



## Expandable Polyurethane Stent Valve®, implanted by catheter. Results of physical, hydrodynamic and experimental tests

Miguel Maluf

Cardiovascular Division – São Paulo Federal University - Brazil

### Abstract

A Expandable Polyurethane Stent Valve®, (EPSV), with a special design for pediatric patients, may be an option for biological prostheses, whose calcification or mismatch, in child's development, shorten their durability.

**Methods:** An expandable chrome - cobalt stent, was applied polyurethane, for the formation of three cuspsids, without sewing, it was submitted to: I- In vitro tests: I- Physical test. Universal tests of samples of PU crimped and non-crimped was performed: A- Strength versus deformation (stretching). B- Scanner for surface for mechanical properties. II- Hydrodynamic test. Using a pulsatile flow, to register: valvular area, pressure gradient and valve regurgitation. 2- In vivo test: III- Experimental: Ten sheep were submitted to implantation of expandable polyurethane stent valve by catheter, in pulmonary position, using right ventricle approach. Expansion diameter: Group A: 22mm (7 cases) and Group B: 18mm (3 cases).

**Results:** I - In vitro tests: PU showed to be a thermoplastic structure with high deformation, resistant to crimping and elongation. The hydrodynamic test showed low gradients and absent or trivial regurgitation of the prosthesis. 2- In vivo tests: After 5th months of follow-up, a 3D echocardiographic study, was performed in eight survival sheep and showed: satisfactory hemodynamic performance, with no significant transvalvular gradient (M = 6.60 mmHg), absent or trivial valvular regurgitation, absent leak and free of calcification. Five survival implanted sheep are well after 24 months of follow up.

**Conclusions:** Monitoring of favorable results, confirms that the expandable PU stent valve, can be implanted in pulmonar position in growing children, below 7 years, during conventional surgery and above 7 years, by peripheral vessel.

### Biography

Miguel Angel Maluf is the full professor of Cardiovascular Surgery since 2015 in the São Paulo Federal University in the Brazil. He have completed his graduation from National University of Córdoba - Argentina in 1972. He was also the residence of Córdoba Hospital - Argentina – 1974. He has completed his training from Specialization Cir. Cardiac – Heart Institute – São Paulo University - 1977- 1985. He has completed his Master's Degree: São Paulo Federal University- 1987 and his doctorate from São Paulo Federal University – 1991. He has the specialty in the Complex Congenital Heart Surgery. Valve Diseases.



### Publications

Program for residents of cardiovascular surgery training in coronary anastomosis using the Arroyo simulator and Unifesp models

New prototype of expandable polyurethane stent valve for replacement of heart valves in pediatric patients

Pediatric Cardiac Surgery: A Challenge of Skill and Creativity in Constant Search Results

Senning operation for correction of the transposition of the great arteries, results, long-term outcome and quality of life

Use of Right Ventricular Remodeling Surgery with a Porcine Pulmonary Prosthesis for Congenital Heart Disease.

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