Radiofrequency perforation of the pulmonary valve: an efficient low cost solution

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Introduction: radiofrequency perforation of the pulmonary valve requires special equipment; price and availability are important. We assessed the feasibility and safety of “standard cathlab tools” in off-label use.

Methods: A co-axial telescopic microcatheter system was prepared (off-label use for all items): a 0.014” PT2 coronary guidewire (€160; Boston Scientific, USA) was chosen because the radiopaque tip is straight and has proven electrical conductance; for insulation the wire was put into a Progreat microcatheter (€250; Terumo, BE; profile 2.7F = 0.025”; lumen 0.021”) with 2 mm protrusion at the distal end; this was delivered to the atretic pulmonary valve through a standard prebended 4F Ri Judkins coronary catheter (lumen 0.035”); gentle forward “push” was maintained on the RF wire complex while burning; radiofrequency RF energy was delivered with a standard surgical electrocauter system (Erbe ICC 80, Tubingen, DE; 5-10 W for 3 sec cutting mode).

Results: In vitro testing in a submerged sheep heart demonstrated perforation of semilunar valves in cutting mode at 5W. Perforation of the pulmonary valve was performed in 5 patients (median age 3 days, weight 2.6±0.3 kg); antegrade 3, retrograde 2; 10-15 W for 2 – 5 sec. After perforation of the valve, the microcatheter was easily pushed across the valve allowing to obtain a good position for the 0.014” wire (through duct into descending aorta or RA) for the ensuing balloon dilation and/or stent placement. In 1 patient a perforation to the pericardium was made; this was sealed by retracting the PT2 wire while applying RF coagulation mode.

Conclusions: The microcatheter telescopic system PT2-Progreat is a low-cost valuable tool in order to deliver radiofrequency energy in selected targets.