Prone positioning has no effect on mortality in ARDS

In patients with ARDS, prone positioning improves oxygenation but has no impact on mortality, except perhaps in those with SAPS >50.

Level of evidence: 1+ (SR based on small RCTs, conducted prior to ARDSNet – subsequent change in practice)

Appraised by: Alex Puxty

Citation: Alsaghir AH, Martin C. Effect of prone positioning in patients with acute respiratory distress syndrome: a meta-analysis. *Crit Care Med* 2008;36:603-09.

Lead author: Claudio Martin

Three-part clinical question:
Patients: Adults with acute respiratory distress syndrome (ARDS).
Intevention: Prone positioning.
Outcome: Primary – mortality; Secondary – improvement in oxygenation, duration of mechanical ventilation and incidence of ventilator-associated pneumonia.

Search terms: respiratory distress syndrome, adult; acute respiratory distress or ARDS; prone position

The review:

Data sources: Cochrane Library, Medline, Embase, hand search, mail shot.

The study selection: Included only randomised controlled trials (RCTs) in human adults.

Data extraction: Trials were limited to adult mechanically ventilated ICU patients comparing supine and prone positioning. Prone positioning had to be used for at least six hours. Outcome measures were mortality (28-30-day, 90-day and ICU mortality), improvement in oxygenation, duration of mechanical ventilation and incidence of ventilator-associated pneumonia.

The studies were multiple, independent reviews of individual reports. They were tested for heterogeneity.

The evidence:

There was no difference in the number of ventilator days or in the incidence of ventilator-acquired pneumonia between the two groups (prone and supine positioning).

There was a significant improvement in both early and late oxygenation in the prone positioning groups, with a weighted mean difference (WMD) in PaO_2/FiO_2 ratio of 43.87 (95% CI, 13.86-73.88) and 24.89 (95% CI, 15.3-34.48) respectively.

Comments:
- In the patients with SAPS >50, the two studies which demonstrated an improvement in mortality had different time scales (ie 10-mortality in one and on ICU discharge in the other).
- Most of the studies had relatively short durations of prone positioning.
- Two of the studies (including the largest, and one which reported improvement in mortality in the higher severity of illness subgroup) used larger Vt than currently recommended as they were done pre-ARDSNet.
- The groups were very heterogeneous.

EBM comments:
1. *Do the methods allow accurate testing of the hypothesis?* **Yes**, it was a thorough meta-analysis of the available evidence.
2. *Do the statistical tests correctly test the results to allow differentiation of statistically significant results?* **Yes**.
3. *Are the calculations valid in the light of the results?* **Yes**.
4. *Did results get omitted and why?* **No**.
5. *Did they suggest areas of further research?* **Yes**. They suggested a RCT in higher illness severity patients to refute or confirm the *post-hoc* sub-group analysis.

Outcome	Time to outcome	Typical CER	Typical OR	RRR	NNT	p value
Mortality	ICU mortality	0.32	0.79	15%	∞	
	95% confidence intervals (CI):		0.45 to 1.39			
***Post-hoc* sub-group analysis (SGA)**						
Sub-group	**CER**	**OR**	**RRR**	**NNT**		
Mortality SAPS >50	0.50	0.29	55%	4		
95% confidence intervals:	0.12 to 0.7			3 to 11		

It was not apparent whether this sub-group analysis was data-dependent or an *a priori* hypothesis. The analysis was clinically significant, made biological sense, was one of many SGAs, and was consistent in more than one RCT.

6. *Did they make any recommendations based on the results and were they appropriate?* **Yes**. They recommended considering early prone positioning in higher illness severity patients based on the little harm and low expense of this intervention – this was not unreasonable, although the evidence of mortality benefit is not strong.
7. *Is the study relevant to my clinical practice?* **Yes** – prone positioning is common.
8. *What level of evidence does the study represent?* **1+**
9. *What grade of recommendation can I make on this result alone?* **B**
10. *What grade of recommendation can I make when this study is considered along with other available evidence?* **B**
11. *Should I change my practice because of these results?* Probably not. The analysis showed neither harm nor any firm benefit of prone positioning, but one could consider it earlier in the most severely ill patients in whom oxygenation is difficult.
12. *Should I audit my current practice because of these results?* **No** – there is still no gold standard to compare against.

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