



**ULBS**

Universitatea "Lucian Blaga" din Sibiu



Interdisciplinary doctoral school

Field of doctoral studies: Medicine

Doctoral thesis

**NEW PERSPECTIVES IN ENDOVASCULAR  
TREATMENT OF AORTIC DISSECTIONS**

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SIBIU 2017

# **SUMMARY: NEW PERSPECTIVES IN ENDOVASCULAR TREATMENT OF AORTIC DISSECTIONS**

**Key words:** type B aortic dissection, aortic remodeling, true lumen, false lumen, multilayer stent, CFD analyse.

An aortic dissection is a serious condition in which the inner layer of the aorta, the large blood vessel branching off the heart, tears. Blood surges through the tear, causing the inner and middle layers of the aorta to separate (dissect) and create 2 lumens- the true lumen and the false lumen.

Acute aortic dissection is a lethal condition and those who survive to this episode will develop chronic aortic dissection. The incidence is 3 cases in 100000 patients.

The prognostic for the untreated aortic dissection is bad, but depends on the type of aortic dissection and the complications. Regarding ascending aortic dissection the mortality is high in the first 24 hours-60%, in first week-75% and at 3 months-90%.

For aortic dissection and type B aortic dissection the best examination regarding the extension and the origin of visceral branches is the CT with contrast. Surgical indication is necessary for every dissection which involves the ascending aorta. This is a surgical emergency which has to be performed as soon as the diagnostic is established. Regarding type B aortic dissection the surgery has to be done only if it is complicated.

The endovascular treatment of type B aortic dissection is necessary when the images reveal aortic rupture and clinical evaluation shows visceral malperfusion, or hemodynamic instability (uncontrollable hypertension or severe hypotension), or refractory pain with maximal analgesic treatment. In most of the treatments the goal is to close the entry tear with a stent graft in order to stabilise the visceral and distal perfusion and to obtain the reexpansion of the true lumen.

In this study I want to underline that aortic dissection is a serious condition in the cardiovascular field, is a life-threatening condition uncompletely understood and described which affect seriously the individuals life because of the majore risc of rupture. As reported in IRAD (International Registry of Aortic Dissections) without treatment 50% of patients die in every 48 hours.

The aim of this study is to analyze the patients diagnosed with type B aortic dissection or residual dissection treated with the new generation of multilayer endografts to prove the safe and efficacy of this device on medium and long term.

Till now there are some publication proving the efficacy and safety on short term. In these publications were not reported complications such as stroke, paraplegia, renal insufficiency, and the visceral and renal branches are patent.

These new generation of multilayer endografts laminate the flow inducing a positive effect on the dissected vessel wall. The multilayer flow modulators laminate the flow, reduces shear stress, induces thrombus formation in false lumen with maintaining the patency of branches without affecting the visceral perfusion. This device has a high radial force which helps to obtain a complete expansion of the stent combined with an extraordinary compliance at the level of renal arteries for a better adaptation.

This study is a monocentric prospective study which analyze 23 patients with thoracoabdominal dissection type B Stanford and treated with this new generation of endografts between april 2014 and 2019. The study group includes both male and female patients with the age between 27 and 72 at the moment of treatment.

The main objectifs of this study are:

- to prove the safety and efficacy of this device on medium and long term in complicated Type B aortic dissection;
- to analyze the modifications induced by the device in true and false lumen and the behavior of treated aorta after procedure;
- to show how laminates the flow;
- to establish the corelations between the CT scan modifications and datas obtained in CFD in cardiovascular field;
- to observe the modifications in of the flow in target organs.

In fact there are lots of controversies regarding the best treatment in this pathology, but the multilayer flow modulator seems to offer a new perspective in this problem. Unlike traditional stents this endograft is able to maintain the perfusion of the covered branches. This is why there are no major adverse effects, the perioperative trauma is minimal and the recovery short.

The CFD analysis proves the fact that this device reduces the velocity and induces the false lumen thrombosis.

The increase of true lumen with the decrease of false lumen are positive results, which sustain the remodeling and healing of the aorta. Remodeling of the aorta is sustained by the length and volume substantially reduction and the decrease of false lumen index.

The increase of true lumen with the decrease of false lumen reduces shear stress which plays an important role in the process of endothelialisation of this device which is happening in the same time with the thrombosis of the false lumen. This process starts right after the procedure and is time depending.

Even the study group is small these are the conclusions:

- the positive effect which is sustained by the modifications at maximal compression plane (PMC) induced in false and true lumen;

- the increase of true lumen with simultaneous decrease of the false lumen.

This series proves that this novel technique using the MFM for complicated TBAD is safe, effective, reproducible and with high rate technical success. No death related to this device was reported, low reintervention rate with no late complication of the aortic disease or organ failure on midterm. All the covered branches are still patent even they were covered by the device.

This ability of treating the whole aorta in one surgery time with no major complications is unique and extraordinary and so necessary in the management of aortic dissection.

The modifications induced by this graft determine a healing reaction of the aortic wall because of the endothelialization of this device which is time-dependent. This phenomenon put together with individual factors and the remodeling process which differ from one patient to another can identify in the future small groups of patients who respond quickly to this treatment. All of this are necessary for the personalized treatment of patients.





