

## Nebulised exogenous natural surfactant after cardiac surgery

SIR—Pulmonary changes after cardiac surgery (CS) with cardiopulmonary bypass (CPBP) are similar to those in adult respiratory distress syndrome (ARDS). Exogenous natural surfactant (ENS) seems a promising approach for the treatment of ARDS.<sup>1</sup> We investigated nebulised ENS in 6 patients (mean age 66 [SD 5]; 2 valve replacement, 4 coronary revascularisation) after CS with CPBP. All patients were mechanically ventilated and under continuous nebulisation for almost 6 hours with ENS (30 mg/kg bodyweight) via a jet nebuliser. An arterial catheter monitored mean blood pressure and the arterial oxygen pressure. The arterial/alveolar oxygen ratio (a/A PO<sub>2</sub>) was calculated. Intravenous volume of colloidal fluid transfused was estimated in mL/m<sup>2</sup>. The pre-nebulisation (PreNeb) and 2 hours post-nebulisation (PostNeb) values were compared:

Patients	a/A PO <sub>2</sub> *		Blood pressure (mm Hg) <sup>†</sup>		Colloids (mL/m <sup>2</sup> )
	PreNeb	PostNeb	PreNeb	PostNeb	
1	0.45	0.72	80	58	1818
2	0.60	0.83	80	71	700
3	0.26	0.55	71	61	633
4	0.39	0.61	61	79	523.25
5	0.67	0.58	78	94	1111.11
6	0.72	0.76	115	73	1052

Paired t test: \*p=0.02, †p=not significant.

Because of a slight hypotensive effect of ENS in this group of unstable postoperative patients, colloidal fluids were perfused. The fluid requirements of these 6 patients during the ENS nebulisation was 806 (581) mL/m<sup>2</sup>—therefore higher than the mean 595 (225) mL/m<sup>2</sup> used in postoperative patients under CS with CPBP not receiving ENS.

Walmrath et al<sup>2</sup> described a redistribution of blood flow from pulmonary shunt areas to regions with normal ventilation with epoprostenol (prostacyclin, PGI<sub>2</sub>) nebulisation. The effect of ENS is to open unventilated areas and augment the functional residual capacity with a better static compliance and arterial oxygenation.<sup>3</sup> This effect could be compared with the benefit of positive end-expiratory pressure application on mechanically ventilated patients.<sup>4</sup> Newly ventilated areas generated by ENS prevent pulmonary hypoxic vasoconstriction and facilitate the recruitment of pulmonary vessels. The consequence of pulmonary blood redistribution is hypotension, also described by Hallman et al in an animal experiment.<sup>5</sup>

We consider both ENS and epoprostenol as useful tools for ARDS treatment. Nebulising the two agents together will be the subject of future research.

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- 1 Richman PS, Spragg RG, Robertson B, Merritt TA, Curstedt T. The adult respiratory distress syndrome: first trials with surfactant replacement. *Eur Respir J* 1989; 2 (suppl 3): 109s-11s.
- 2 Walmrath D, Schneider T, Pilch J, Grimminger F, Seeger W. Aerosolised prostacyclin in adult respiratory distress syndrome. *Lancet* 1993; 342: 961-62.
- 3 Gommers D, Vilstrup C, Bos JAH, et al. Exogenous surfactant therapy increases static lung compliance, and cannot be assessed by measurements of dynamic compliance alone. *Crit Care Med* 1993; 21: 567-74.
- 4 Hedenstierna G. Pathophysiology of ventilation-perfusion abnormalities in acute respiratory failure. *Acta Anaesthesiol Scand* 1993; 37: (S100) 155-56.
- 5 Hallman M, Barsotti M, Chundu B, Slivka S. Effect of exogenous surfactant on hemodynamics in respiratory failure is related to the blood volume. *Am Rev Respir Dis* 1991; 143: A312.