

5.4 Strategies to optimize delivery and minimize risks of Enteral Nutrition: Body position

There were no new randomized controlled trials since the 2015 update and hence there are no changes to the following summary of evidence.

Question: Do alterations in body position result in better outcomes in the critically ill adult patient?

Summary of evidence: There was 1 level 1 study and 1 level 2 studies that compared the frequency of pneumonia in critically ill patients assigned to semi-recumbent or supine position. In one study (Nieuwenhoven 2006) the target of the intervention (45 degrees head of the bed elevation) was never achieved hence a meta-analysis of the two studies was not done.

Mortality: There was no significant difference between the groups in either study.

Infections: There was a significant reduction in the incidence of pneumonia in patients in the semi recumbent vs. supine position (RR 0.22, 95% CI 0.05, 0.9, $p=0.018$) in one study (Drakulovic 1999) but no effect on pneumonia in the other study that did not achieve the target intervention (Nieuwenhoven 2006; 13/112 vs. 8/109, $p=ns$).

LOS, Ventilator days: There were no statistically significant differences between the groups in either study.

Conclusions:

- 1) Semi-recumbent position may be associated with a reduction in pneumonia in critically ill patients.
- 2) Semi-recumbent position has no effect on mortality, ICU length of stay or duration of mechanical ventilation.

Level 1 study: *if all of the following are fulfilled: concealed randomization, blinded outcome adjudication and an intention to treat analysis.*

Level 2 study: *If any one of the above characteristics are unfulfilled.*

Table 1. Randomized studies evaluating body position in critically ill patients

Study	Population	Methods (score)	Intervention	Mortality # (%)		Pneumonia # (%)		Length of stay (days)		Other outcomes	
				Semi Recumbent	Supine	Semi Recumbent	Supine	Semi Recumbent	Supine	Semi Recumbent	Supine
1) Drakulovic 1999	Mechanically ventilated Mixed ICU patients N=90	C.Random: yes ITT: no Blinding: no (10)	Semirecumbent vs. supine	ICU 7/39 (18)	ICU 13/47 (28)	2/39 (5)	11/47 (23)	ICU 9.7 ± 7.8	ICU 9.3 ± 7.2	Body position independent risk factor for VAP in multivariate analysis- major risk factor was duration of ventilation. Ventilator Days 7.1 ± 6.9* 6.0 ± 6.2*	
2) Nieuwenhoven 2006	ICU patients from 4 ICUs incubated within 24 hrs of admission and expected to be intubated > 48 hrs N=221	C.Random: yes ITT: yes Blinding: Yes (13)	45degrees vs. Standard head of the bed elevation	ICU 33/112 (29) Hospital 44/112 (39)	ICU 33/109 (30) Hospital 41/109 (38)	13/112 (12)	8/109 (7)	ICU 9 (0-281) Hospital 27 (2-301)	ICU 10 (9-91) Hospital 24 (0-186)	Ventilator Days 6 (0-64) 6 (0-281)	

C.Random: Concealed randomization
 ITT: Intent to treat
 NR: Not reported

± () : Mean ± Standard deviation (number)
 ICU: intensive care unit

References

Included Studies

1. Drakulovic MB, Torres A, Bauer TT, Nicolas JM, Nogue S, Ferrer M Lancet. Supine body position as a risk factor for nosocomial pneumonia in mechanically ventilated patients: a randomised trial. 1999 ;27;354(9193):1851-8.
2. van Nieuwenhoven CA, Vandenbroucke-Grauls C, van Tiel FH, Joore HC, van Schijndel RJ, van der Tweel I, Ramsay G, Bonten MJ. Crit Care Med. 2006;34(2):396-402. Feasibility and effects of the semirecumbent position to prevent ventilator-associated pneumonia: a randomized study.

Table 2. Excluded Articles

#	Reason excluded	Reference
1	Rotational therapy	Gentilello L, Thompson DA, Tonnesen AS, Hernandez D, Kapadia AS, Allen SJ, Houtchens BA, Miner ME. Effect of a rotating bed on the incidence of pulmonary complications in critically ill patients. Crit Care Med. 1988 Aug;16(8):783-6.
2	Rotational therapy	Summer WR, Curry P, Haponik EF, Nelson S, Elston R. Continuous mechanical ventilation turning of intensive care unit patients shortens length of stay in some diagnostic-related groups. J Crit Care. 1989 4(1):45-53
3	Rotational therapy	Fink MP, Helsmoortel CM, Stein KL, Lee PC, Cohn SM. The efficacy of an oscillating bed in the prevention of lower respiratory tract infection in critically ill victims of blunt trauma. A prospective study. Chest. 1990 Jan;97(1):132-7.
4	No clinical outcomes	Ibáñez J, Peñafiel A, Raurich JM, Marse P, Jordá R, Mata F. Gastroesophageal reflux in intubated patients receiving enteral nutrition: effect of supine and semirecumbent positions. JPEN J Parenter Enteral Nutr. 1992 Sep-Oct;16(5):419-22.
5	Rotational therapy	deBoisblanc BP, Castro M, Everret B, Grender J, Walker CD, Summer WR. Effect of air-supported, continuous, postural oscillation on the risk of early ICU pneumonia in nontraumatic critical illness. Chest. 1993 May;103(5):1543-7.
6	No clinical outcomes	Orozco-Levi M, Torres A, Ferrer M, Piera C, el-Ebiary M, de la Bellacasa JP, Rodriguez-Roisin R. Semirecumbent position protects from pulmonary aspiration but not completely from gastroesophageal reflux in mechanically ventilated patients. Am J Respir Crit Care Med. 1995 Oct;152(4 Pt 1):1387-90.
7	Rotational therapy	Traver GA, Tyler ML, Hudson LD, Sherrill DL, Quan SF. Continuous oscillation: outcome in critically ill patients. J Crit Care. 1995 Sep;10(3):97-103.
8	Rotational therapy	Whiteman K, Nachtmann L, Kramer D, Sereika S, Bierman M. Effects of continuous lateral rotation therapy on pulmonary complications in liver transplant patients. Am J Crit Care. 1995 Mar;4(2):133-9.
9	Rotational therapy	MacIntyre NR, Helms M, Wunderink R, Schmidt G, San SA. Automated rotational therapy for the prevention of respiratory complications during mechanical ventilation. Respir Care 1999;44(12):1447-1451

10	Compares nasogastric tubes, not different body positions	Ibáñez J, Peñafiel A, Marsé P, Jordá R, Raurich JM, Mata F. Incidence of gastroesophageal reflux and aspiration in mechanically ventilated patients using small-bore nasogastric tubes. JPEN J Parenter Enteral Nutr. 2000 Mar-Apr;24(2):103-6..
11	Not RCT	van der Voort PH, Zandstra DF. Enteral feeding in the critically ill: comparison between the supine and prone positions: a prospective crossover study in mechanically ventilated patients. Crit Care. 2001 Aug;5(4):216-20. Epub 2001 May 25.
12	Not all ICU pts, Rotational therapy	Ahrens T, Kollef M, Stewart J, Shannon W. Effect of kinetic therapy on pulmonary complications. Am J Crit Care. 2004 Sep;13(5):376-83.