Université catholique de Louvain UCL SECTEUR DES SCIENCES ET TECHNOLOGIES

INSTITUTE OF MECHANICS, MATERIALS AND CIVIL ENGINEERING

Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences de l'Ingénieur

Monsieur Xavier BOLLEN

Master ingénieur civil électromécanicien

Design of a device for minimally invasive aortic valve resection

The increase of life expectancy in Western countries over the past 30 years has resulted in an exponential increase of elderly patients presenting for cardiac surgery. In this population, aortic stenosis is the most important acquired heart disease, with a prevalence of 4.8% in patients aged over 75 years. Despite the good results with conventional aortic valve replacement in elderly patients, many patients are denied surgery because of the high operative risk. In this frail population, transcatheter aortic valve implantation (TAVI) can be a good compromise to achieve good results and minimize morbidity and mortality. This technique allows the implantation of an expandable bioprosthesis without the resection of the native aortic valve. Several complications have been described as a consequence of the residual highly calcified valve being squeezed between the aortic wall and the stent of the implant. To avoid those complications, it is necessary to resect the aortic valve before TAVI.

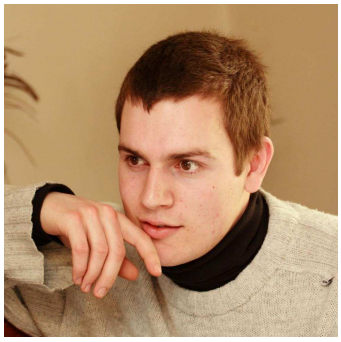
Starting from the initial need asked by the surgeon – design a device for minimally invasive aortic valve resection – this thesis firstly focuses on a detailed study of the heart, the pathology of calcific aortic stenosis and its different current medical treatments.

The clarification of the task starts with the analysis of the need and the functional analysis of the need leading to the establishment of the functional specifications. Then, the choices for the different function from the functional specifications are performed. The conception of the different subsets of the solution follows a traditional design method, until the realization of demonstrators.

A clinical trial on patients undergoing open heart surgery ends this work and validates the concept of the final solution. Finally, some prospects are given to improve the device before its marketing thanks to the results achieved throughout this work.

Jeudi 23 juin 2016 à 16h30

Auditoire BARB 94
Place Sainte Barbe, 1
1348 Louvain-la-Neuve



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