



Culture of pulmonary artery endothelial cells from pulmonary artery catheter balloon tips: considerations for use in pulmonary vascular disease

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Pulmonary artery endothelial cells (PAECs) from pulmonary artery catheter balloons used during routine right heart catheterisation can be cultured and sustained to study endothelial cell dysfunction at various stages of pulmonary hypertension <http://bit.ly/2RL6dTc>

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ABSTRACT Endothelial dysfunction is a hallmark of pulmonary arterial hypertension (PAH) but there are no established methods to study pulmonary artery endothelial cells (PAECs) from living patients. We sought to culture PAECs from pulmonary artery catheter (PAC) balloons used during right-heart catheterisation (RHC) to characterise successful culture attempts and to describe PAEC behaviour.

PAECs were grown in primary culture to confluence and endothelial cell phenotype was confirmed. Standard assays for apoptosis, migration and tube formation were performed between passages three to eight. We collected 49 PAC tips from 45 subjects with successful PAEC culture from 19 balloons (39%).

There were no differences in subject demographic details or RHC procedural details in successful *versus* unsuccessful attempts. However, for subjects who met haemodynamic criteria for PAH, there was a higher but nonsignificant ($p=0.10$) proportion amongst successful attempts (10 out of 19, 53%) *versus* unsuccessful attempts (nine out of 30, 30%). A successful culture was more likely in subjects with a lower cardiac index ($p=0.03$) and higher pulmonary vascular resistance ($p=0.04$). PAECs from a subject with idiopathic PAH were apoptosis resistant compared to commercial PAECs ($p=0.04$) and had reduced migration compared to PAECs from a subject with portopulmonary hypertension with high cardiac output ($p=0.01$). PAECs from a subject with HIV-associated PAH formed fewer ($p=0.01$) and shorter ($p=0.02$) vessel networks compared to commercial PAECs.

Sustained culture and characterisation of PAECs from RHC balloons is feasible, especially in PAH with high haemodynamic burden. This technique may provide insight into endothelial dysfunction during PAH pathogenesis.