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Pulmonary arterial pressure response to unilateral pulmonary branch occlusion by balloon inflation was completely abolished by percutaneous pulmonary artery denervation

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Abstract

Background: Previous studies reported that baroreceptors and sympathetical nerves ending in or near bifurcation arear of main pulmonary artery (PA) participated in the modulation of pulmonary arterial pressure (PAP), and surgical denervation was effective in reducing PAP response to unilateral PA occlusion. However, there is no study reported the effect of percutaneous pulmonary artery denervation (PADN) by radiofrequency ablation on PAP.

Methods: Distal basal trunk and interlobar artery of left PA in five Mongolia dogs were sequentially occluded for 10 minutes by a balloon inflation to completely stop the blood flow distal to balloon, respectively. PADN by use of a specifically designed system was underwent at five levels: Level 1 (just at the bifurcation level), Level 2 (at the ostial left branch), Level 3 (at the ostial right branch) and Level 4 (5mm distal to the orifice of right) or 5(5mm distal to left branches). After PADN, balloon inflation was performed at the same sits as before PADN. Systolic, mean and diastolic PAP, cardiac output (CO), right ventricular pressure(RVP), pulmonary vessel resistance (PVR), pulmonary arterial occlusion pressure (PAOP) were measured before and during balloon inflation. Transpulmonary pressure gradient (TPG) was calculated. ECG was monitored through the whole procedure. PADN was performed only in Level 4 and Level 5 in another 4 dogs.

Results: Baseline systolic, mean and diastolic PAP was 29.2±3.8 mmHg, 14.6±1.7 mmHg and 9.2±1.1 mmHg, respectively. Hemodynamic parameters did not change during distal basal trunk occlusion. During occlusion of left interlobar artery, PAP, systolic RVP and PVR gradually increased and reached peak value after 5-min (Δ13.4 mmHg, $p<0.001$; Δ14.8 mmHg, $p=0.044$ and Δ622.3 dye/s/cm^5, $p<0.001$, respectively), without significant difference in mean and diastolic RVP, PAOP and CO. The average PADN procedural time was 18.6 minutes. After PADN procedure in Level 1-3 but not in Level 4 or 5, the PAP response to left interlobar artery occlusion was completely abolished.

Conclusion: Occlusion of left interlobar artery was associated with significant increase of PAP. This pressure response was completely abolished by PADN around the bifurcation area of main PA.

Biography

Shaoliang-Chen is a Deputy President of the hospital, Department director of cardiology. He had done his Doctor of Philosophy in the year 2006 at Suzhou University. He is a Committee member of Interventional Cardiology Professional Group, Chinese Society of Cardiology, Member of Academic Committee of Cardiovascular Interventional Therapy Training Center, Chinese Medical Association, Member of Standing Committee of Cardiovascular Department, Internal Medicine Doctor Association Committee, Chinese Medical Doctor Association, Chief member of Peripheral Vascular Disease Committee, Jiangsu Institute of Integrated Traditional and Western Medicine, Vice director committee member of Jiangsu province society of Cardiology, Vice director member of Cardiovascular Committee, Jiangsu Institute of Integrated Traditional and Western Medicine, Vice chairman of Cardiovascular Disease Management Committee, Chinese Association for International Exchange of Medical Care, Chief member of Jiangsu Province Branch, Working Committee of Cardiovascular Rehabilitation Medicine Professional Committee, Chinese Association of Social Workers, Member of the Fifth Committee of Internal Medicine, Jiangsu Province Branch of Medical Association, The American College of Cardiology(F.A.C.C), The Society for Cardiovascular Angiography and Interventions(FSCAI), American Society of Angiology FASA).