HYPERTENSION

A new marker of irreversible PAH

Pulmonary arterial hypertension (PAH) is a common complication of congenital heart disease (CHD), and often persists after the heart defect has been repaired. Distinguishing reversible from irreversible PAH ahead of surgery can be difficult. A recently published study from the Necker-Enfants Malades hospital, Paris, has identified circulating endothelial cells (CECs) as a potential noninvasive marker of irreversible PAH.

> “CEC count could help to predict reversibility of PAH in patients with CHD”

CECs are markers of endothelial damage that are elevated in coronary disease and renal vascular disease. Previous work had produced evidence of endothelial dysfunction in irreversible PAH. “We recently reported a lung biopsy study showing impaired apoptotic regulation of endothelial cells in irreversible PAH,” explains David Smadja, lead author of the study. “We postulated that the numbers of CECs and circulating progenitor cells (CPCs) might serve as noninvasive biomarkers of endothelial turnover and thus help to identify CHD patients at risk of irreversible PAH, thereby avoiding the need for lung biopsy.”

The study population comprised 26 consecutive patients with CHD and PAH and 5 control individuals with an unrelated cardiac condition. Patients were retrospectively classed as having reversible or irreversible PAH on the basis of pulmonary artery pressure 6 months after surgery. CEC and CPC numbers in peripheral veins were similar to those in the pulmonary circulation. Patients with irreversible PAH had significantly higher serum CEC levels (median 57 cells/ml) than patients with reversible PAH and controls (median 3 cells/ml). This finding reflects endothelial damage in patients with irreversible PAH. Lung biopsy samples showed evidence of intimal damage, neoangiogenesis and endothelial remodeling in patients with irreversible PAH. Elevated CPC levels would indicate mobilization from bone marrow to repair endothelial damage; however, CPC levels were similar in all three groups of patients.

The findings suggest that peripheral CEC count could help to predict reversibility of PAH in patients with CHD. “CEC count could thus be used for individual evaluation of vascular competence as a noninvasive biomarker of endothelial turnover and as a treatment decision aid in CHD patients at risk for irreversible PAH,” concludes Dr Smadja.

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Original article Smadja, D. M. *et al*. Circulating endothelial cells: a new candidate biomarker of irreversible pulmonary hypertension secondary to congenital heart disease. *Circulation* **119**, 374–381 (2009).