

EXPANDABLE POLYURETHANE STENT VALVE: RESULTS OF PHYSICAL, HYDRODYNAMIC AND EXPERIMENTAL TESTS

Miguel Maluf

São Paulo Federal University, Brazil

Background: 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 cusps, without sewing and it was submitted to and in vitro tests and in vivo tests. Physical test which comprises universal tests of samples of PU crimped and non-crimped was performed: strength versus deformation (stretching); scanner for surface for mechanical properties. Hydrodynamic test using a pulsatile flow, to register valvular area, pressure gradient and valve regurgitation was performed. Experimental tests with ten sheep were submitted to implantation of expandable polyurethane stent valve by catheter, in pulmonary position, using right ventricle approach. Expansion diameter: Group A: 22 mm (7 cases) and Group B: 18 mm (3 cases).

Results: 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. In vivo tests: After 5th month 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.

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

miguemaluf@gmail.com