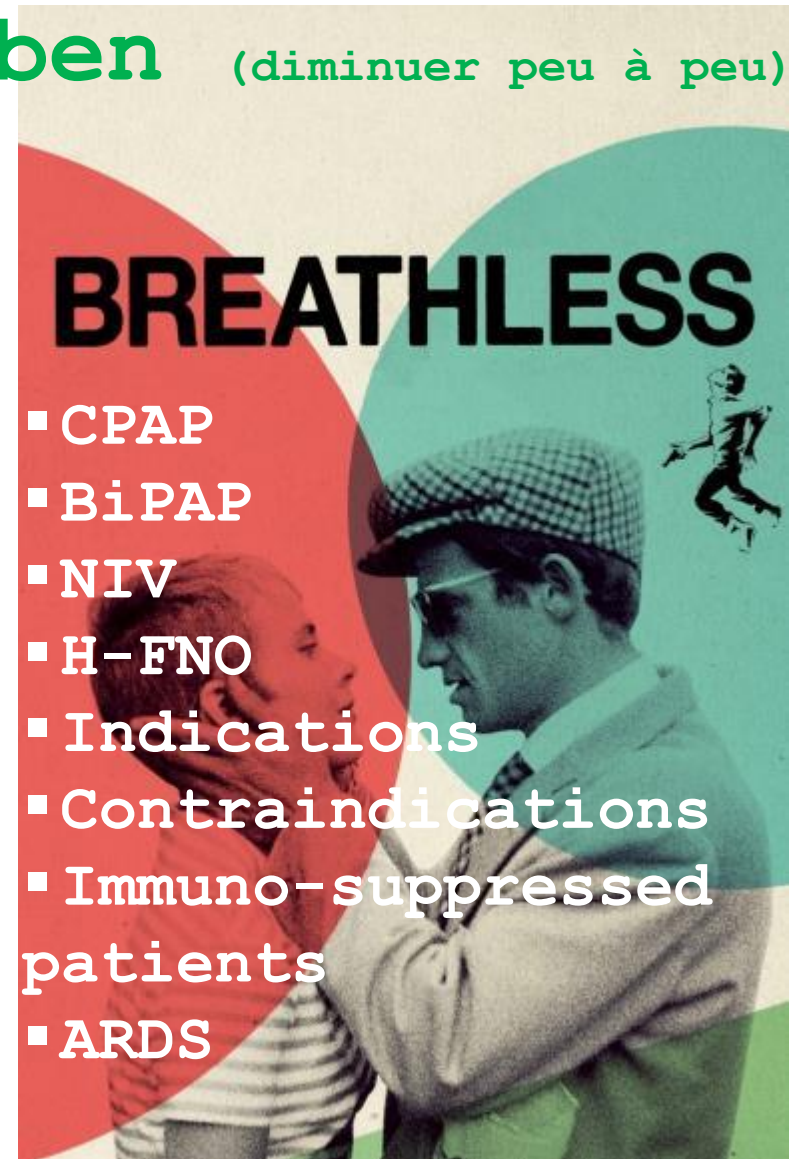
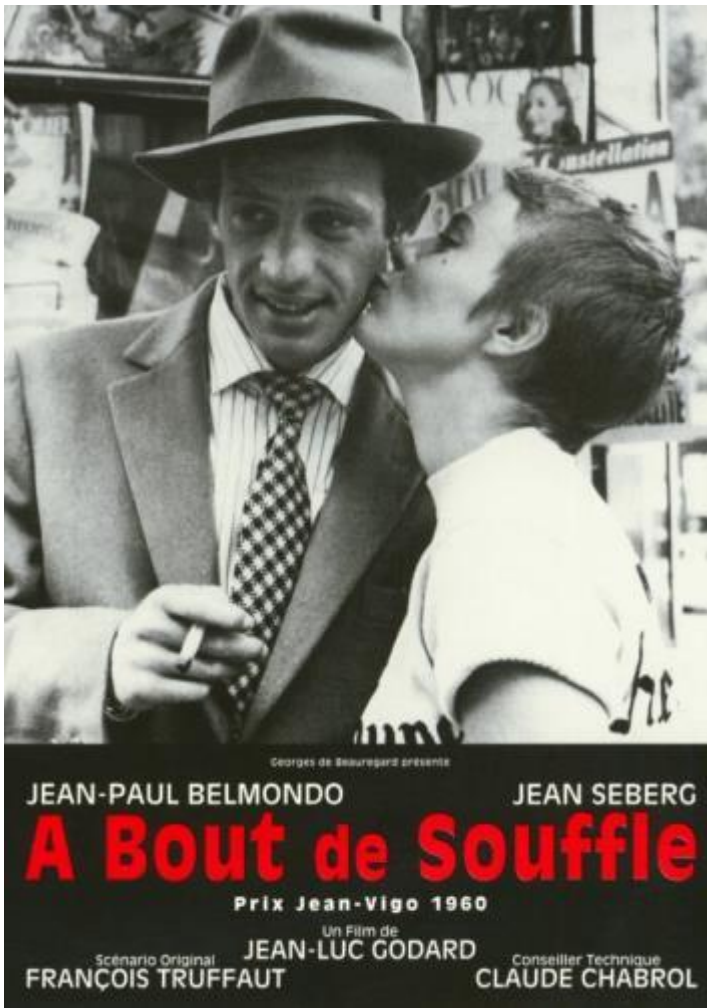




**Nicht invasive
Beatmung auf der IPS**

**Ventilation non
invasive à l'USI**

Nouvelle Vague ... und deren verebben (diminuer peu à peu)



Conflict of interest



Theorie







TRUMP DECLARES CPAP IS «OBSOLET» IN ICU



Kato T, et al. World J Cardiol 2014; 6:1175-1191

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22.04.2017

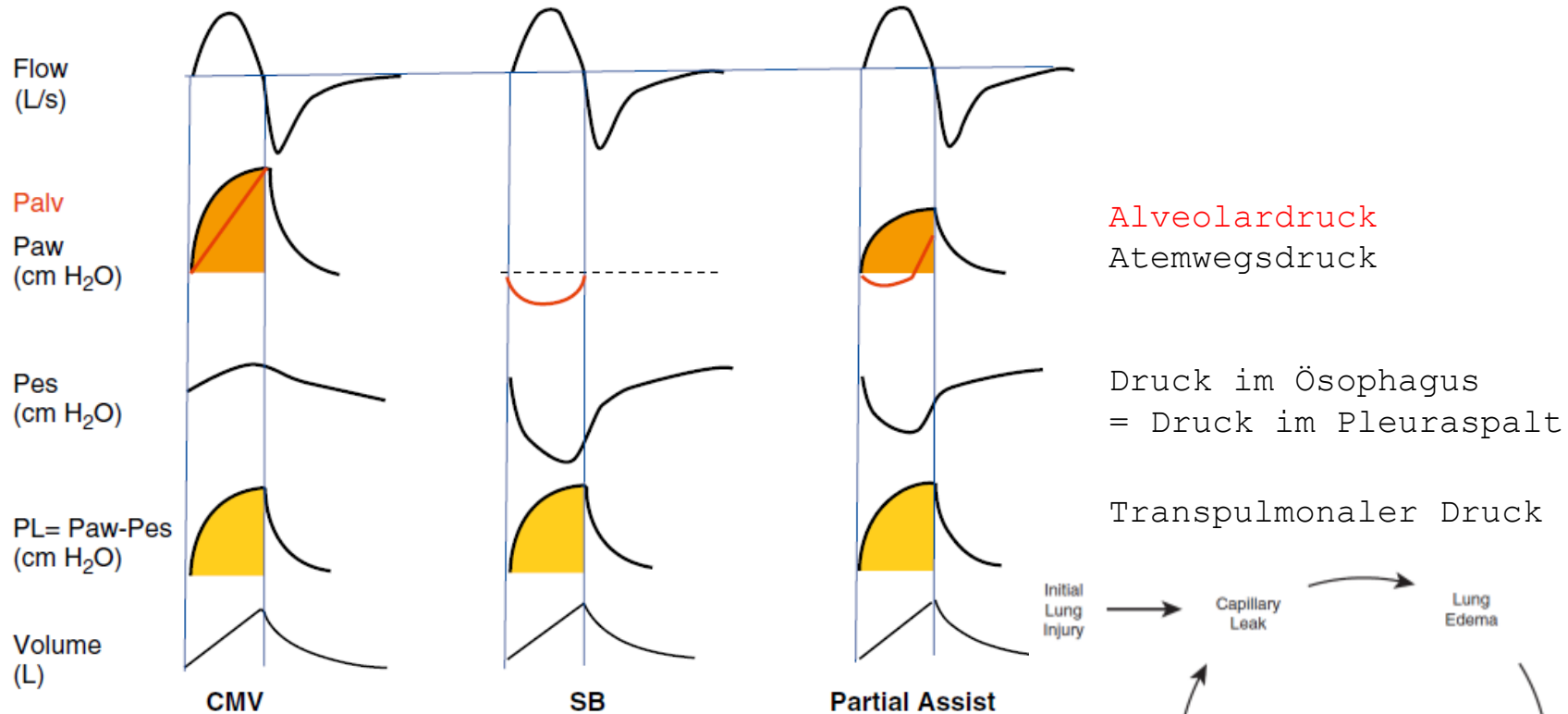
NIV

Non-invasive ventilation



P-SILI; patient self-inflicted lung injury

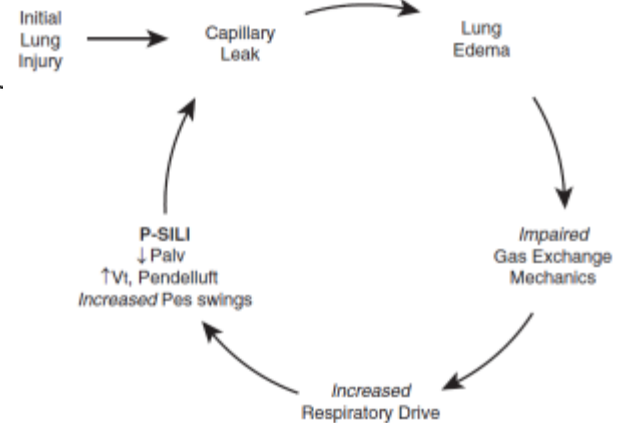
Patienten selbst-verursachter Lungenschaden



Alveolardruck
Atemwegsdruck

Druck im Ösophagus
= Druck im Pleuraspalt

Transpulmonaler Druck



Oxygenations-Index

PaO₂ / FiO₂ Ratio

PaO ₂ /FiO ₂ Ratio	FiO ₂ 0.4 PaO ₂	FiO ₂ 0.6 PaO ₂	FiO ₂ 0.8 PaO ₂	FiO ₂ 1.0 PaO ₂
< 300 mm Hg < 40 kPa	120 16	180 24	240 32	300 40
< 200 mm Hg < 26.6 kPa	80 10.6	120 16	160 21.3	200 26.6
< 150 mm Hg < 20 kPa	60 8	90 12	120 16	150 18
< 100 mm Hg < 13.3 kPa	40 5.3	60 8	80 10.6	120 13.3

Therapie

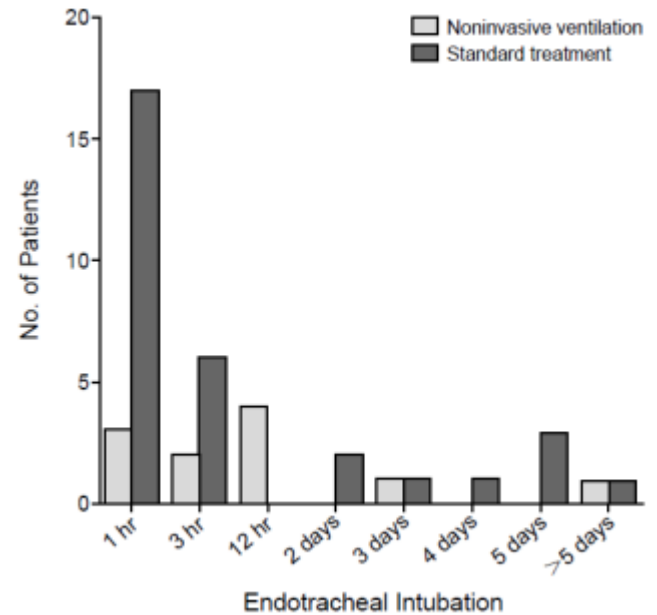
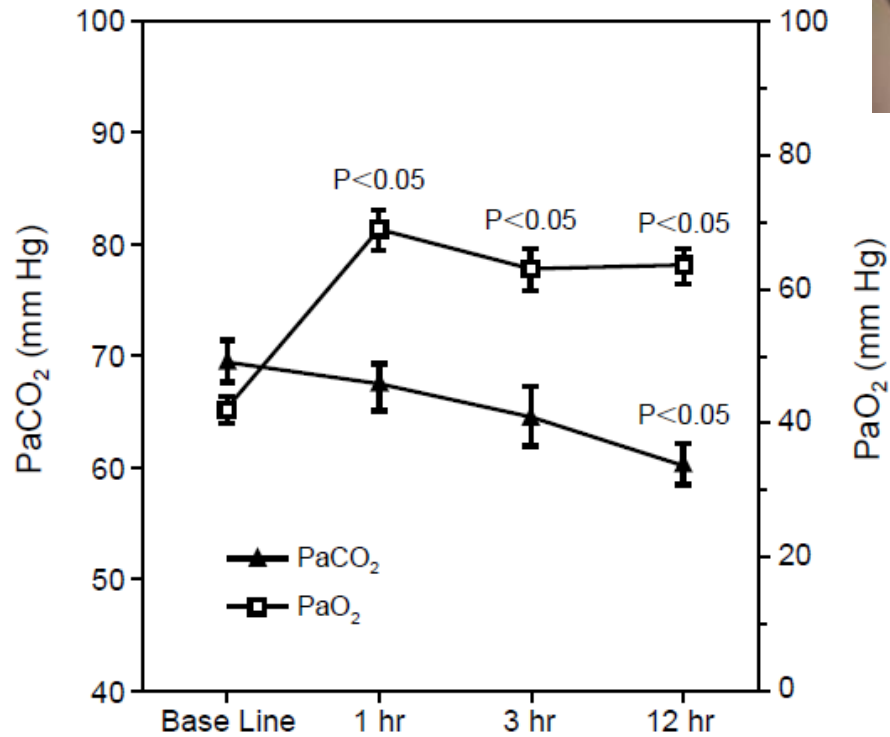
COPD,
Herzinsuffizienz,
Acute Lung Injury,
Immunschwäche.



NIV Kontraindikationen

- Koma, schwere neurologische Störungen (Stoke) und Krampfanfälle (Sedation?)
- Schwierigkeiten mit Sekret-Clearance und dem Offenhalten des Atemwegs
- Kreislaufinstabilität (Blutdruck und Rhythmus)
- Verlegung des oberen Atemwegs
- Schwere obere gastrointestinale Blutung
- Chirurgie, Trauma und Verbrennung von Mund, Kiefer und Gesicht.
- Zustand nach Ösophagus- und Magen Chirurgie
- Nicht entlasteter Pneumothorax
- Erbrechen

NIV und COPD



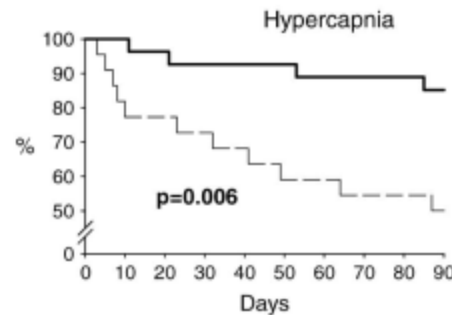
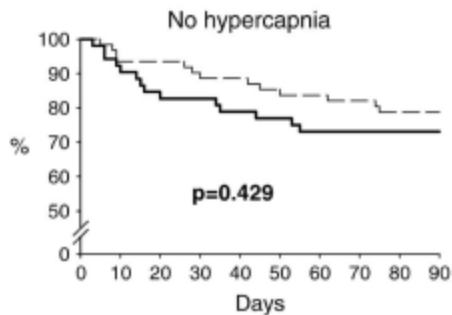
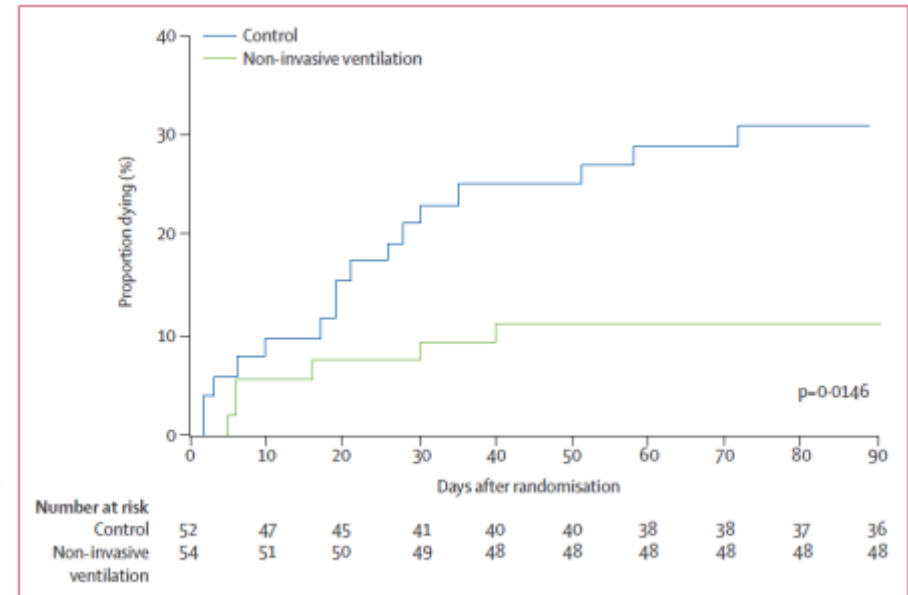
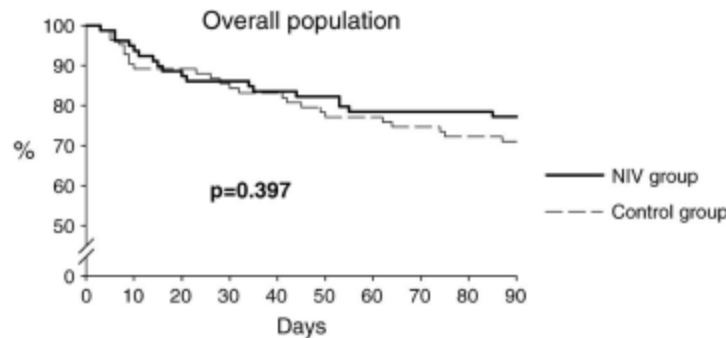
Brochard L, et al. N Engl J Med 1995; 333:817-22

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22.04.2017

Early Noninvasive Ventilation Averts Extubation Failure in Patients at Risk

Non-invasive ventilation after extubation in hypercapnic patients with chronic respiratory disorders: randomised controlled trial



Noninvasive Ventilation in Acute Cardiogenic Pulmonary Edema

Systematic Review and Meta-analysis

Figure 2. Effects of Noninvasive Ventilation on **Death**

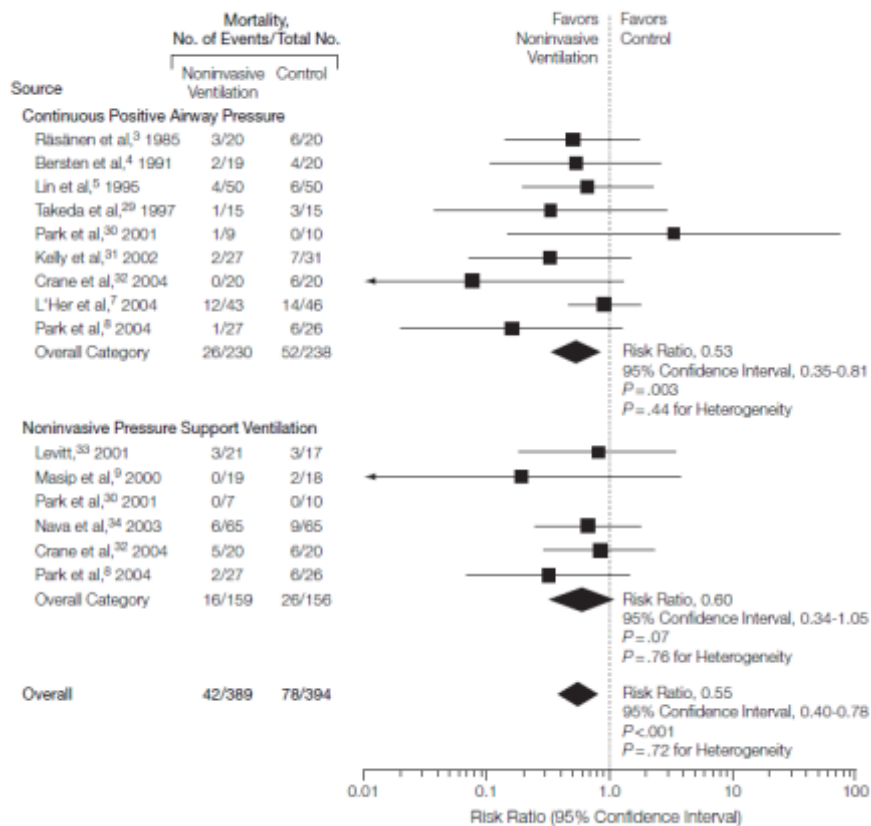
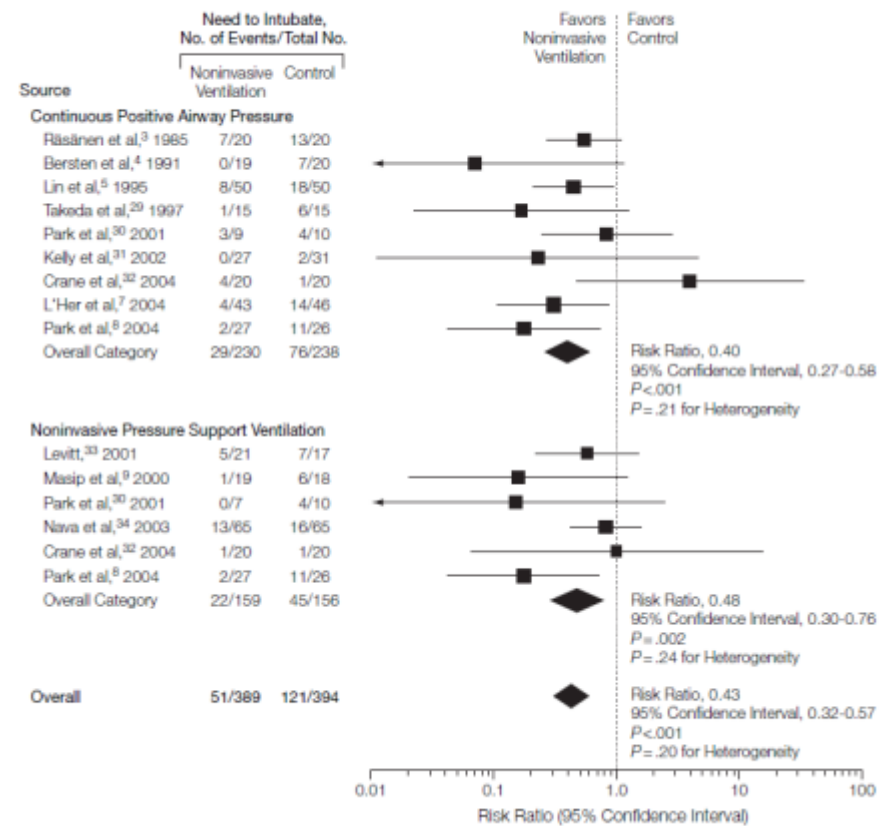


Figure 3. Effects of Noninvasive Ventilation on **Need to Intubate**





TRUMP DECLARES CPAP IS «NOT SO OBSOLET» IN PULMONARY EDEMA

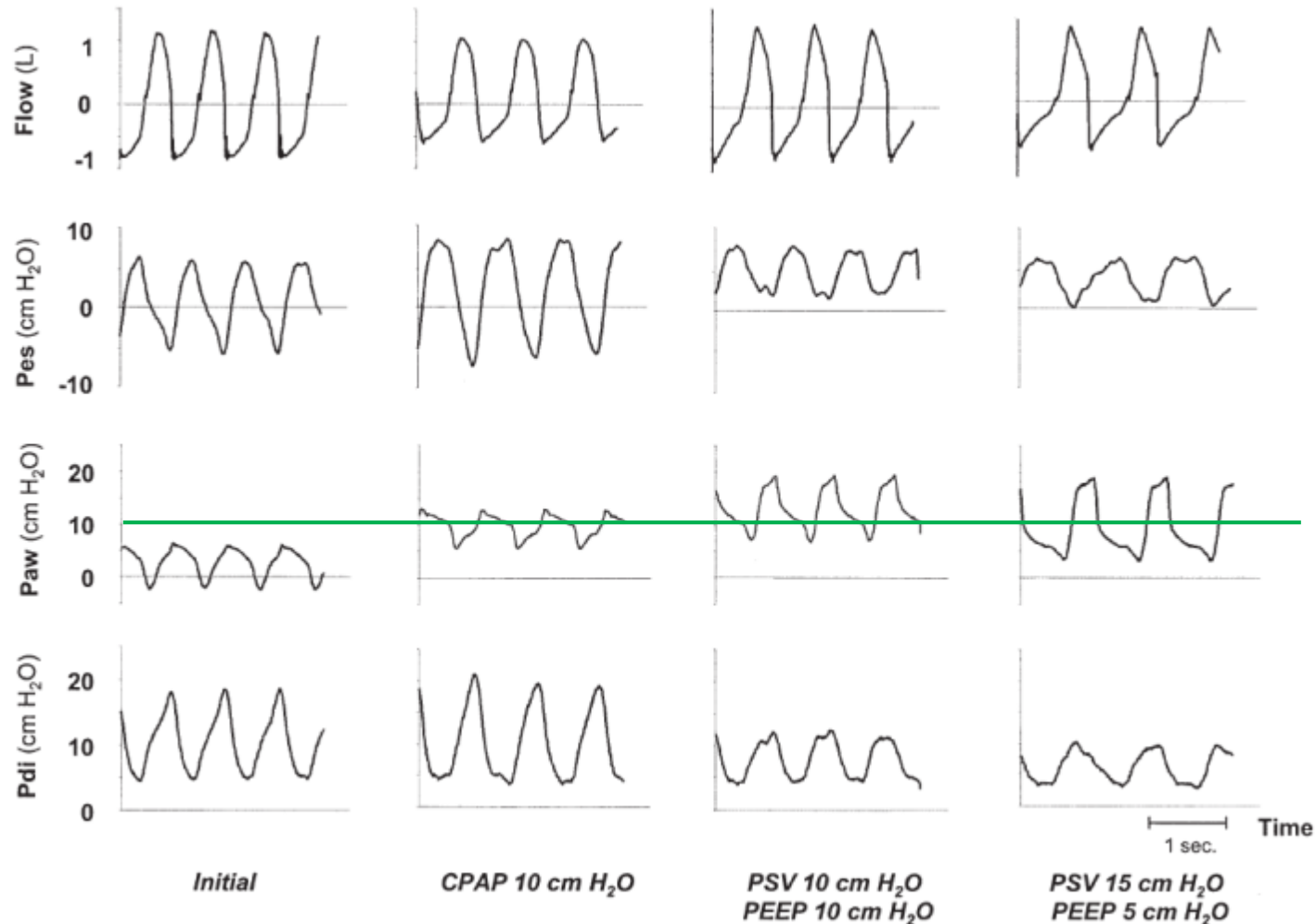
Gray A, et al. New Engl J Med 2008;359:142-51.

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22.04.2017

Physiologic Effects of Noninvasive Ventilation during Acute Lung Injury

Erwan L'Her, Nicolas Deye, François Lellouche, Solenne Taille, Alexandre Demoule, Amanda Fraticelli, Jordi Mancebo, and Laurent Brochard



L'Her et al. Am J Respir Crit Care Med 2005, 172: 1112-1118.

Physiologic Effects of Noninvasive Ventilation during Acute Lung Injury

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TABLE 2. RESPIRATORY PATTERN AND HEMODYNAMIC PARAMETERS DURING THE FIVE STUDY PERIODS

Variable	Initial*	CPAP	PSV10/PEEP10	PSV15/PEEP5	Final
V _T e, ml	524 ± 212	394 ± 224 [†]	483 ± 247	591 ± 279 ^{‡§}	535 ± 229
RR, breaths/min	29 ± 10	28 ± 11	28 ± 11	26 ± 9 [†]	30 ± 12
V̇ _E , L/min	15.7 ± 4.4	12.3 ± 3.4	14.6 ± 3.8	17.6 ± 5.4 [‡]	15.6 ± 5.3
Leaks, %	25 ± 13	39 ± 18 [†]	36 ± 18	37 ± 22 [†]	24 ± 15
MAP, mm Hg	77 ± 13	79 ± 16 [†]	77 ± 16	75 ± 16	84 ± 17 [†]
HR, beats/min	100 ± 13	100 ± 9	95 ± 14	96 ± 16	99 ± 14

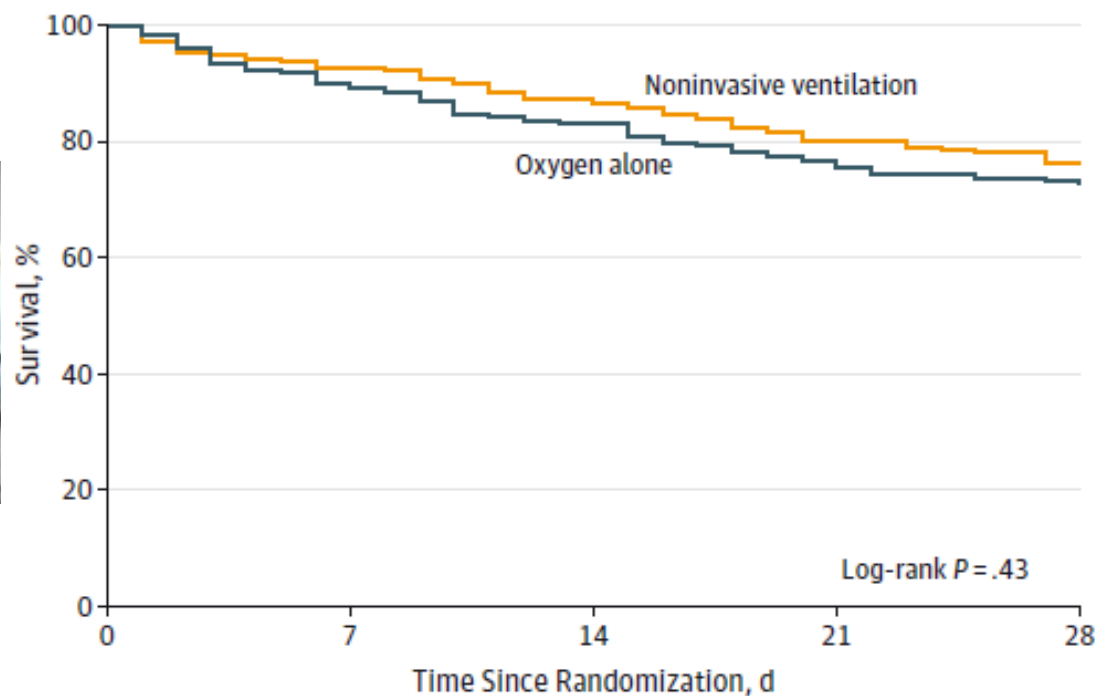
TABLE 3. ARTERIAL BLOOD GASES DURING THE FIVE STUDY PERIODS

Variable	Initial*	CPAP	PSV10/PEEP10	PSV15/PEEP5	Final
pH	7.37 ± 0.10	7.36 ± 0.12	7.39 ± 0.08	7.40 ± 0.08 ^{‡§}	7.38 ± 0.10
Pa _{O₂} /F _{I_{O₂} mm Hg}	131 ± 61	184 ± 74 [†]	206 ± 120 [‡]	153 ± 41	169 ± 83
Pa _{CO₂} mm Hg	42.0 ± 11.3	44.4 ± 17.8	40.2 ± 14.3	38.6 ± 12.3 [§]	42.2 ± 14.4

L'Her et al. Am J Respir Crit Care Med 2005, 172: 1112-1118.

Effect of Noninvasive Ventilation vs Oxygen Therapy on Mortality Among Immunocompromised Patients With Acute Respiratory Failure

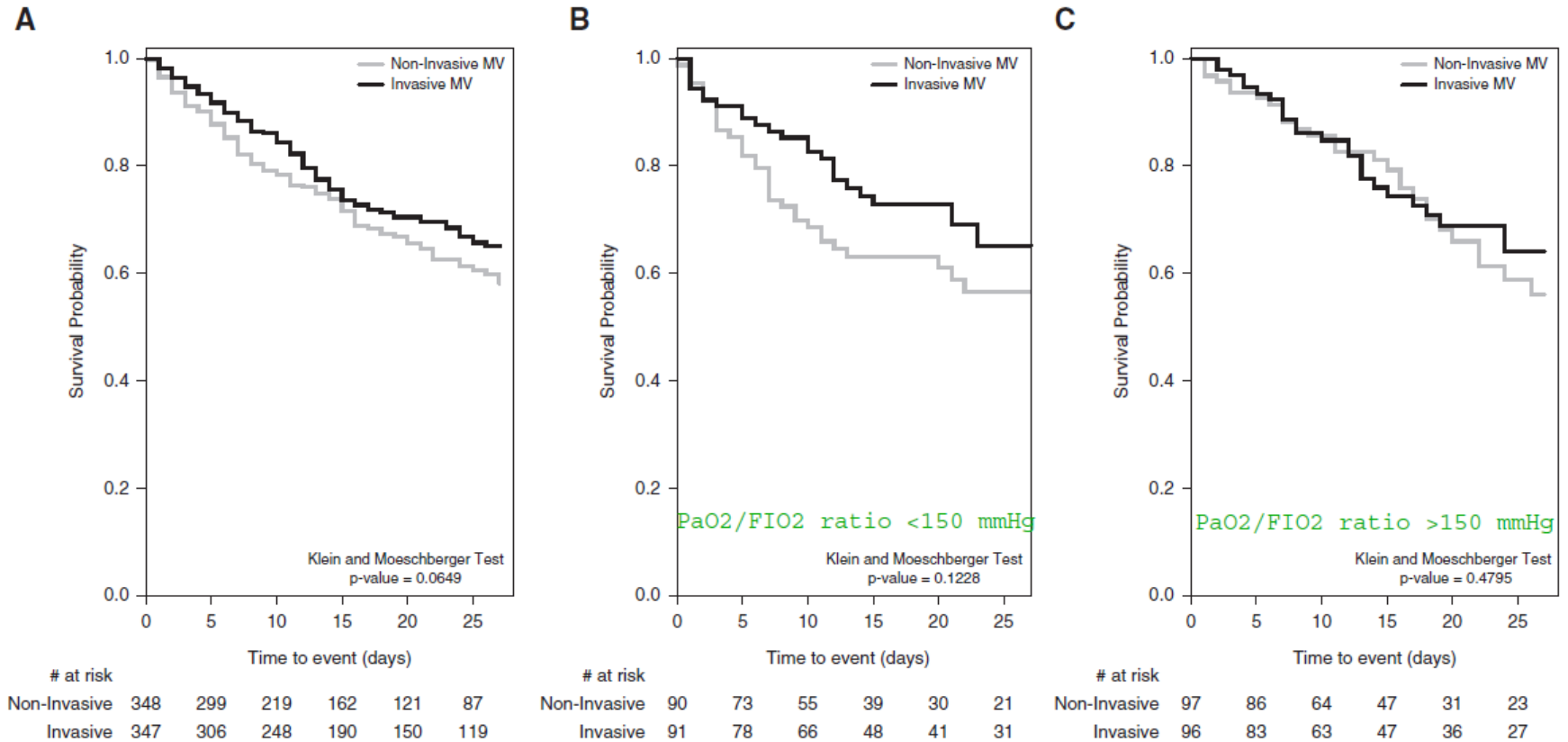
Figure 2. Probability of Survival at Day 28



No. at risk	0	7	14	21	28
Noninvasive ventilation	191	177	167	153	146
Oxygen alone	183	165	152	140	134

Noninvasive Ventilation of Patients with Acute Respiratory Distress Syndrome

Insights from the LUNG SAFE Study



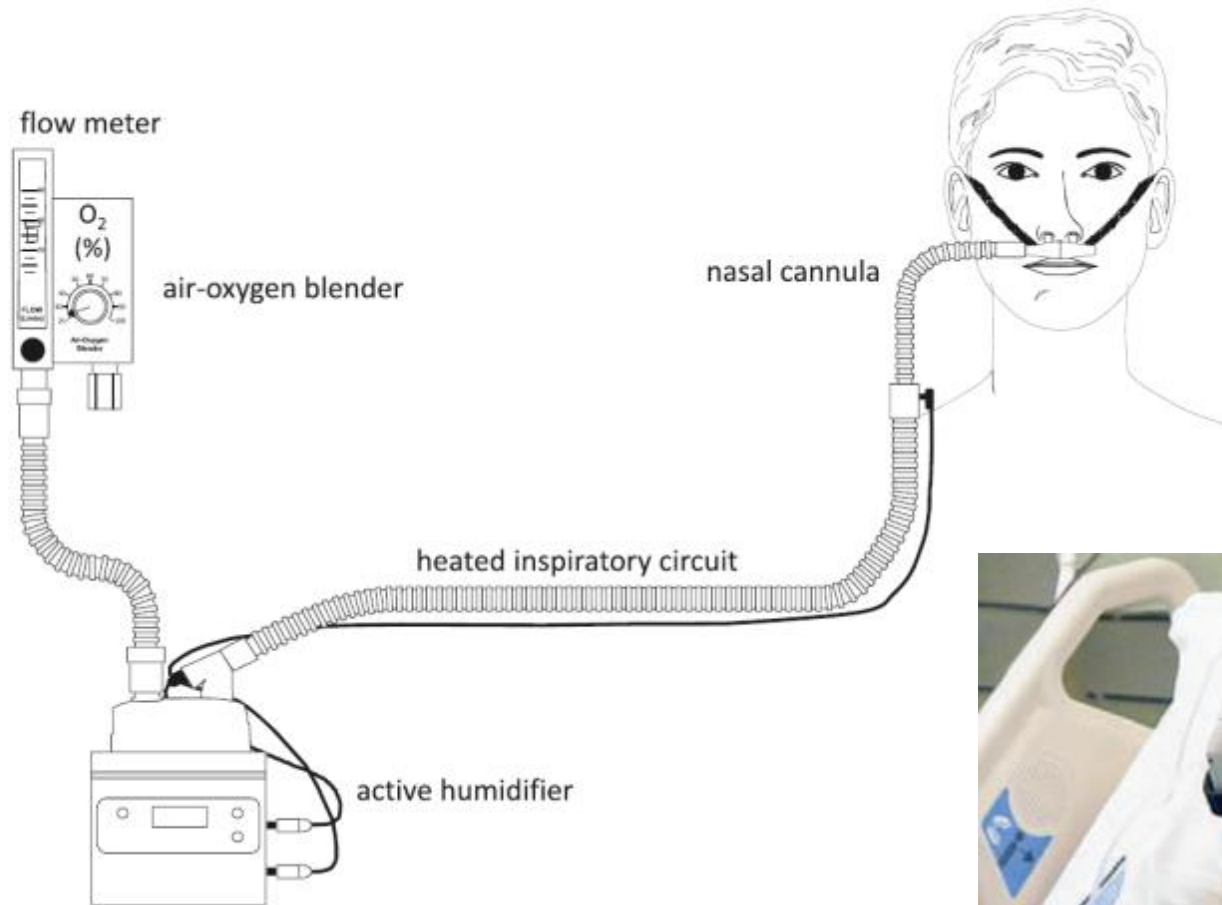
Prädiktoren für ein Versagen der NIV Therapie bei hypoxämien Patienten

- Erhöhter Schweregrad des IPS Patienten (SAPS II > 33)
- Alter über 40 Jahre
- ARDS (Acute Respiratory Distress Syndrome) oder eine ambulant erworbene Pneumonie
- Fehlende Verbesserung nach 1 STUNDE NIV Therapie ($\text{PaO}_2/\text{FiO}_2 < 175 \text{ mm Hg}; 23.3 \text{ kPa}$)
- Höhere Atemfrequenz unter NIV
- Therapie mit kreislaufstützenden Medikamenten
- Nierenersatzverfahren

High Flow Oxygen Therapie

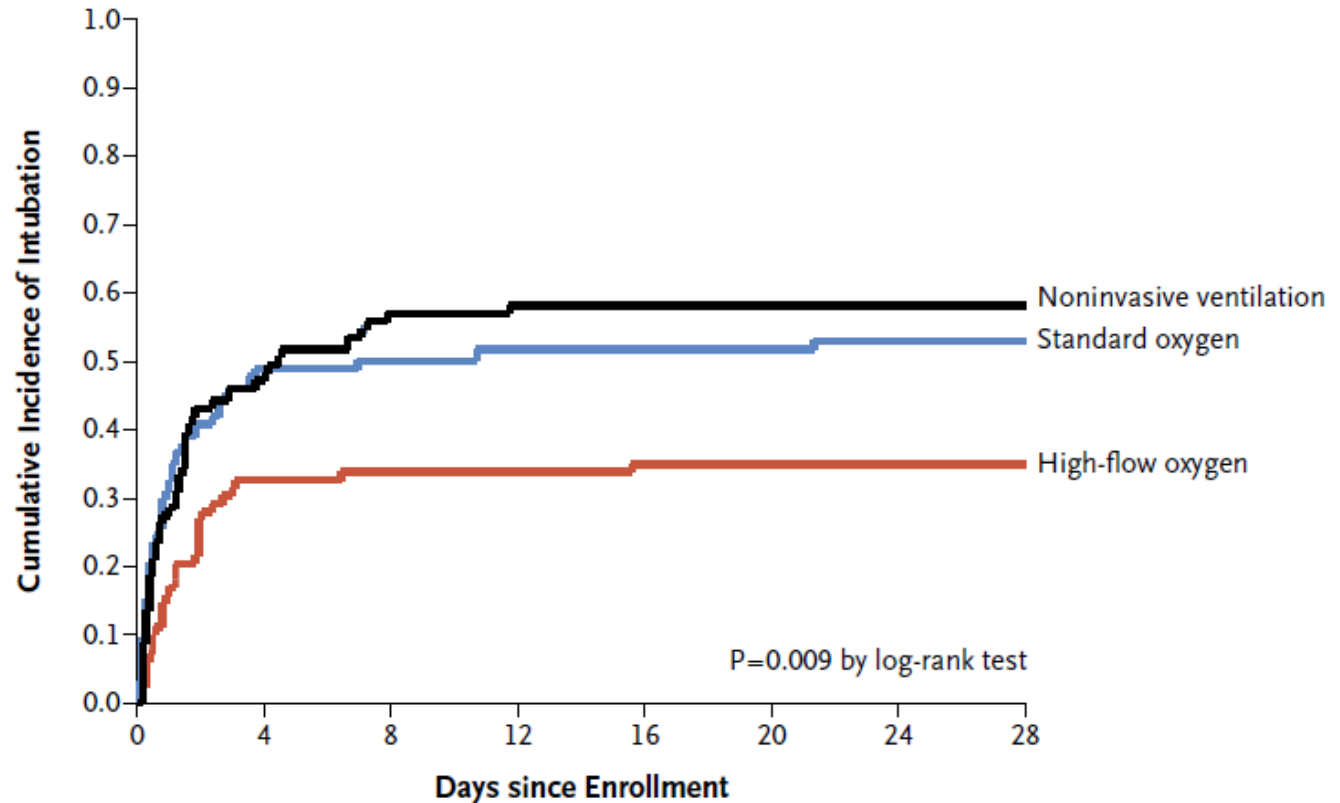


High-Flow Nasal Oxygen



High-Flow Oxygen through Nasal Cannula in Acute Hypoxemic Respiratory Failure

B Patients with a $\text{PaO}_2:\text{FiO}_2 \leq 200$ mm Hg



No. at Risk

	0	4	8	12	16	20	24	28
High-flow oxygen	83	55	54	54	53	53	53	53
Standard oxygen	74	37	35	34	34	34	33	33
Noninvasive ventilation	81	41	34	32	32	32	32	32

Intubation auf der Intensiv- station



TIPPs & Tricks

- Oberkörper Hochlagerung
- NIV Beatmung auf 100% FiO₂ einstellen
- NIV Beatmung belassen
- An den Sympathikus denken
- Induktionsmedikamente spritzen
- Prophylaktische med. Kreislaufunterstützung
- Wenn Atmung sistiert NIV-Maske entfernen und intubieren



