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Premounted low profile (PLP) Stents reexpandable with over size balloons to double its original diameter. An “In vitro” evaluation study of new vascular Stents before its use in Infancy.

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Introduction

Although the use of intravascular stenting for vascular stenosis has been very successful and safe procedure, the application in Infancy has always been limited due to the lack of Stent adaptation to the natural growth of the vessel. Other limiting factor was to find a PLP Stent to be introduced through small size vessel adaptable for redilatation without shortening of its original length.

Recently a small number of PLP stents have been designed with open struts to allow over expansion from the original radial diameter getting bigger without shortening the original length of the stent. This new concept may be applicable to small narrow vessels in infancy allowing stent redilatation to adapt the Stent diameter to the growing size of the children.

Methods

In Vitro evaluation of three types of vascular PLP balloon expandable Stents like:

“Formula” from Cook, “Valeo” from Edwards and “Express” from Boston Scientific.

The three types of stents had similar engineering designed with open struts and were expanded to the original diameter of the PLP balloon size of 7mm, followed by over expansion with 14-16-18mm balloons to double radial diameter using maximum recommended balloon pressure.

Results

The three types of stents when submitted to maximum balloon expansion reshaped the open struts to double the radial diameter with no shortening Stent length. When the recommended maximum balloon pressure balloon was exceeded the balloon exploded breaking part of the struts of the Express Stent however the other two Stents (Formula and Valeo) supported well the balloon burst keeping the new radial strength diameter.

Gradual stent over expansion was also performed in aortic fresh necropsy specimen to evaluate macroscopic distension of the newborn aorta supported by over distended stent. Microscopy histological analysis of the stented aortic segment was also carried out.

Conclusion

PLP balloon distensible vascular Stents are now available for implant using e 6F introducer. The over distension of these new engineering designed stents allow to double the original premounted balloon diameter. These types of stents should be considered for future used in Infancy to keep pace with somatic growth of the vessel.