcatheter tricuspid valve interventions (TTVI) in clinical practice have widened options for symptomatic patients with VHD.

In order to offer individualized treatment, patients are nowadays assessed by heart teams and divided into different risk categories according to their age and comorbidities. Although entailing several limitations in predicting operative mortality and morbidity, risk scores (e.g. EuroSCORE, STS-PROM) are currently used to allocate patients different treatment strategies (open heart surgery vs. TAVR).

20 years ago, the journey of transcatheter valve therapy started with treatment of patients deemed inoperable or at very high surgical risk. Since, device techniques have remarkably evolved leading to an expansion of minimally invasive interventions across the risk strata.

While PMVR is currently performed in elderly or high-risk patients, particularly TAVR is increasingly used in lower risk patients both in Europe and in the USA offering a safe and effective alternative to open heart surgery. TR repair during left-sided valve surgery is well established. However, isolated open TR repair is associated with increased mortality. Moreover, an increasing number of patients with MR deemed inoperable have also TR. For these patients TTVI offers a safe and effective alternative to open heart surgery.

Atrial fibrillation (AF) is the most common cardiac arrhythmia generating a major impact on global health care and carries a heavy economic burden. AF can lead to heart failure and stroke and has a high prevalence in VHD. While oral anticoagulation mitigates stroke risk, it significantly increases bleeding events. Left atrial appendage occlusion, which can be performed minimal-invasively, reduces the risk of AF-induced stroke and bleeding complications and therefore represents a valuable alternative to oral anticoagulation in patients with high bleeding risk.

Despite the success story of transcatheter treatment techniques, open heart surgery is still the preferred treatment option for many patients. Meticulous risk assessment and preprocedural planning is therefore crucial in order to offer individualized treatment to VHD patients. Also, future trials will be needed in order to improve patient selection and specific treatment allocation.

„Der Anfang vom Ende“ Ist die Zeit der offenen Herzchirurgie zur Behandlung der Aortenklappenstenose abgelaufen?

Vor ungefähr 20 Jahren hat der perkutane Aortenklappenersatz die Therapie der Aortenklappenstenose und damit die invasive Kardiologie revolutioniert. Die Aortenstenose entsteht durch einen jahrelangen Degenerationsprozess, welcher zu einer Einengung der Aortenklappe führt und so den Auswurf des Blutes vom linken Ventrikel in die Aorta behindert. Zur Behandlung wird die defekte Aortenklappe durch eine Prothese ersetzt. Bis vor ca. 20 Jahren konnte der Eingriff nur am offenen Herzen vorgenommen werden. Aufgrund der Risiken dieses Eingriffes konnten viele ältere und multimorbide Patienten nicht behandelt werden. Durch die Entwicklung und Perfektionierung des minimal-invasiven, perkutanen Aortenklappenersatzes wurde die Therapie nicht nur dieser Patientengruppe zugänglich. Heutzutage wird die Aortenklappe auch immer mehr Patienten mit niedrigem Risiko perkutan ersetzt.

Diese Vorlesung soll einen Einblick in die Eingriffstechniken, deren Vor- und Nachteile und einen Ausblick in die Zukunft der Behandlung der Aortenklappenstenose gewähren.