Umělá plicní ventilace, vysokofrekvenční oscilace, inhalovaný oxid dusnatý, pronační poloha

Peter Košut
KDAR LF MU a FN Brno

Umělá plicní ventilace

Indikace UPV u septického dítěte:

- Sedace pro invazivní vstupy
- Respirační selhání
- Poruchy vědomí
- Eliminace dechové práce (až 40 % CO)
- Kompenzace MAc

Table 2. Recommendations for the routine management of children with acute lung injury and acute respiratory distress syndrome

Data to	Recommended Guide Use	Promising Preliminary Data	NOT Recommended	No
Keep plateau pressure ≤30 cm H_2O	A (25), EO			
Avoid tidal volumes ≥10 mL/kg[a]	A (25), EO			
4–6 mL/kg tidal volume protocol		A (25)		
Pao_2 goal 60–80 torr (8 to 10.7 kPa) (Spo_2 ≥90%)	EO			
pH goal of 7.30 to 7.45	EO			
High flow nasal cannula Fio_2			EO	X
Prone positioning			A (50), P (15)	
Inhaled nitric oxide			A P (52)	
Corticosteroids for lung inflammation		A (82)		X
Noninvasive ventilation		P (29)		X
Extubation readiness testing		P (45)		X
High-frequency oscillatory ventilation		P (75)		X
Endotracheal surfactant		P (16)		
Sedation and analgesia	EO			X
Restrictive fluid management		A (54)		X
Hemoglobin target ≥10 g/dL, if unstable[b]	EO			
Hemoglobin target ≥7 g/dL, if not unstable[b]	P (59)			
Tight glucose control (e.g., 80–110 g/dL)			EO	X
Avoid extreme hypo- and hyperglycemia	EO			
Inhaled bronchodilators			EO	
Stress ulcer prophylaxis	EO			
Selective decontamination digestive tract		A (72; 73)		
ECMO for rescue therapy		P (76)		X

A, evidence from adult cohorts; P, evidence from Pediatric cohorts; EO, expert opinion; ECMO, extracorporeal membrane oxygenation.

[a]Ideal or adjusted body weight; [b]unstable, hemodynamic shock or profound hypoxia.

Randolph AG, *Crit Care Med* 2009; 37: 2448 – 2454

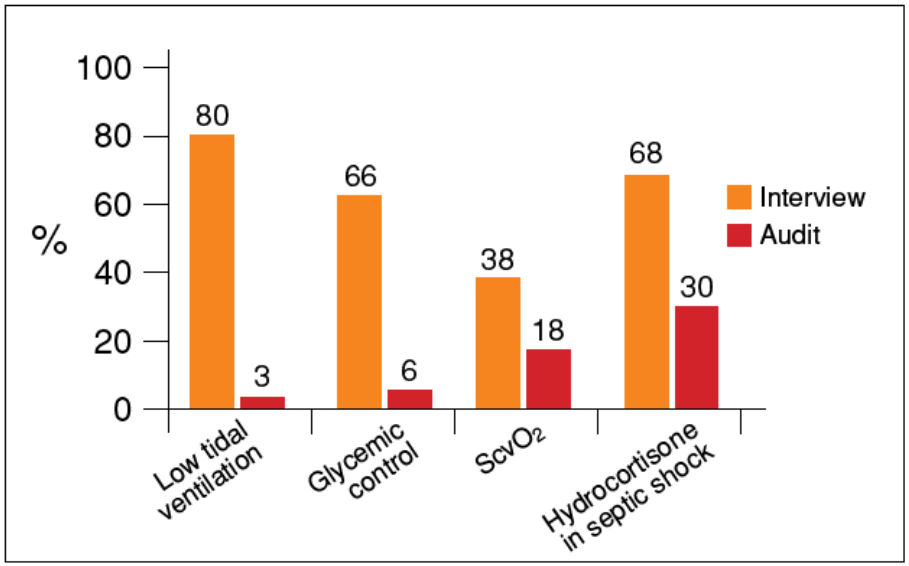

Figure. Supportive and adjunctive therapies results from the German "Prevalence Study." Brunkhorst FM et al. *Infection* 2005; 33 (Suppl 1): 49 (abstract)

Brunkhorst FM et al, *Infection* 2005; 33, Suppl 1: 49

Intensive Care Med (2009) 35:1428–1437
DOI 10.1007/s00134-009-1527-z

PEDIATRIC ORIGINAL

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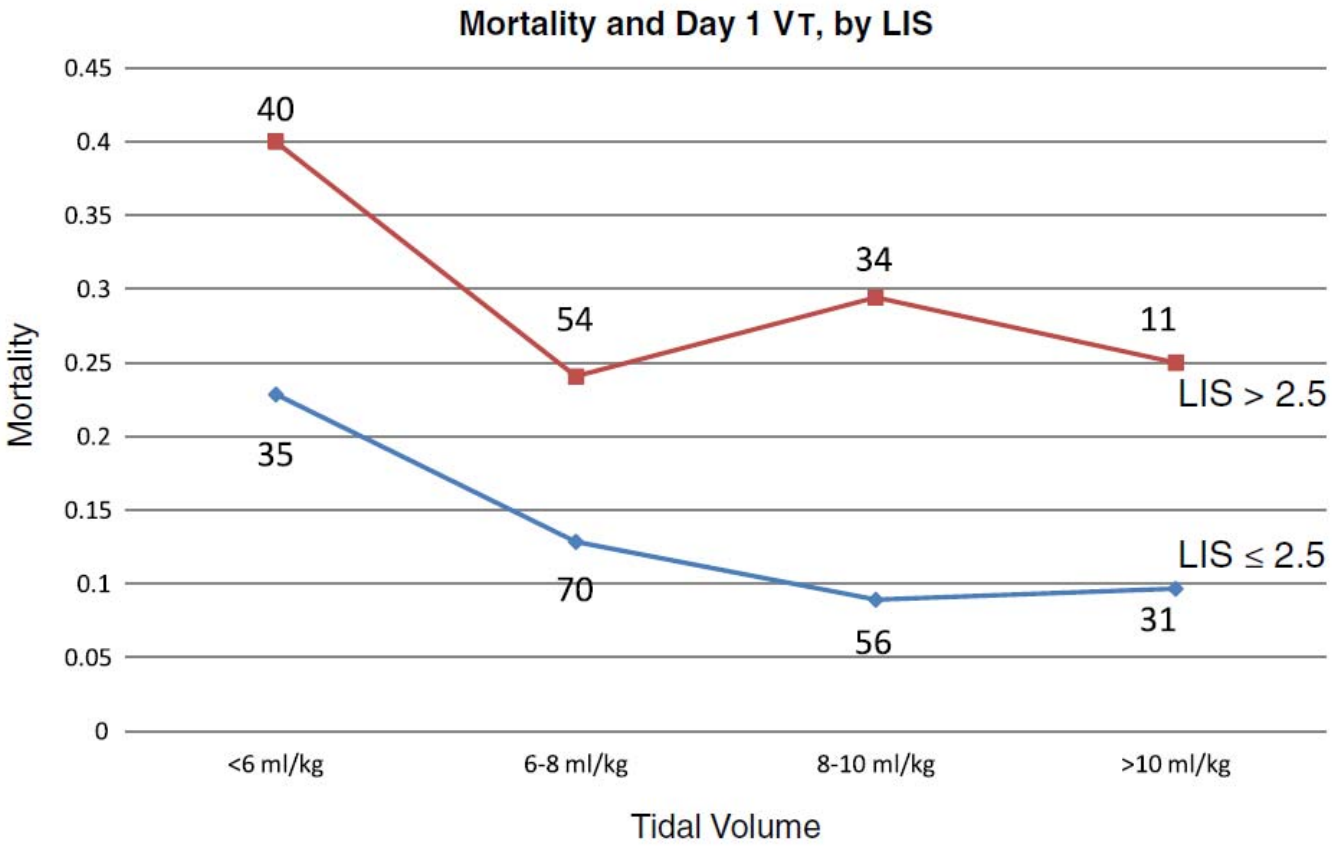
Effect of tidal volume in children with acute hypoxemic respiratory failure



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4–6 mL/kg tidal volume protocol		A (25)		
Pao_2 goal 60–80 torr (8 to 10.7 kPa) (Spo_2 ≥90%)	EO			
pH goal of 7.30 to 7.45	EO			
High flow nasal cannula FIO_2			EO	X
Prone positioning			A (50), P (15)	
Inhaled nitric oxide			A P (52)	
Corticosteroids for lung inflammation		A (82)		X
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Avoid extreme hypo- and hyperglycemia	EO			
Inhaled bronchodilators			EO	
Stress ulcer prophylaxis	EO			
Selective decontamination digestive tract		A (72; 73)		
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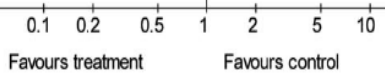
Randolph AG, *Crit Care Med* 2009; 37: 2448 – 2454

High-Frequency Ventilation Versus Conventional Ventilation for the Treatment of Acute Lung Injury and Acute Respiratory Distress Syndrome: A Systematic Review and Cochrane Analysis

Hannah Wunsch, MD, MSc*, and James Mapstone, MB Bchir, MSc, MA†

Outcome: 30 day mortality

Study or sub-category	HFOV n/N	CV n/N	RR (fixed) 95% CI	Weight %	RR (fixed) 95% CI
Arnold 1994	10/29	12/29		23.76	0.83 [0.43, 1.62]
Derdak 2002	28/75	38/73		76.24	0.72 [0.50, 1.03]



Outcome: 6 month mortality

Study or sub-category	HFOV n/N	CV n/N	RR (fixed) 95% CI	Weight %	RR (fixed) 95% CI
Derdak 2002	35/75	43/73		100.00	0.79 [0.58, 1.08]

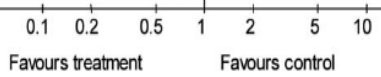


Table 2. Recommendations for the routine management of children with acute lung injury and acute respiratory distress syndrome

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4–6 mL/kg tidal volume protocol		A (25)		
Pao_2 goal 60–80 torr (8 to 10.7 kPa) (Spo_2 ≥90%)	EO			
pH goal of 7.30 to 7.45	EO			
High flow nasal cannula FIO_2			EO	X
Prone positioning			A (50), P (15)	
Inhaled nitric oxide			A P (52)	
Corticosteroids for lung inflammation		A (82)		X
Noninvasive ventilation		P (29)		X
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Inhaled bronchodilators			EO	
Stress ulcer prophylaxis	EO			
Selective decontamination digestive tract		A (72; 73)		
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A, evidence from adult cohorts; P, evidence from Pediatric cohorts; EO, expert opinion; ECMO, extracorporeal membrane oxygenation.

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Randolph AG, *Crit Care Med* 2009; 37: 2448 – 2454

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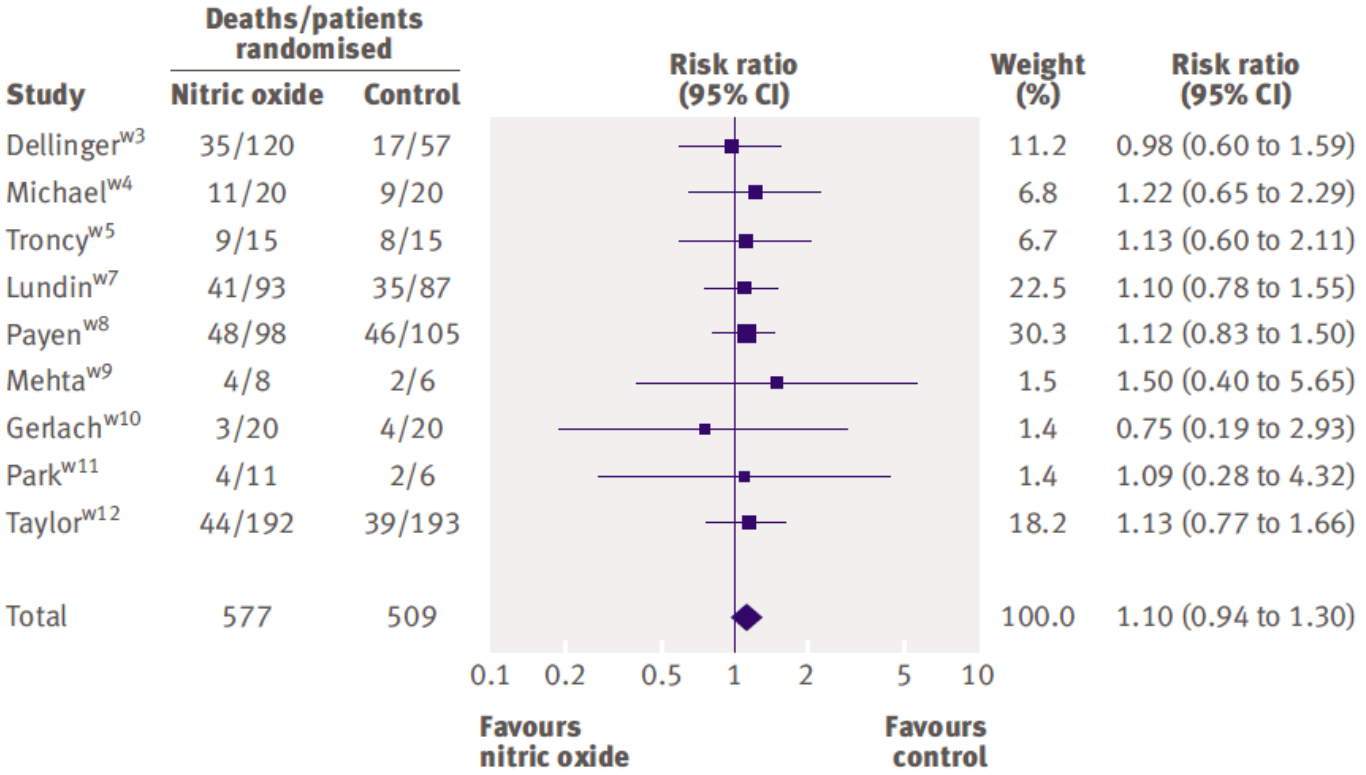
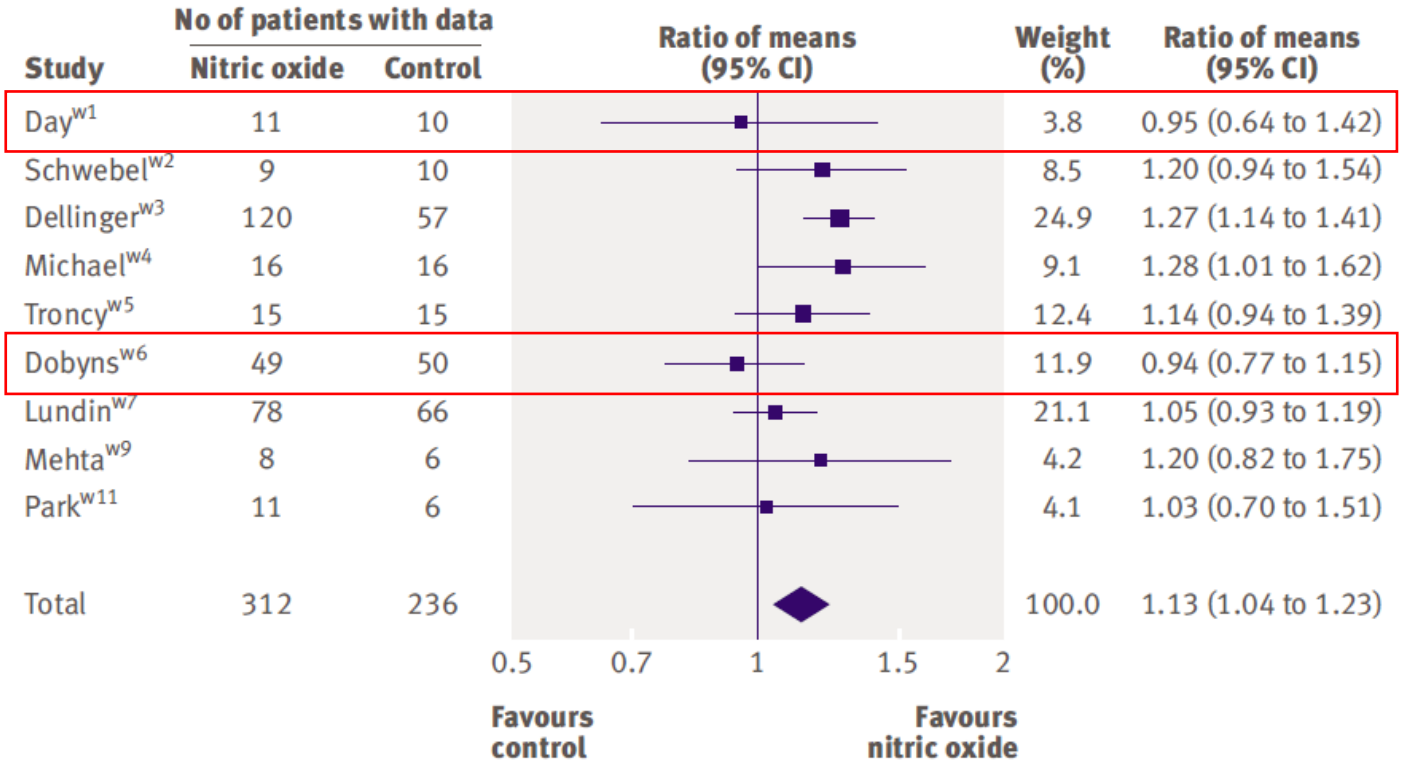


Adhikari NKJ, *BMJ* 2007; doi:10.1136/bmj.39139.716794.55

PaO_2/FiO_2



Study	No of patients with data: Nitric oxide	No of patients with data: Control	Ratio of means (95% CI)	Weight (%)	Ratio of means (95% CI)
Day[w1]	11	10		3.8	0.95 (0.64 to 1.42)
Schwebel[w2]	9	10		8.5	1.20 (0.94 to 1.54)
Dellinger[w3]	120	57		24.9	1.27 (1.14 to 1.41)
Michael[w4]	16	16		9.1	1.28 (1.01 to 1.62)
Troncy[w5]	15	15		12.4	1.14 (0.94 to 1.39)
Dobyns[w6]	49	50		11.9	0.94 (0.77 to 1.15)
Lundin[w7]	78	66		21.1	1.05 (0.93 to 1.19)
Mehta[w9]	8	6		4.2	1.20 (0.82 to 1.75)
Park[w11]	11	6		4.1	1.03 (0.70 to 1.51)
Total	312	236		100.0	1.13 (1.04 to 1.23)

Adhikari NKJ, *BMJ* 2007; doi:10.1136/bmj.39139.716794.55

Intensive Care Med (2004) 30:372–380
DOI 10.1007/s00134-003-2122-3

CONSENSUS CONFERENCE

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Gunnar Sedin
Nim Subhedar

Inhaled nitric oxide therapy in neonates and children: reaching a European consensus

iNO není indikován:

- u nezralých novorozenců
- u dětí s ALI/ARDS

iNO je indikován:

- u zralých novorozenců (PPHN)

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4–6 mL/kg tidal volume protocol		A (25)		
Pao_2 goal 60–80 torr (8 to 10.7 kPa) (Spo_2 ≥90%)	EO			
pH goal of 7.30 to 7.45	EO			
High flow nasal cannula FIO_2			EO	X
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Tight glucose control (e.g., 80–110 g/dL)			EO	X
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Randolph AG, *Crit Care Med* 2009; 37: 2448 – 2454

Intensive Care Med (2010) 36:585–599
DOI 10.1007/s00134-009-1748-1

REVIEW

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Claude Guérin
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Prone ventilation reduces mortality in patients with acute respiratory failure and severe hypoxemia: systematic review and meta-analysis

Table 1 Characteristics of the randomized controlled trials included in the systematic review

	Guérin et al. [17] 2004	Taccone et al. [27] 2009	Gattinoni et al. [16] 2001	Mancebo et al. [18] 2006	Curley et al. [41] 2005
Population:					
Patients	802	344	304	142	102 children (age 2 weeks to 18 years)
Enrolment period	1998-2002	2004-2008	1996-1999	1998-2002	2001-2004
Enrolment criteria	Hypoxemic acute respiratory failure (413 ALI/ARDS patients)[a]	ARDS with PEEP ≥5 cmH_2O[a]	ALI/ARDS with PEEP ≥5 cmH_2O[a]	ARDS with four-quadrant infiltrates on CXR[a]	ALI/ARDS [a]
Mean enrolment PaO_2/FiO_2 (mm Hg)	152	113	127	105	100
Mean enrolment PEEP (cmH_2O)	8	10	10	7	9
Stratified randomization by severity	No	Yes (by PaO_2/FiO_2)	No	No	No
Time after meeting enrolment criteria	>12-24 h	<72 h	Not prespecified	<48 h	<48 h
Last follow-up	90 days	6 months	6 months	Hospital discharge	Hospital discharge or 28 days
Prone positioning:					
Planned duration	≥8 h/day until weaning criteria	20 h/day for 28 days	6 h/day for 10 days	20 h/day until weaning criteria	20 h/day until weaning criteria (max. 7 days)
Actual duration (average)	9 h for 4.1 days	18 h for 8.3 days	7 h for 4.7 days	17 h for 10.1 days	18 h for 4 days
Prone discontinuation criteria	Clinical improvement [b]	FiO_2 ≤40% and PEEP ≤10 cmH_2O	None	FiO_2 ≤45% and PEEP ≤5 cmH_2O	Spontaneous breathing and OI <6
Crossover criteria (supine to prone)	PaO_2/FiO_2 <100 for 12 h	PaO_2 ≤55 mmHg on FiO_2 = 1.0 and PEEP ≥15 cmH_2O	No	PaO_2 ≤60 mmHg on FiO_2 = 1.0 and PEEP = 20 cmH_2O	No
Co-interventions:					
Protective mechanical ventilation	No	Yes (*i.e.*, Vt ≤ 8ml/kg of PBW [c])	Consensus conference guidelines[a]	Yes (*i.e.*, Vt ≤10ml/kg of PBW[c] or ABW)	Yes (*i.e.*, Vt 6-7 ml/kg of IBW[h])
Weaning protocol	Yes	No	No	Yes	Yes
Pre-defined sedation targets	No	No	No	Yes	Yes
Concealment of allocation	Sealed opaque envelopes	Central	Central	Sealed opaque envelopes	Sealed opaque envelopes
Randomized patients excluded for all mortality analyses [f]	7/385 supine, 4/417 prone	1/175 supine, 1/169 prone	No	2/62 supine, 4/80 prone	No
Crossover (supine to prone group)	81/378	20/174	12/152	5/60	0/51
Crossover (prone to supine group) [i]	170/413	0/168	0/152	0/76	4/51
Trial ended early	No	No	Yes (slow enrolment)	Yes (slow enrolment)	Yes (futility stopping rule)

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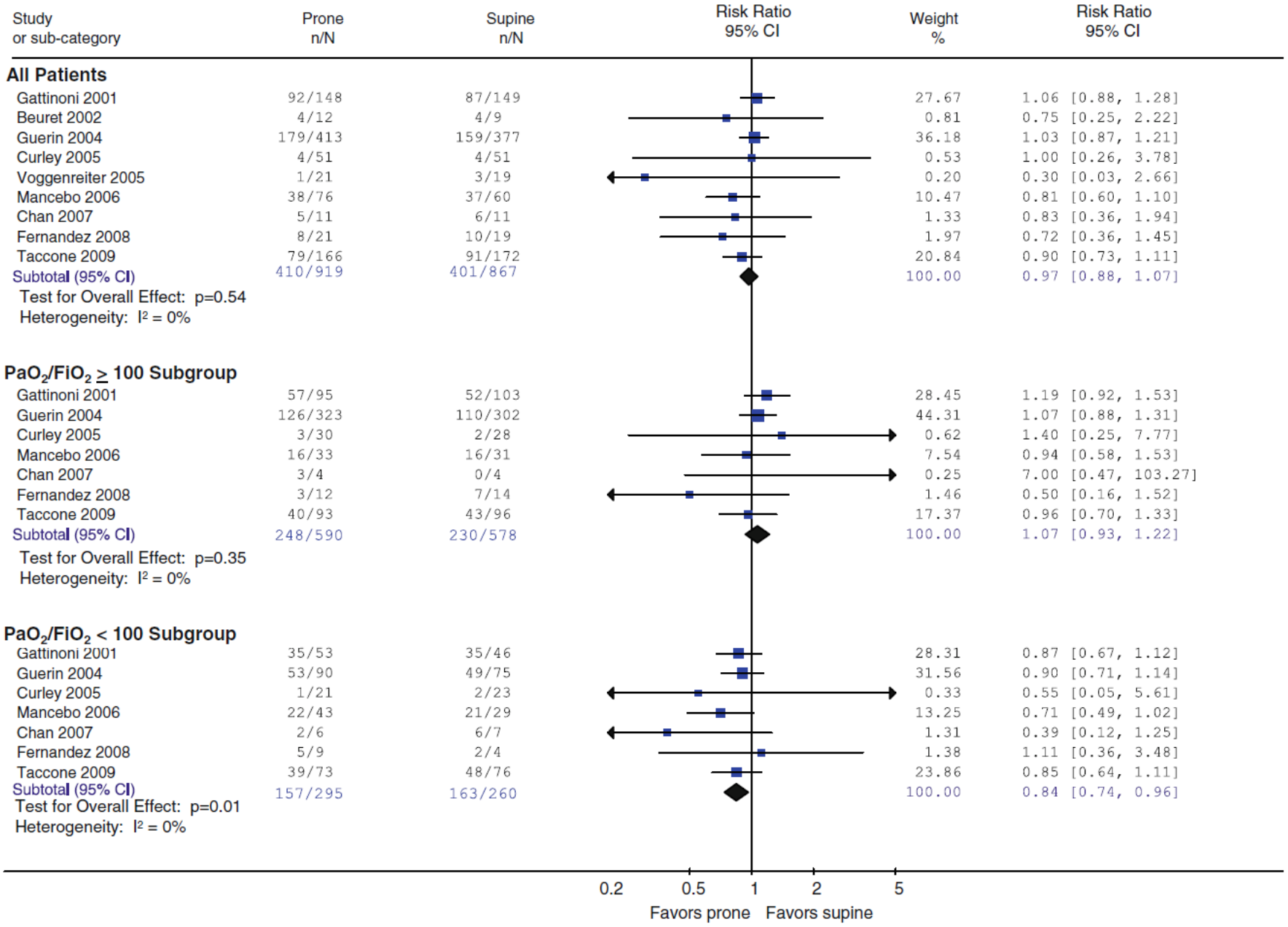
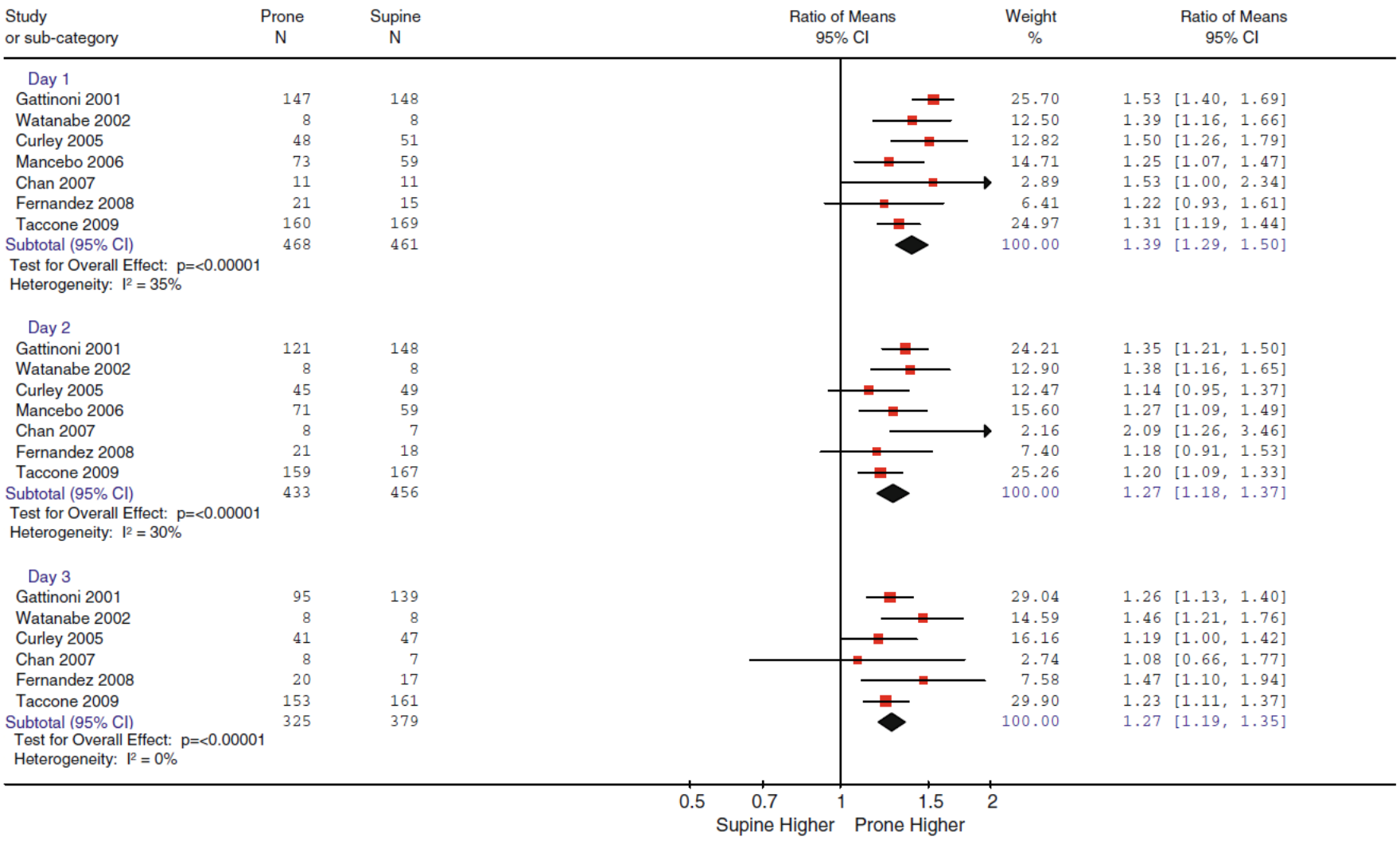


Sud S, *Intensive Care Med* 2010; 36: 585 – 599

PaO_2/FiO_2



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