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Short reports

Improved oxygenation in patients with extensive unilateral pneumonia using the lateral decubitus position

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In the lateral decubitus position, the perfusion to the lower lung is increased without change in the cardiac output.[1] This suggests that in cases with unilateral pneumonia, the intrapulmonary shunt will be decreased by turning the patient to the lateral decubitus position with the normal lung in the lower position, in order to increase its perfusion. Zack *et al*[2] reported that in a patient with a left-sided infiltrate who was turned to the right lateral decubitus position, arterial P_{O_2} (Pa_{O_2}) was markedly increased.

Patients, methods, and results

To assess the potential benefits of the lateral decubitus position for gas exchange in patients with extensive unilateral pneumonia, we turned four patients from the supine to the contralateral decubitus position. All patients were breathing spontaneously and none had chronic lung disease. Pulmonary arterial samples were obtained with a Swan-Ganz catheter and cardiac output measured by a thermodilution technique. The shunt was calculated after 20 minutes pure oxygen breathing with a mask.

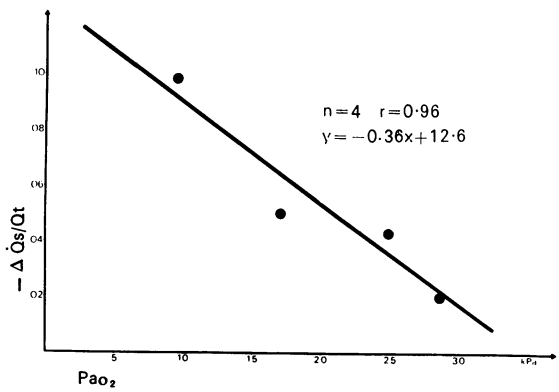

Figure *Relationship between* Pa_{O_2} *in the supine position* ($F_{IO_2}=1$) *and the change in intrapulmonary shunt* ($\dot{Q}s/\dot{Q}t$) *in the lateral decubitus position.*

Blood gas measurements and haemodynamic data are summarised in the table. After turning from the supine to the lateral position, Pa_{O_2} increased by a mean of 13·9±5·3 kPa ($p<0·05$), and shunt decreased by 0·05±0·02 ($p<0·05$). No significant change in pulmonary arterial pressure, cardiac output, or oxygen consumption was observed. A negative relationship between the Pa_{O_2} in the supine position and the change in intrapulmonary shunt in the lateral decubitus position was found (figure). In one patient with a large intrapulmonary shunt (0·24) the lateral decubitus position was maintained for 24 hours. Both the increase in Pa_{O_2} and the decrease in shunt remained unchanged throughout this time.

Comment

This preliminary report of four patients indicates a significant decrease in the intrapulmonary shunt. The lower the initial value of Pa_{O_2}, the higher the decrease in intrapulmonary shunt. Such a decrease appears to remain unchanged throughout the period during which patients are turned to the lateral decubitus position. This method may be of value in patients with a low Pa_{O_2} (<20 kPa, $F_{IO_2}=1$).

The hypoxaemia of such patients can be reduced by this method as soon as they are admitted to an intensive care unit. The lateral decubitus position would be a complementary technique to continuous positive airway pressure breathing with a mask. Thus, intubation and mechanical ventilation of these patients can be avoided.

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References

1 Arborelius M Jr, Granqvist U, Lilja B, Zauner CW. Regional lung function and central haemodynamics in the right lateral position during hypoxia and hyperoxia. *Respiration* 1974; **31**:193–200.

2 Zack MB, Pontoppidan H, Kazemi H. The effect of lateral positions on gas exchange in pulmonary disease. *Am Rev Respir Dis* 1974; **110**: 49–55.

Table *Blood gas measurements and haemodynamic data*

	Pa_{O_2} (kPa)			$P\bar{v}_{O_2}$ (kPa)			$\dot{Q}s/\dot{Q}t$			MPAP (mmHg)			CI (l/min/m²)			$\dot{V}O_2$ (ml/min/m²)		
Case	*SP*	*LP*	*Δ*	*SP*	*LP*	*Δ*	*SP*	*LP*	*Δ*	*SP*	*LP*	*Δ*	*SP*	*LP*	*Δ*	*SP*	*LP*	*Δ*
1	9·5	29·9	+20·4	3·38	3·77	+0·39	0·24	0·14	−0·10	12	13	+1	4	3·9	−0·1	338	334	−4
2	28·6	36·3	+ 7·7	3·77	3·77	0·0	0·17	0·15	−0·02	15	11	−4	3·7	3·5	−0·2	264	269	+5
3	16·9	26·7	+ 9·8	3·77	3·90	+0·13	0·27	0·22	−0·05	8	10	+2	4·7	4·5	−0·2	242	243	+1
4	24·7	42·4	+17·7	4·55	4·68	+0·13	0·19	0·15	−0·04	16	15	−1	3·5	3·5	0	228	225	−3
Mean	19·9	33·8	+13·9	3·87	4·03	+0·16	0·21	0·16	−0·05	12·8	12·3	−5	4	3·9	−0·1	268	268	0
±SE	± 7·3	± 6	± 5·3	±0·42	±0·38	±0·14	±0·05	±0·03	±0·03	± 3	±2	± 2·3	±0·5	±0·5	±0·05	± 42	± 41	±2
p		< 0·05			NS			< 0·05			NS			NS			NS	

Abbreviations: Pa_{O_2}=arterial P_{O_2}, $\dot{Q}s/\dot{Q}t$=intrapulmonary shunt, MPAP=mean pulmonary arterial pressure, CI=cardiac index, $\dot{V}O_2$=oxygen consumption, SP=supine position, LP=lateral decubitus position, Δ=change from SP to LP, $P\bar{v}_{O_2}$=mixed venous P_{O_2}.