

Critical care: Year in review 2009

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The NEW ENGLAND
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ESTABLISHED IN 1812

FEBRUARY 28, 2008

VOL. 358 NO. 9

Vasopressin versus Norepinephrine Infusion
in Patients with Septic Shock

Multicenter, randomized, double-blind

low-dose vasopressin

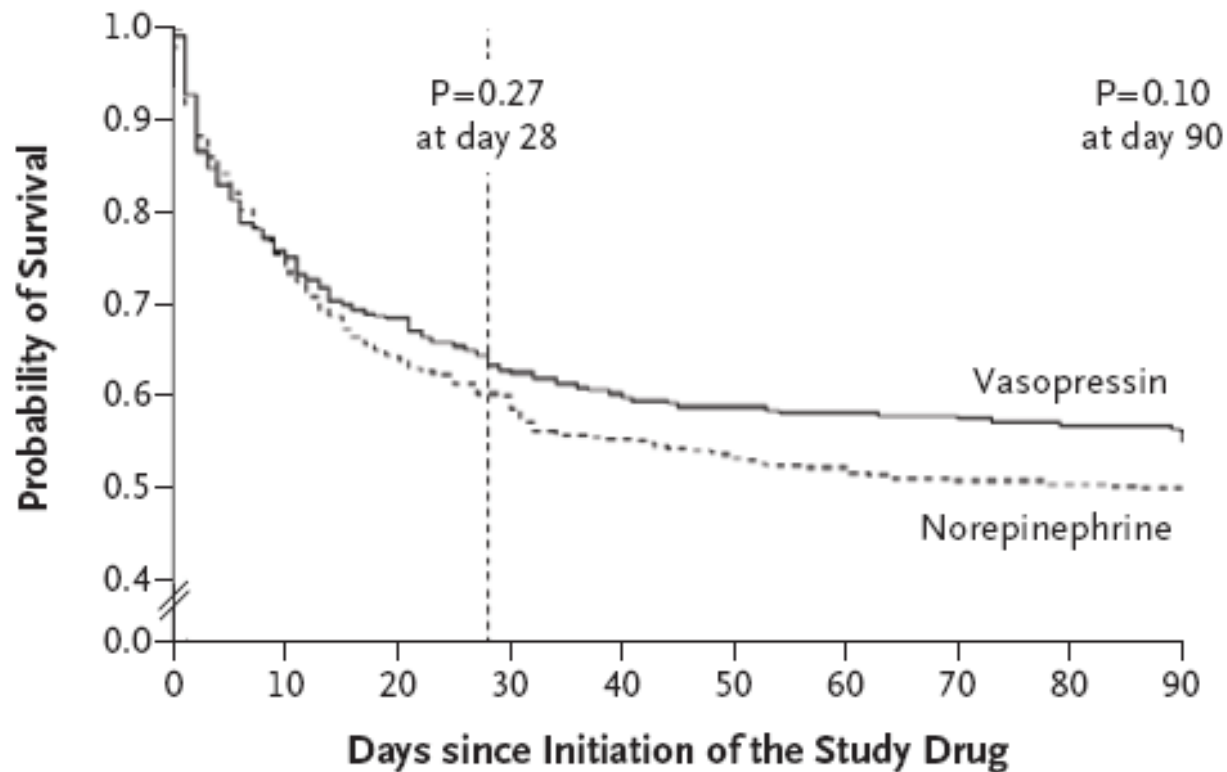
396 patients

Norepinephrine

382 patients

28 day mortality

Kaplan–Meier Survival Curves for Patients Who Underwent Randomization and Infusion



No. at Risk

Vasopressin	397	301	272	249	240	234	232	230	226	220
Norepinephrine	382	289	247	230	212	205	200	194	193	191

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MARCH 4, 2010

VOL. 362 NO. 9

Comparison of Dopamine and Norepinephrine
in the Treatment of Shock

Multicenter, randomized trial

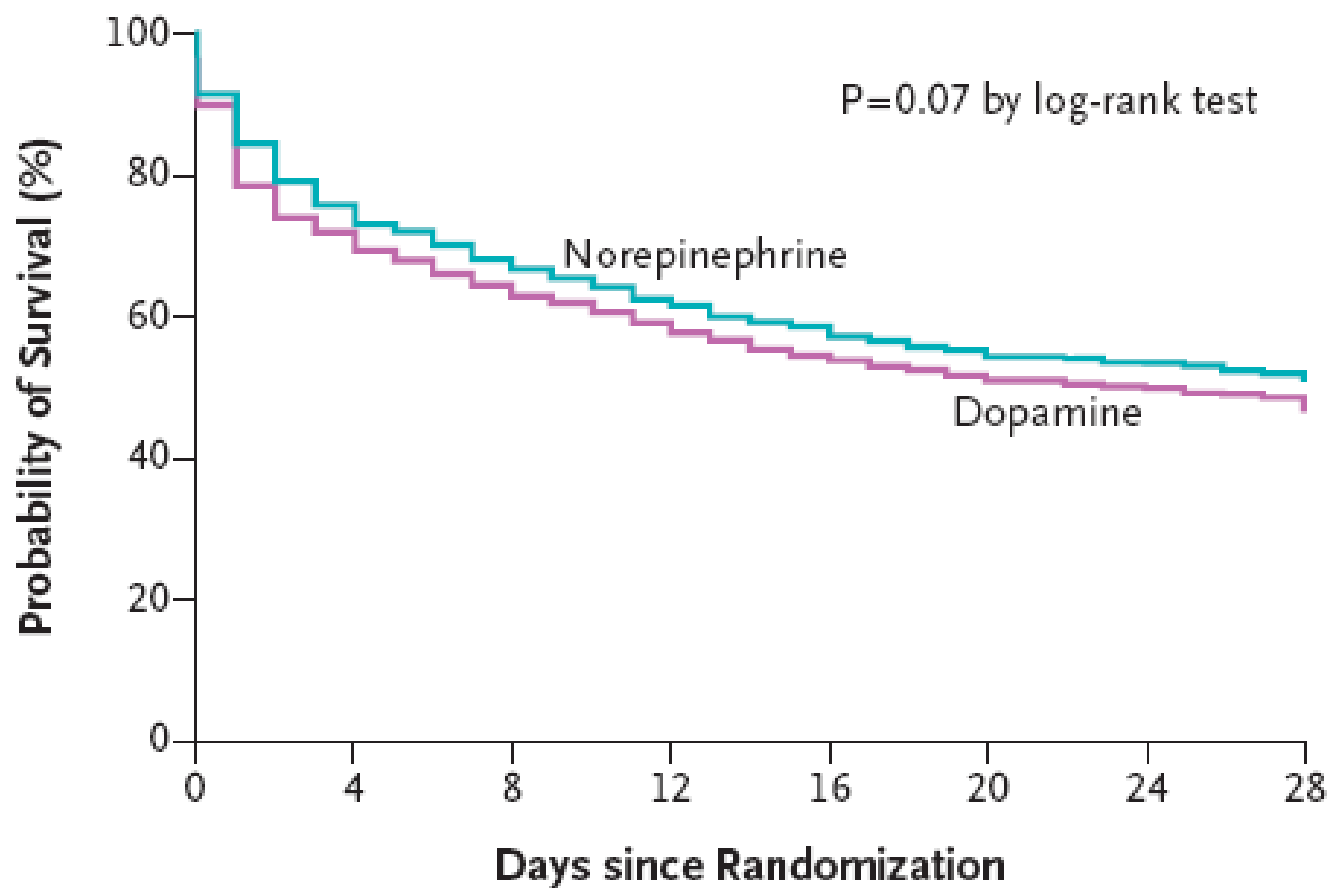
Dopamine

858 patients

Norepinephrine

821 patients

28 day mortality

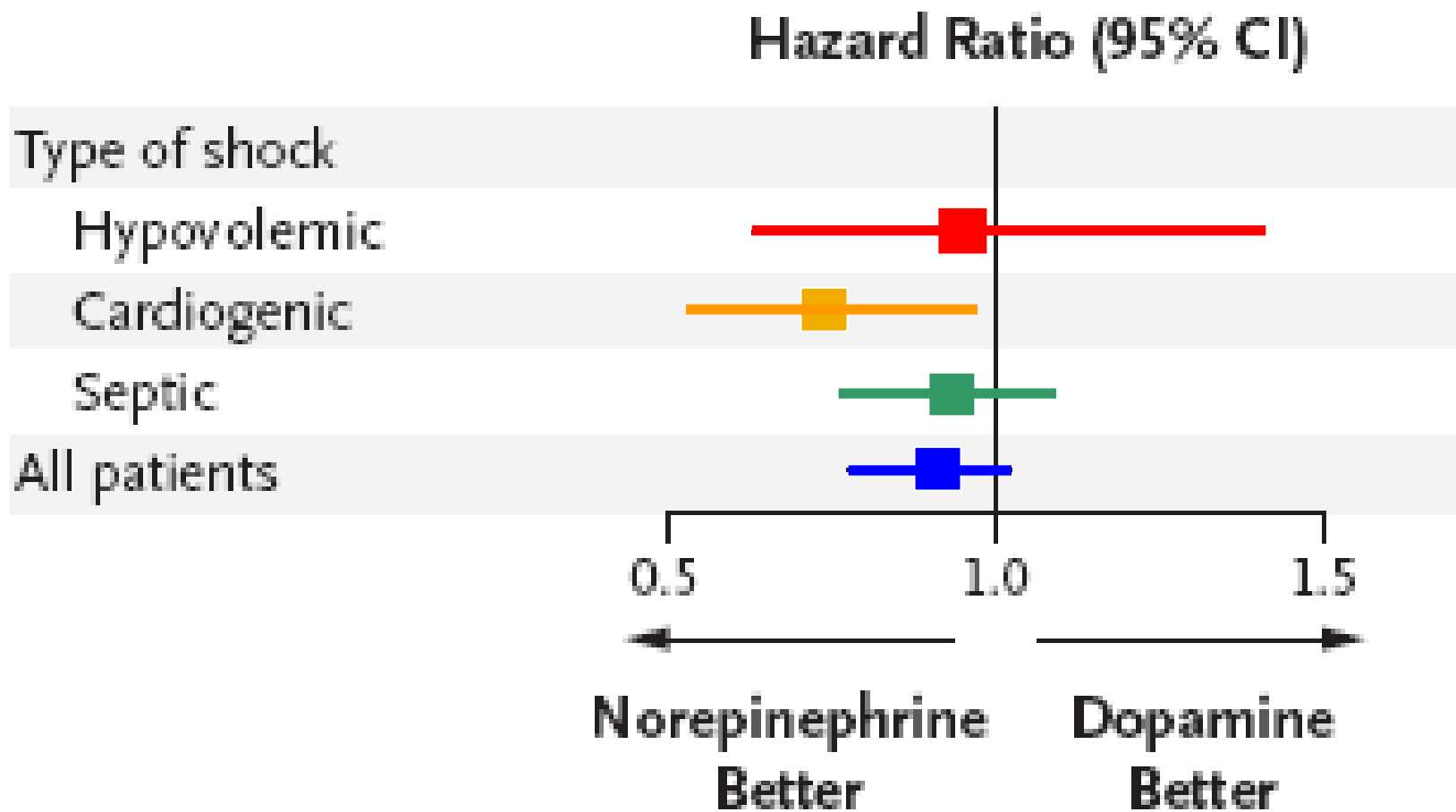


No. at Risk

Norepinephrine	821	617	553	504	467	432	412	394
Dopamine	858	611	546	494	452	426	407	386

Figure 2. Kaplan–Meier Curves for 28-Day Survival in the Intention-to-Treat Population.

Forest Plot for Predefined Subgroup Analysis According to Type of Shock.



Secondary Outcomes and Adverse Events

Adverse events			
Arrhythmias — no. (%)	207 (24.1)	102 (12.4)	<0.001
Atrial fibrillation	176 (20.5)	90 (11.0)	
Ventricular tachycardia	21 (2.4)	8 (1.0)	
Ventricular fibrillation	10 (1.2)	4 (0.5)	

ORIGINAL ARTICLE

Noninvasive Ventilation in Acute

Multicenter, open, prospective, randomized, controlled trial

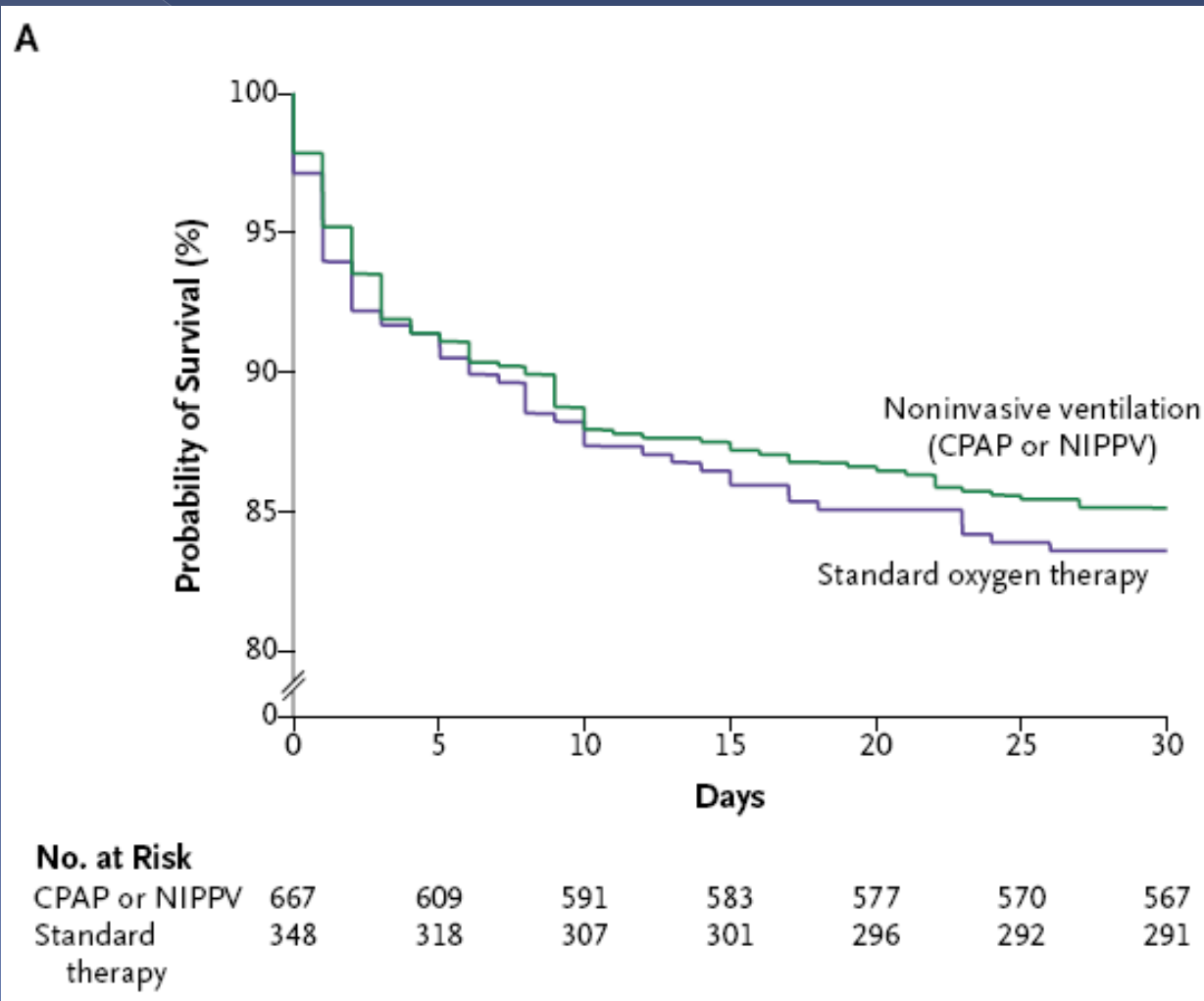
Standard oxygen therapy	CPAP	NIPPV
(N = 367)	(N = 346)	(N = 356)
Death or intubation within 7 days		

July 10,, 2008

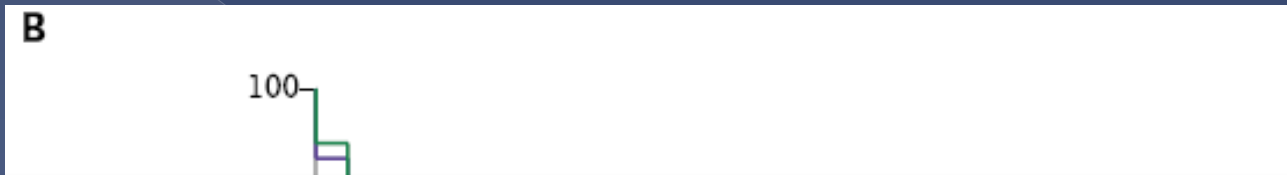
Table 3. Primary and Secondary End Points for Patients Receiving Standard Oxygen Treatment and Those Receiving Noninvasive Ventilation (CPAP or NIPPV).*

Variable	Standard Oxygen Treatment (N=367)	CPAP or NIPPV (N=702)	Odds Ratio (95% CI)	P Value
Death within 7 days (% of patients)	9.8	9.5	0.97 (0.63 to 1.48)	0.87
Death within 30 days (% of patients)	16.4	15.2	0.92 (0.64 to 1.31)	0.64
Intubation within 7 days (% of patients)	2.8	2.9	1.05 (0.49 to 2.27)	0.90
Admission to critical care unit (% of patients)	40.5	45.2	1.21 (0.93 to 1.57)	0.15
Myocardial infarction (% of patients)				
Mean change at 1 hr after start of treatment‡				
Dyspnea score§	3.9	4.6	0.7 (0.2 to 1.3)	0.008
Pulse rate (beats/min)	13	16	4 (1 to 6)	0.004
Mean length of hospital stay (days)	10.5	11.4	0.9 (-0.2 to 2.0)	0.10
Mean change at 1 hr after start of treatment‡				
Arterial pH	0.08	0.11	0.03 (0.02 to 0.04)	<0.001
Arterial PaO ₂ (kPa)	0.7	-0.6	-1.2 (-2.6 to 0.1)	0.07
Arterial PaCO ₂ (kPa)	0.8	1.5	0.7 (0.4 to 0.9)	<0.001
Respiratory rate (breaths/min)	7.1	7.2	0.2 (-0.8 to 1.1)	0.74
Peripheral oxygen saturation (%)	3.5	3.0	-0.4 (-1.4 to 0.6)	0.41
Arterial pH	0.08	0.11	0.03 (0.02 to 0.04)	<0.001
Arterial PaO ₂ (kPa)	0.7	-0.6	-1.2 (-2.6 to 0.1)	0.07
Arterial PaCO ₂ (kPa)	0.8	1.5	0.7 (0.4 to 0.9)	<0.001
Serum bicarbonate level (mmol/liter)	1.7	1.8	0.1 (-0.7 to 1.0)	0.77

Kaplan–Meier Survival Curves.: Comparison between noninvasive and standard oxygen therapy

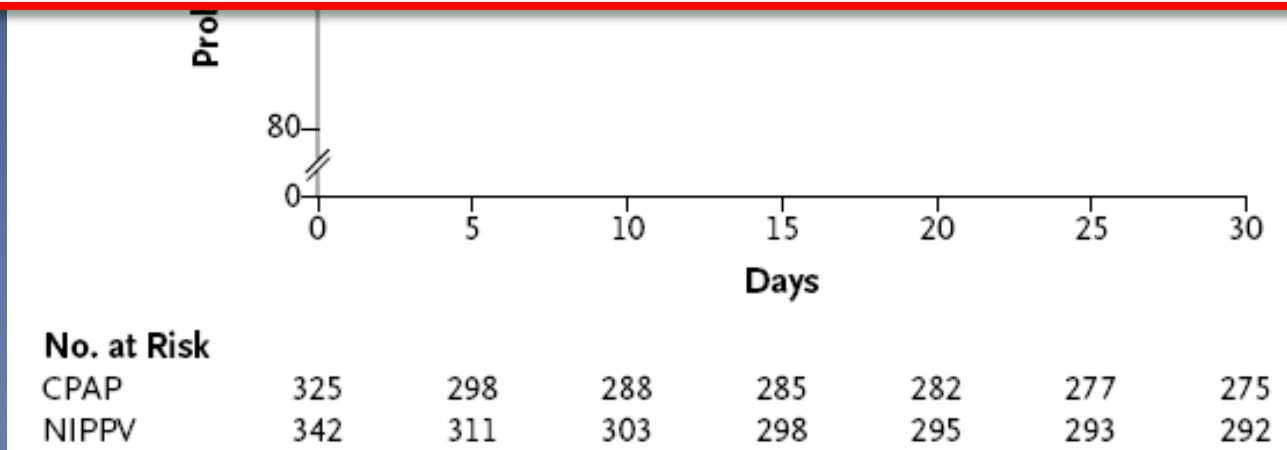


Kaplan–Meier Survival Curves.: continuous positive airway pressure and noninvasive intermittent positive-pressure ventilation



CONCLUSIONS

In patients with acute cardiogenic pulmonary edema, noninvasive ventilation induces a more rapid improvement in respiratory distress and metabolic disturbance than does standard oxygen therapy but has no effect on short-term mortality. (Current Controlled Trials number, ISRCTN07448447.)



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VOL. 361 NO. 17

Intensity of Continuous Renal-Replacement Therapy in Critically Ill Patients

Multicenter, randomized trial

Continuous renal-replacement therapy in the form of postdilution continuous venovenous hemodiafiltration with different effluent flow intensity)

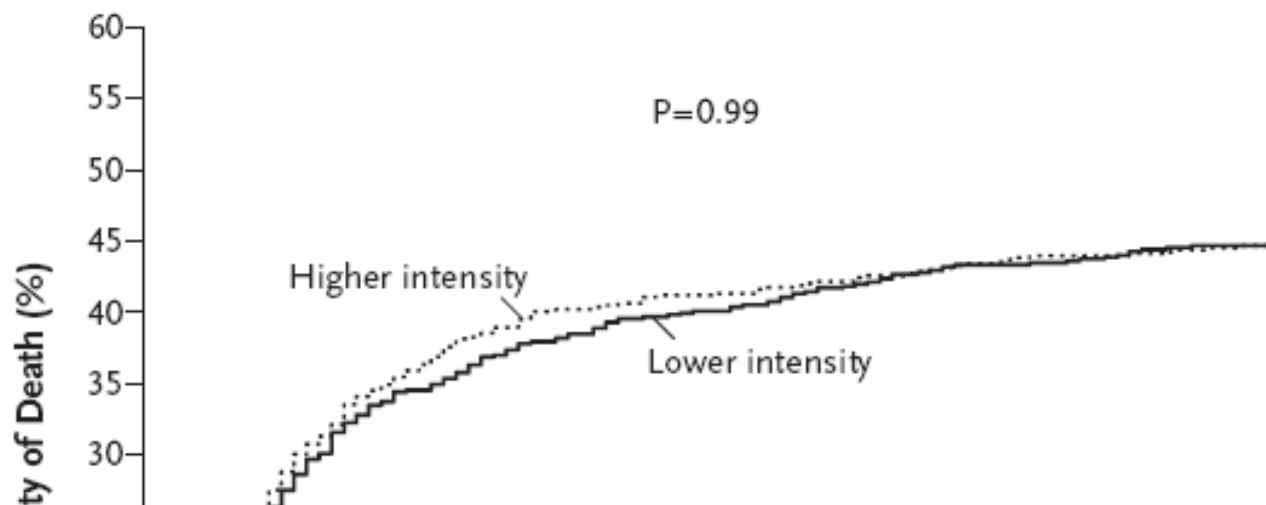
40 ml per kilogram per hour
(higher intensity)

(N = 747)

25 ml per kilogram per hour
(lower intensity).

(N = 761)

Death after 90 days



CONCLUSIONS

In critically ill patients with acute kidney injury, treatment with higher-intensity continuous renal-replacement therapy did not reduce mortality at 90 days. (ClinicalTrials.gov number, NCT00221013.)

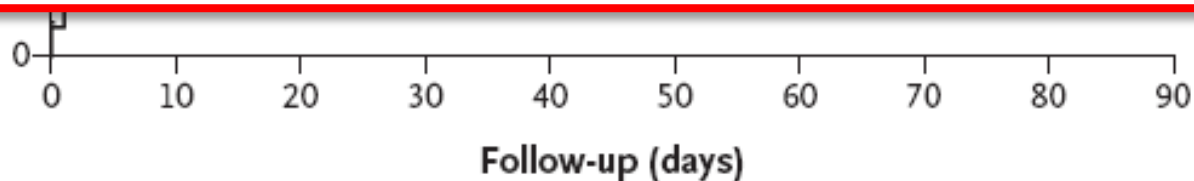


Figure 2. Kaplan–Meier Estimates of the Probability of Death.

Mortality at 28 days was similar in the higher-intensity and lower-intensity treatment groups (38.5% and 36.9%, respectively), and mortality at 90 days was the same (44.7%) in both groups.

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MARCH 26, 2009

VOL. 360 NO. 13

Intensive versus Conventional Glucose Control in Critically Ill Patients

Multicenter, randomized, controlled trial

Intensive glucose control
Target range of 81 to 108

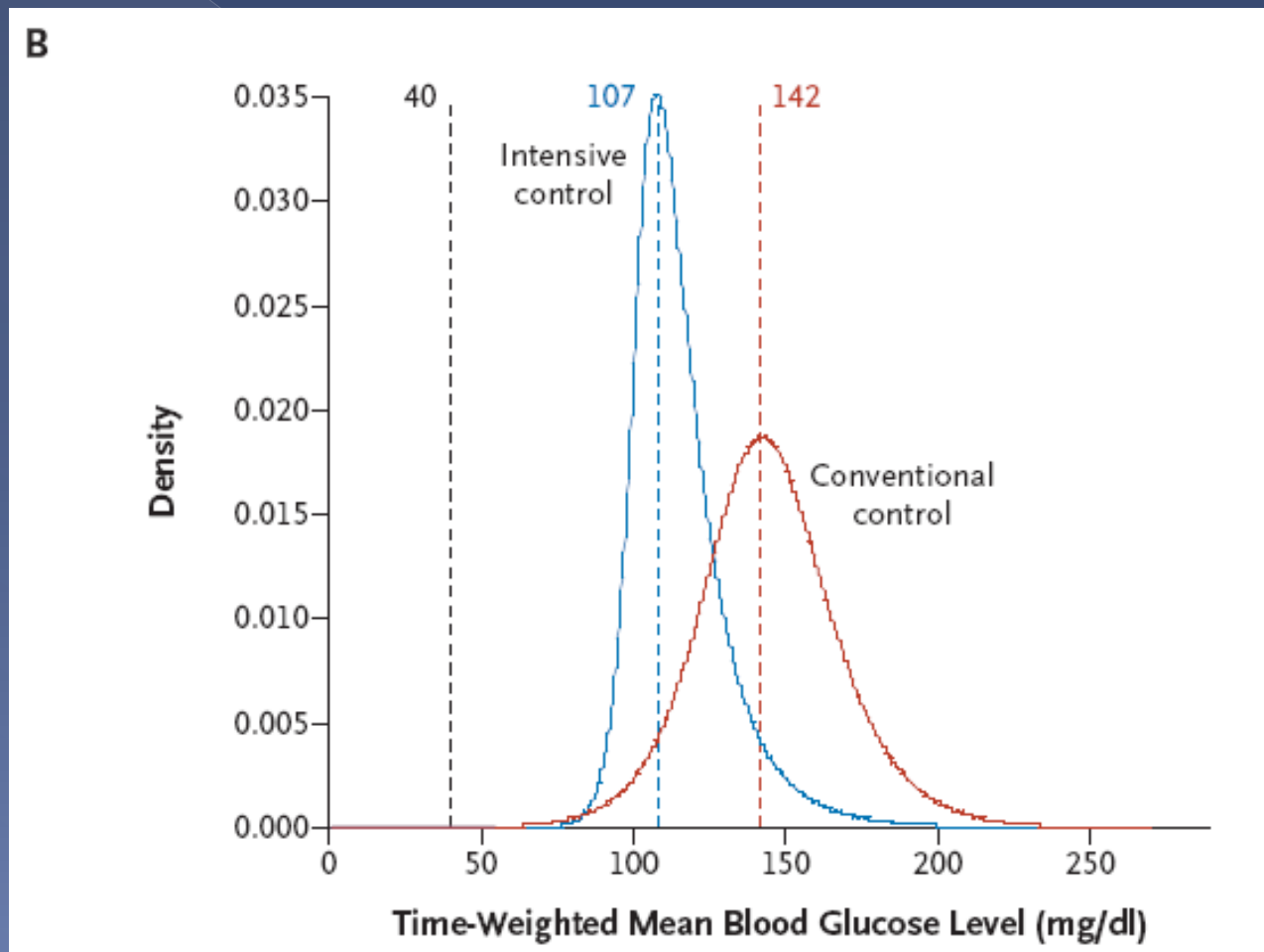
(N = 3054)

Conventional glucose control
Target of 180 mg or less

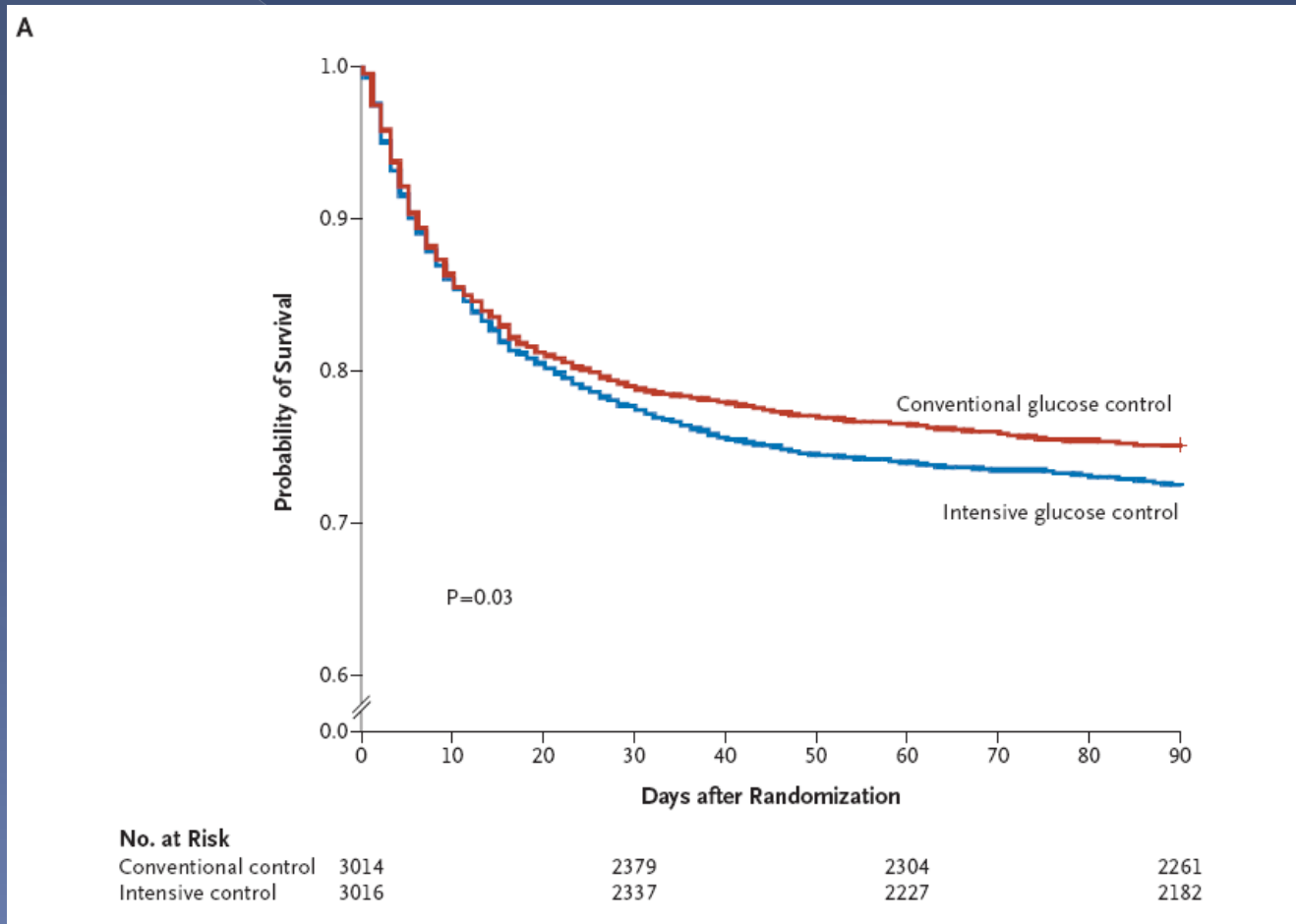
(N = 3050)

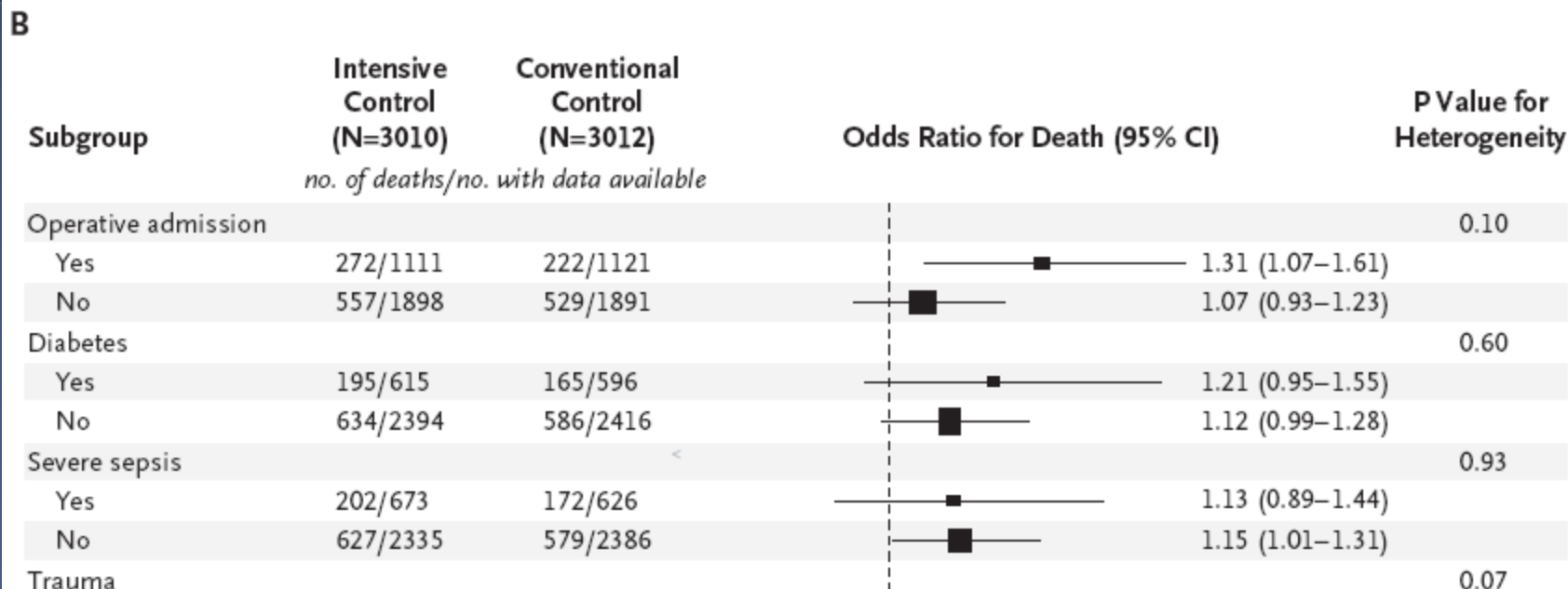
Death after 90 days

Data on Blood Glucose Level, According to Treatment Group



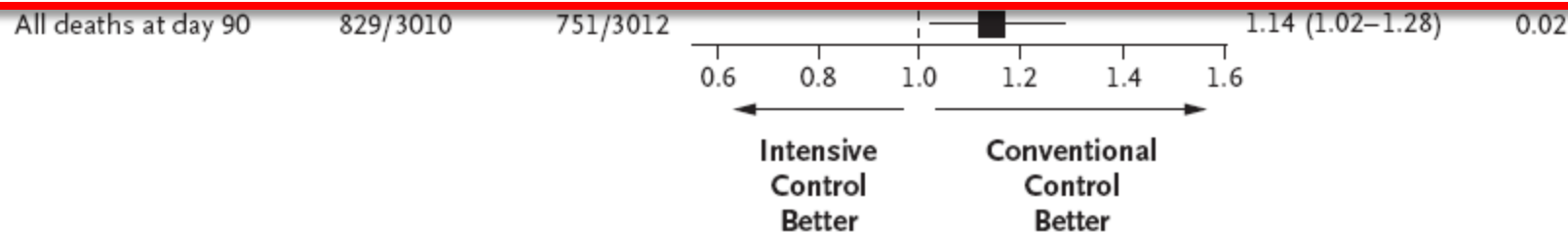
Probability of Survival and Odds Ratios for Death, According to Treatment Group





CONCLUSIONS

In this large, international, randomized trial, we found that intensive glucose control increased mortality among adults in the ICU: a blood glucose target of 180 mg or less per deciliter resulted in lower mortality than did a target of 81 to 108 mg per deciliter. (ClinicalTrials.gov number, NCT00220987.)



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VOL. 358 NO. 2

Hydrocortisone Therapy for Patients with Septic Shock

Multicenter, randomized, double-blind, placebo-controlled

Intervention

251 patients received 50 mg of intravenous hydrocortisone every 6 hours for 5 days

Control

248 patients to receive placebo every 6 hours for 5 days

28 day mortality

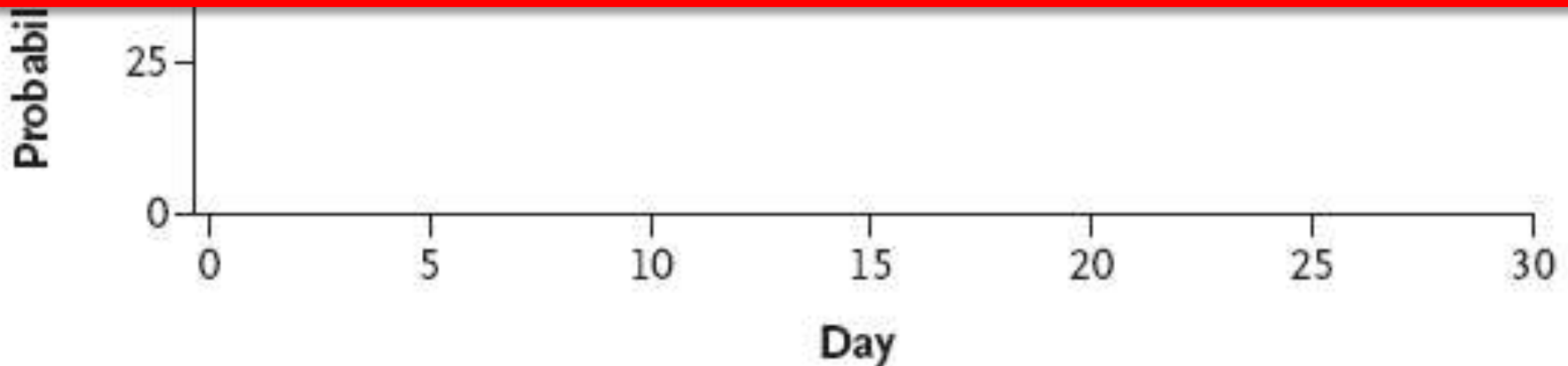
Kaplan–Meier Curves for Survival at 28 Days

C All Patients

100

CONCLUSIONS

Hydrocortisone did not improve survival or reversal of shock in patients with septic shock, either overall or in patients who did not have a response to corticotropin, although hydrocortisone hastened reversal of shock in patients in whom shock was reversed. (ClinicalTrials.gov number, NCT00147004.)



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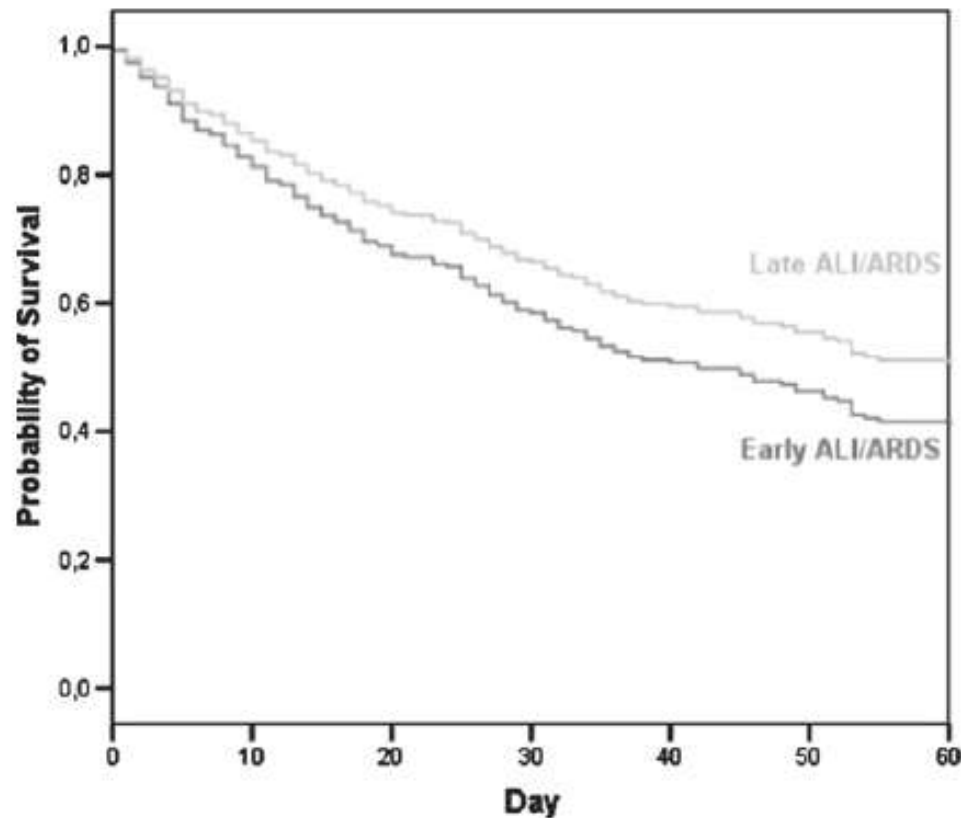
ARDS of Early or Late Onset : Does It Make a Difference?

Jean-Louis Vincent, Yasser Sakr, Johan Groeneveld, Durk F. Zandstra, Eric Hoste, Yannick Malledant, Katie Lei and Charles L. Sprung

Chest 2010;137;81-87; Prepublished online October 9, 2009;
DOI 10.1378/chest.09-0714

Survival of patients with early- and late-onset ALI/ARDS according to time from ICU admission: unadjusted survival curves

A: p-value=0.10



CHEST[®]

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Retrospective Analysis

Pantoprazole

Ranitidine

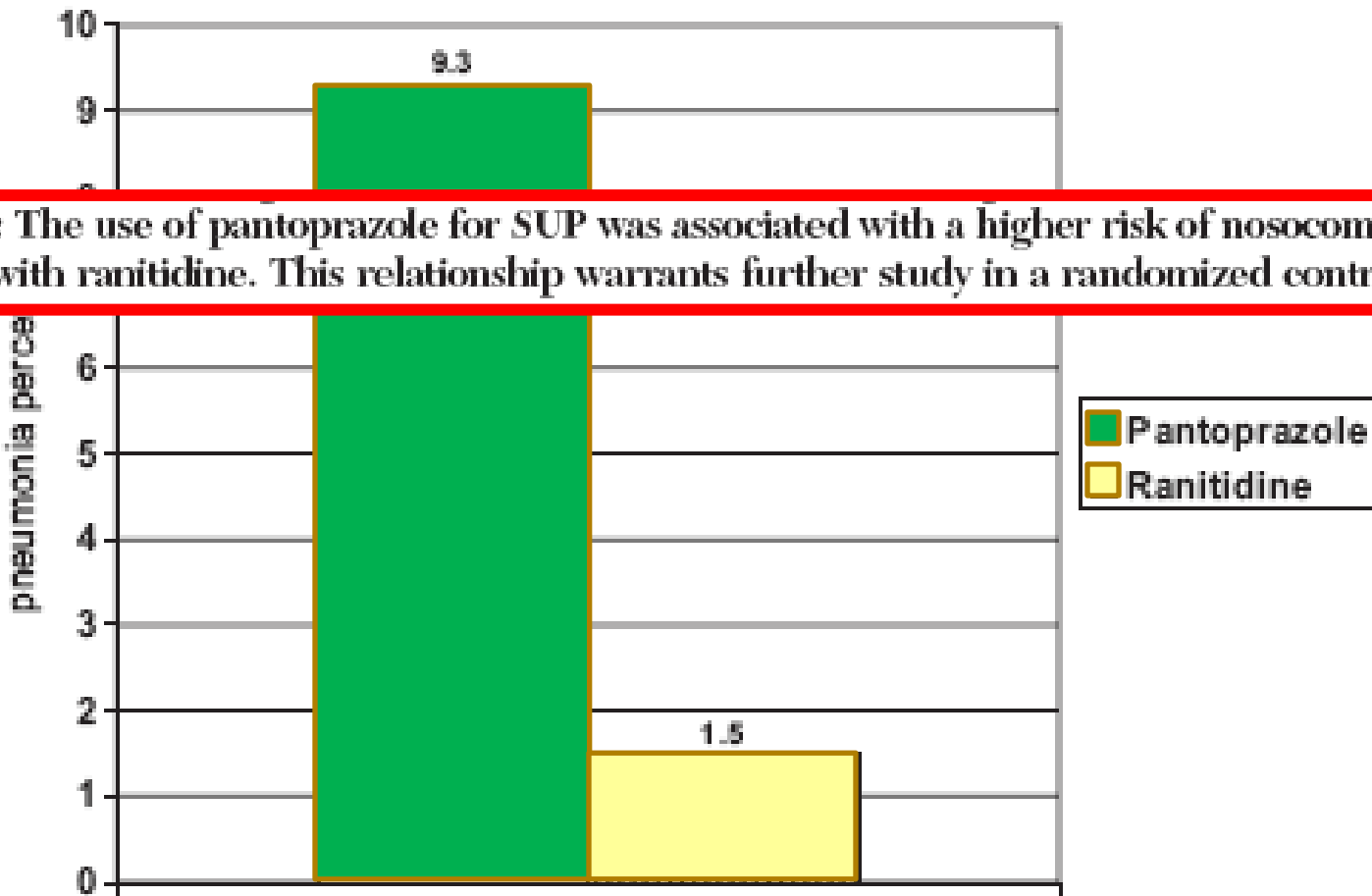
377 Patients

457 Patients

Incidence of nosocomial pneumonia during ICU stay

Chest 2009;136;440-447; Prepublished online March 24, 2009;
DOI 10.1378/chest.08-1634

Unadjusted Pneumonia Incidence



Conclusion: The use of pantoprazole for SUP was associated with a higher risk of nosocomial pneumonia compared with ranitidine. This relationship warrants further study in a randomized controlled trial.

JAMA®

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Online article and related content
current as of April 18, 2010.

Chlorhexidine-Impregnated Sponges and Less Frequent Dressing Changes for Prevention of Catheter-Related Infections in Critically Ill Adults: A Randomized Controlled Trial

Jean-François Timsit; Carole Schwebel; Lila Bouadma; et al.

JAMA. 2009;301(12):1231-1241 (doi:10.1001/jama.2009.376)

Study Design

Intervention		Control	
Chlorhexidine gluconate–impregnated sponge (CHGIS)		Standard Dressing	
Every 7 days	Every 3 Days	Every 7 days	Every 3 Days
413 Patients	412 Patients	412 Patients	416 Patients

Major CRIs for comparison of CHGIS vs control dressings;
colonization rate for comparison of 3- vs 7-day dressing changes.

Hazard Ratios in the Intention-To-Treat and Per-Protocol Analyses

Table 3. Hazard Ratios in the Intention-To-Treat and Per-Protocol Analyses

Variable	Dressing						Dressing Change Interval					
	Incidence, No./1000 Catheter-Days		ITT Analysis		Per-Protocol Analysis ^a		Incidence, No./1000 Catheter-Days		ITT Analysis		Per-Protocol Analysis ^a	
	Control	CHGIS	HR	P	HR	P	3 d	7 d	HR	P	HR	P
	(n = 1825)	(n = 1953)	(95% CI)	Value	(95% CI)	Value	(n = 1815)	(n = 1963)	(95% CI)	Value	(95% CI)	Value
Catheter colonization >10 CFUs/plate	15.8	6.3	0.36 (0.28-0.46)	<.001	0.35 (0.27-0.45)	<.001	10.4	11.0	0.99 (0.77-1.28)	.95	0.99 (0.77-1.28)	.95
Catheter-related bloodstream infection	1.3	0.4	0.24 (0.09-0.65)	.005	0.24 (0.09-0.63)	.004	0.7	0.9	1.26 (0.47-3.34)	.65	1.28 (0.48-3.40)	.62
Major catheter-related infection	1.4	0.6	0.39 (0.16-0.93)	.03	0.38 (0.16-0.92)	.03	0.9	1.1	1.16 (0.50-2.69)	.74	1.18 (0.51-2.73)	.70

Abbreviations: CFU, colony-forming unit; CHGIS, chlorhexidine gluconate-impregnated sponge; CI, confidence interval; HR, hazard ratio; ITT, intention-to-treat.

^aAnalysis adjusted on imbalanced parameters (ie, presence of ≥ 1 chronic disease for comparison of control and CHGIS groups).

JAMA[®]

Online article and related content
current as of April 18, 2010.

Prone Positioning in Patients With Moderate and Severe Acute Respiratory Distress Syndrome

A Randomized Controlled Trial

JAMA. 2009;302(18):1977-1984

Multicenter, unblinded, randomized controlled trial

Supine

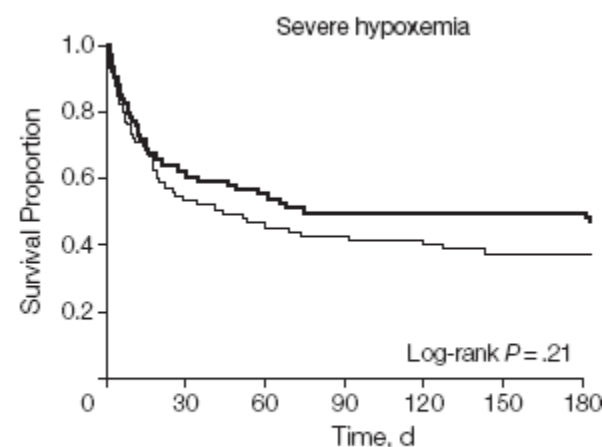
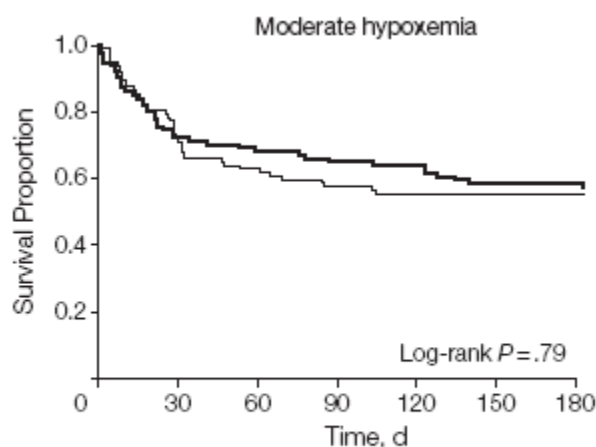
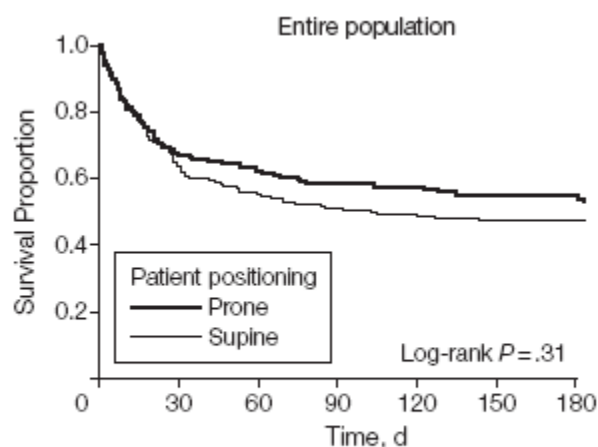
Prone

174 Patients

168 Patients

28-day all-cause mortality

Kaplan-Meier Survival Curves of the Prone Supine II Study Population: Entire Population and Patients With Moderate and Severe Hypoxemia



No. at risk

	0	30	60	90	120	150	180
Prone	168	113	104	96	95	90	90
Supine	174	110	95	87	84	81	81

	0	30	60	90	120	150	180
Prone	94	68	64	60	59	54	54
Supine	98	70	60	55	53	53	53

	0	30	60	90	120	150	180
Prone	74	45	40	36	36	36	36
Supine	76	40	35	32	31	28	28

Conclusion Data from this study indicate that prone positioning does not provide significant survival benefit in patients with ARDS or in subgroups of patients with moderate and severe hypoxemia.

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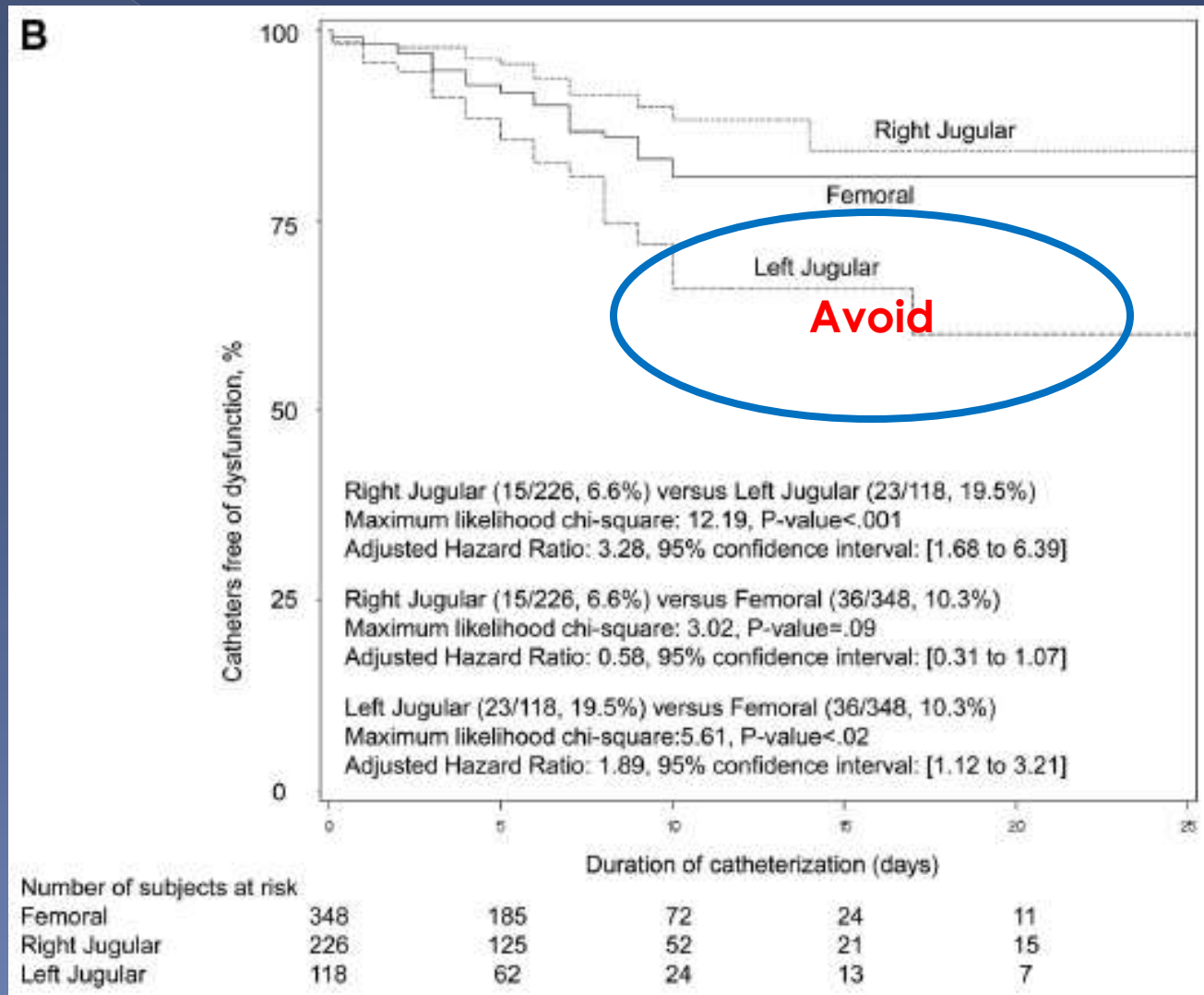
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Catheter dysfunction and dialysis performance according to vascular access among 736 critically ill adults requiring renal replacement therapy: A randomized controlled study

Jean-Jacques Parienti, MD, PhD; Bruno Mégarbane, MD, PhD; Marc-Olivier Fischer, MD; Alexandre Lautrette, MD, PhD; Nicole Gazui, MD; Nathalie Marin, PharmD; Jean-Luc Hanouz, MD, PhD; Michel Ramakers, MD; Cédric Daubin, MD; Jean-Paul Mira, MD, PhD; Pierre Charbonneau, MD; Damien du Cheyron, MD, PhD; for Members of the Cathedia Study Group

Crit Care Med 2010 Vol. 38, No. 4

Catheter dysfunction according to randomized sites



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Duodenal versus gastric feeding in medical intensive care unit patients: A prospective, randomized, clinical study*

Prospective, randomized, clinical study

Nasoduodenal Feeding

59 Patients

Nasogastric Feeding

62 Patients

Optimal nutritional support assessed by measurement of time to goal tube feed rate and daily calorie and protein intake.

Crit Care Med 2009 Vol. 37, No. 6

Primary Outcome

Parameter	NG Group (n = 62)	ND Group (n = 59)	p
Mean daily calories intake			
kcal/d, mean \pm SD	1426 \pm 110	1658 \pm 118	0.02
kcal·kg ⁻¹ ·d ⁻¹ , mean \pm SD	23.5 \pm 8.8	27.1 \pm 7.6	0.02
Mean daily protein intake			
g/day, mean \pm SD	58.8 \pm 4.9	67.9 \pm 4.9	0.03
g·kg ⁻¹ ·d ⁻¹ , mean \pm SD	0.97 \pm 0.39	1.11 \pm 0.31	0.03
Mean percentage of daily goal calorie fed (%), mean \pm SD)	83 \pm 6	95 \pm 5	0.003
Time to goal rate, (hr), mean \pm SD	54.5 \pm 51.4	32.4 \pm 27.1	0.004

Conclusions: Patients who received ND feedings achieved nutritional goals earlier than those who received NG feeding. ND feeding group also has a lower rate of vomiting and VAP in the medical ICU setting. (Crit Care Med 2009; 37:1866–1872)

medical ICU setting. (crit care med 2009; 37:1866–1872)

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PIRO score for community-acquired pneumonia: A new prediction rule for assessment of severity in intensive care unit patients with community-acquired pneumonia*

Jordi Rello, MD, PhD; Alejandro Rodriguez, MD, PhD; Thiago Lisboa, MD; Miguel Gallego, MD; Manel Lujan, MD; Richard Wunderink, MD, PhD

Crit Care Med 2009 Vol. 37, No. 2

PIRO Score

Score	Variables	Points
Predisposition	COPD or Immunosuppression	1
	Age > 70 ys	1
Insult	Bacteremia	1
	Multilobar opacities on radiograph	1
Response	Shock	1
	Severe hypoxemia	1
Organ dysfunction	Acute renal failure	1
	Respiratory distress syndrome	1

Range 0-8 points

PIRO Score

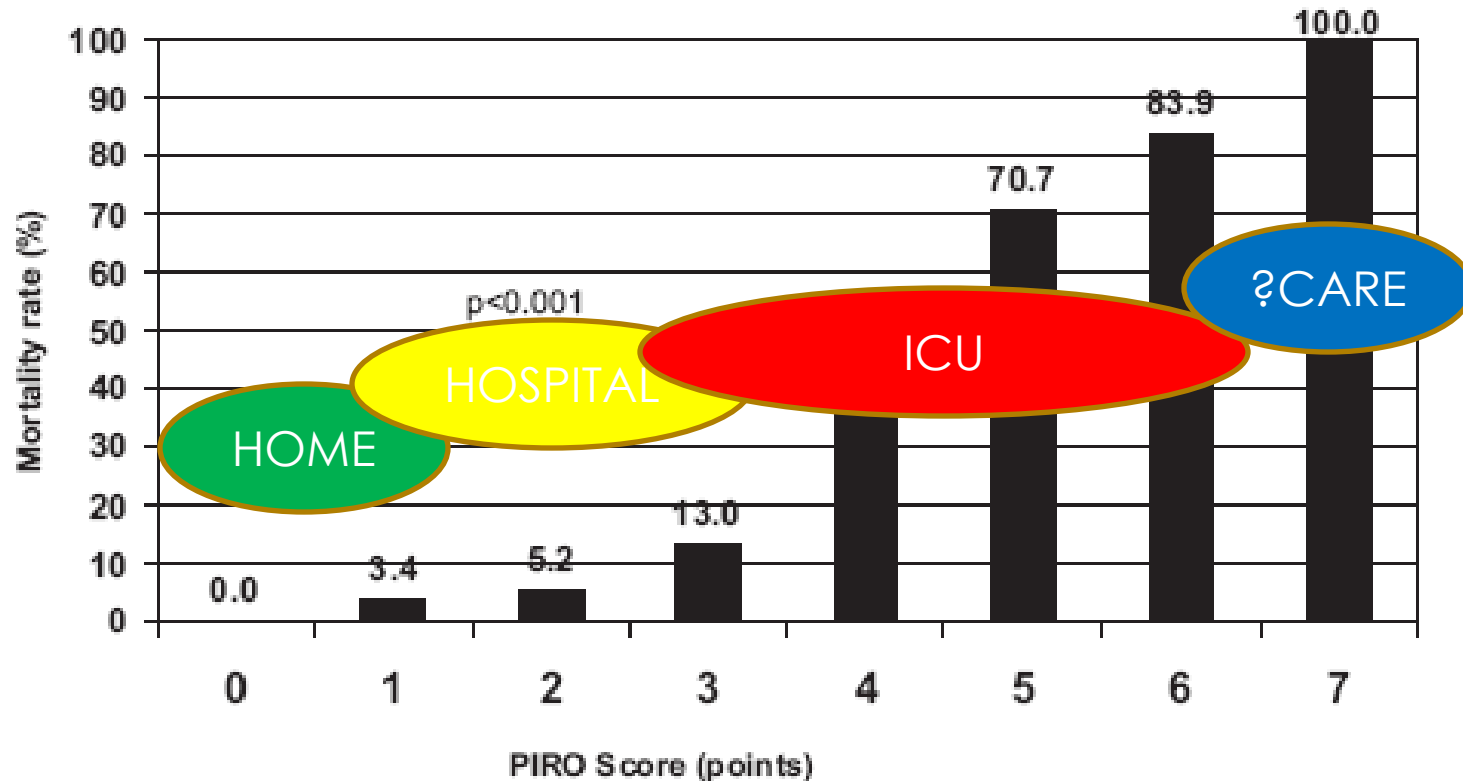


Figure 3. Twenty-eight-day mortality rate according predisposition, insult, response, and organ dysfunction (*PIRO*) score for community-acquired pneumonia.

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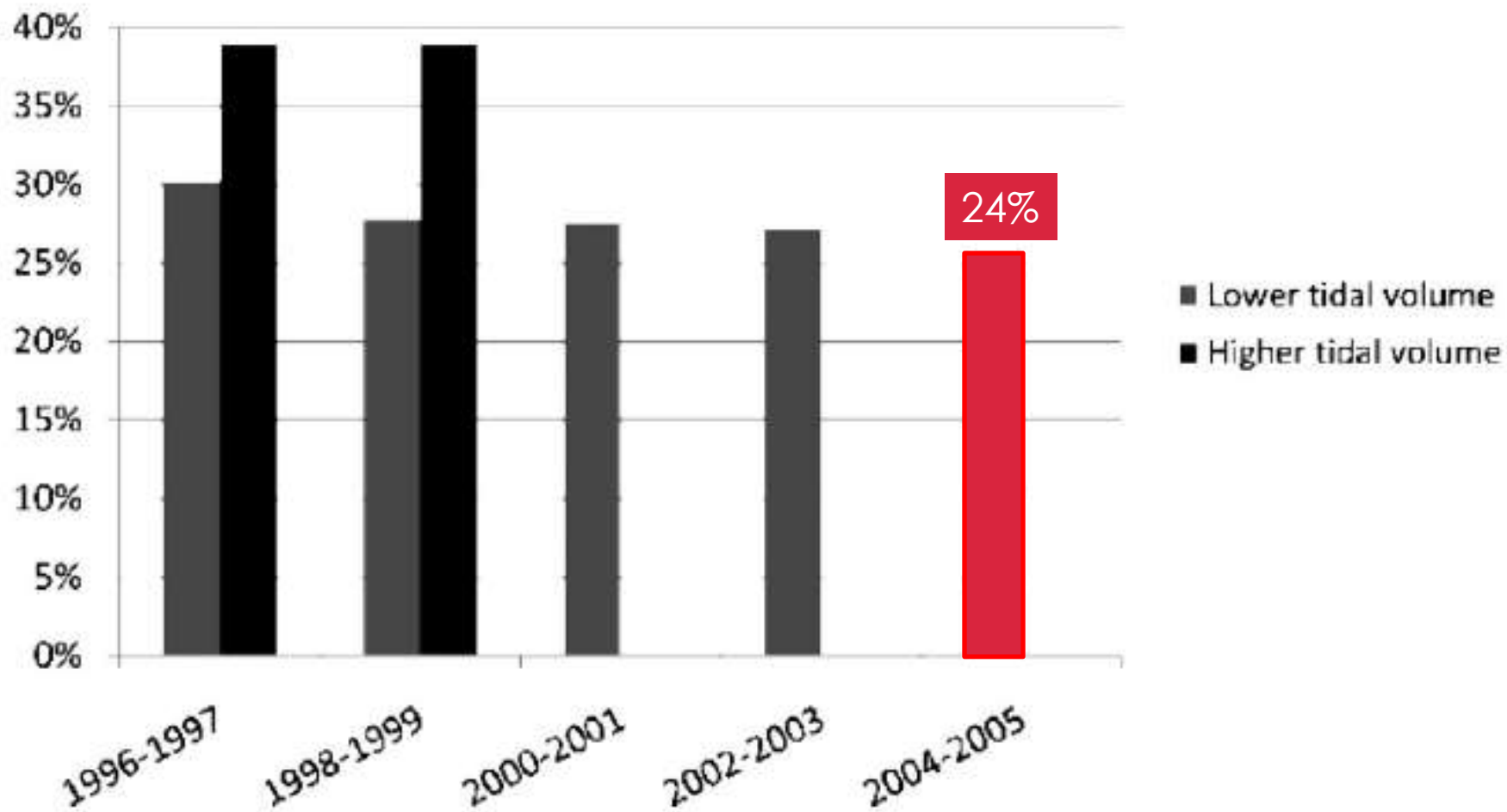


Recent trends in acute lung injury mortality: 1996–2005*

Sara E. Erickson, MD; Greg S. Martin, MD, MSc; J. Lucian Davis, MD; Michael A. Matthay, MD; Mark D. Eisner, MD, MPH; for the NIH NHLBI ARDS Network

Crit Care Med 2009 Vol. 37, No. 5

Crude 60-day mortality among Acute Respiratory Distress Syndrome (ARDS) Network patients, 1996–2005.



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Use of corticosteroids in acute lung injury and acute respiratory distress syndrome: A systematic review and meta-analysis*

Benjamin M. P. Tang, PhD; Jonathan C. Craig, PhD; Guy D. Eslick, PhD; Ian Seppelt, MBBS; Anthony S. McLean, MBBS

Crit Care Med 2009 Vol. 37, No. 5

Mortality

Group by Study Design	Events / Total		Risk ratio and 95% CI		Relative weight (%)	Risk ratio	Lower limit	Upper limit	p-Value
	Treated	Control							
Cohort	Keel	5 / 13	12 / 18		19.39	0.58	0.27	1.24	0.16

Conclusion: The use of low-dose corticosteroids was associated with improved mortality and morbidity outcomes without increased adverse reactions. The consistency of results in both study designs and all outcomes suggests that they are an effective treatment for ALI or ARDS. The mortality benefits in early ARDS should be confirmed by an adequately powered randomized trial. (Crit Care Med 2009; 37:1594–1603)

RCT	ARDSNet	28 / 89	29 / 91		40.13	0.99	0.64	1.52	0.95
RCT	Meduri 2	15 / 63	12 / 28		35.42	0.56	0.30	1.03	0.06
	Subtotal	191	150			0.51	0.24	1.09	0.08
	Total	331	317			0.62	0.43	0.91	0.01

Test for overall effect: $Z = -2.88$, $p = 0.004$
 Test for heterogeneity: $p = 0.039$, $I^2 = 51\%$

0.01 0.1 1 10 100
 Favours Treatment Favours Control

American College of Physicians

Internal 
Medicine 2010

Update in Pulmonary/Critical Care Medicine

Anthony F. Suffredini, MD; Henry Masur, MD; and Joseph P. Lynch III, MD

Using Serum Procalcitonin Levels to Guide Antibiotic Use in Lower Respiratory Infections

Schuetz P, Christ-Crain M, Thomann R, Falconnier C, Wolbers M, Widmer I, et al; ProHOSP Study Group. Effect of procalcitonin-based guidelines vs standard guidelines on antibiotic use in lower respiratory tract infections: the ProHOSP randomized controlled trial. JAMA. 2009;302:1059-66. [PMID: 19738090]

