


Non compliant Endografts for TEVAR and EVAR Have a Detrimental Effect on Systolic Blood Pressure and Cardiac Function; Compliant Endografts are the Remedy

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Compliant Endografts

Endovascular Treatment of Aortic Aneurysms, Dissections and traumatic transections are approved treatments of those conditions. Perioperative mortality and morbidity are much less significant than open, classical surgical procedure. in the long term, patients over 65 years of age keep the advantage of the endovascular procedure over time.


In younger patients the need for secondary procedures after endovascular treatment are more frequent, but most of them are done as a minimally endovascular procedures.



Compliant Endografts

Very soon we became aware than treating aorto-aortic infrarenal cases, some cases resulted in endoleaks from the distal end. After unsuccessfully treating a bifurcated infra-renal aneurysm, an aorto-uni-iliac graft was adopted, finishing the procedure occluding the contralateral common iliac artery and doing a femoro-femoral bypass.

Lately we found that Volodos in Ukraine treated a thoracic aortic trauma before we started. Probably because of the lack of communication and persistence in doing several procedures, his efforts were not acknowledged. He attempted to treat an abdominal aortic aneurysm, but he failed.



Compliant Endografts

After spreading the procedure worldwide, visiting 62 countries myself, several companies started to produce commercial devices. Branches and fenestrations soon appeared which allowed to extend the indications to thoraco-abdominal aneurysm and arch pathology.




Compliant Endografts

In spite of all the excitement in few years we learnt that implanting a semi-rigid endograft into an elastic aorta produced undesirable consequences.

The rigidity of the thoracic aorta after implanting an endograft increased about 5 times compared with the normal one.

The consequences of the increased rigidity were soon apparent. Systolic pressure increased significantly because the lack of compensation by expansion of the elastic aorta. Diastolic pressure decreased also significantly because the lack of contraction of the aorta in diastole.



Compliant Endografts

We learnt about the bad consequences by examining a young patient who was treated at Washington University in the year 2004. He was suffering uncontrollable systolic hypertension, low diastolic pressure, incidence of peripheral vascular disease and diastolic cardiac insufficiency. This observation was done in the year 2019. Very soon we started to examine hundreds of patients treated because trauma, aneurysms and dissections. In spite of great variations in symptoms, all had systolic hypertension, diastolic hypotension, left ventricular dysfunction, peripheral vascular disease and in few patients we detected cardiac angina caused by the low diastolic pressure, in spite of insignificant coronary artery disease.



Compliant Endografts

We did the first experimental study in the Jacobs Institute in Buffalo, using a 3D impression of a silicon aorta connected to a Harvard pump and reducing the flow in the branches to obtain a systolic pressure of 120 mm of mercury in systole and 70 mm in diastole. We measured the flow and pressures. We created a model of a rigid segment in the thoracic aorta by wrapping a silicone tube 15% narrower than the aorta outside the aortic tube. We compared the pressure and flow before and after the insertion of the outer tube



Compliant Endografts

Convinced that we should introduce changes in the endograft, we concluded that it has to be expandable. In a previous study using gated CT scan we learnt that expansion in systole has a media of 15% of the initial diameter and also we learnt that the aorta is not circular but ovoid in section, thus, we calculated diameters from the calculation of the circumference.



THANK YOU

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