Medidas precoces para prevenção de lesões pulmonares nas primeiras 24 horas

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O CPAP é a melhor opção, entretanto prematuro é frequentemente intubado, portanto é necessário saber ventilar!

Estudo	Idade Gestacional	Amostra (n)	Fio2 para intubar	Taxa de intubação %
Rocha 2013	<30	131	≥ 40%	21
CURPAP (Sandri)	25-28	208	>40%	33
De Jaegere 2012	<30	182	≥ 40%	36
Rojas 2009	27-31	279	>75%	39
COIN (Morley)	25-28	610	>60%	46
Fuchs 2011	23-28	140	≥60%	51
DRM (Dunn)	26-29	648	>60%	52
Dargaville 2013	25-28 29-32	79 79	≥ 50%	68 45
SUPPORT (Finner)	24-27	1316≥	>50%	83
Gonçalves-Ferri 2013 (Brasil)	25-28 29-32	14 19	≥60%	86 48

Quando intubar na sala de parto?

Qual paciente ficará em CPAP na sala de parto?

European Consensus Guidelines on the Management of Respiratory Distress Syndrome – 2016 Update

David G. Sweet[a] Virgilio Carnielli[b] Gorm Greisen[c] Mikko Hallman[d]
Eren Ozek[e] Richard Plavka[f] Ola Didrik Saugstad[g] Umberto Simeoni[h]
Christian P. Speer[i] Máximo Vento[j] Gerard H.A. Visser[k] Henry L. Halliday[l]

4 Intubation should be reserved for babies who have not responded to positive pressure ventilation via face mask (A1). Babies who require intubation for stabilization should be given surfactant (B1).

Intubar os pacientes que não respondem a ventilação com pressão positiva e máscara.
O que significa não responder?
Apneia e bradicardia = Intubação (certeza!!!!)
Desconforto e necessidade de oxigênio? (??????)

Neonatology, 2016

Na dúvida se o CPAP é possível....

Vale a pena tentar?

Table 1 Clinical data of study patients

	Preterm infants, 23–28 weeks GA (n=225)			
		CPAP, n=140 (62%)		
	Intubation (A), n=85 (38%)	Failure (B), n=72 (32%)	Responder (C), n=68 (30%)	p Value
Birth weight (g), mean (SD)	782 (265)	843 (267)	890 (245)	<0.05*
GA (weeks), mean (SD)	25.5 (1.7)	26.3 (1.4)	26.9 (1.5)	<0.01†
Full course of antenatal steroids (%)	66 (78)	59 (82)	58 (85)	NS
Small for GA (%)	12 (14)	16 (22)	8 (12)	NS
Premature rupture of membranes (%)	27 (32)	17 (23)	17 (25)	NS
Pneumothorax (%)	8 (9)	7 (10)	0 (0)	<0.05‡
Pulmonary interstitial emphysema (%)	11 (13)	12 (17)	0 (0)	<0.05‡
IVH grade 3 or 4 (%)¶	22 (26)	12 (17)	0 (0)	<0.01‡
NEC≥stage 2**/perforation (%)	14 (16)	7 (10)	4 (6)	NS
BPD at 36 weeks GA (%)	27 (32)	20 (27)	5 (7)	<0.01‡
Discharged on oxygen (%)	14 (16)	11 (15)	3 (4)	NS
Mortality (%)	15 (18)	3 (4)	1 (1)	<0.001†
Survival w/o BPD, IVH grade 3 or 4, NEC (%)	36 (42)	43 (60)	60 (88)	<0.001§

*A vs C.
†A vs B, A vs C.
‡A vs C, B vs C.
§A vs B vs C.
¶IVH grade according to Papile *et al.*[29]
**NEC stage according to Bell *et al.*[30]
BPD, bronchopulmonary dysplasia; CPAP, continuous positive airway pressure; GA, gestational age; IVH, intraventricular haemorrhage; NEC, necrotising enterocolitis; w/o, without.

Critérios para intubação:
FiO2>60%
FC < 100
GA < 25 sem para surf. profilático

Tentar o CPAP mesmo com risco de falha parece ser melhor

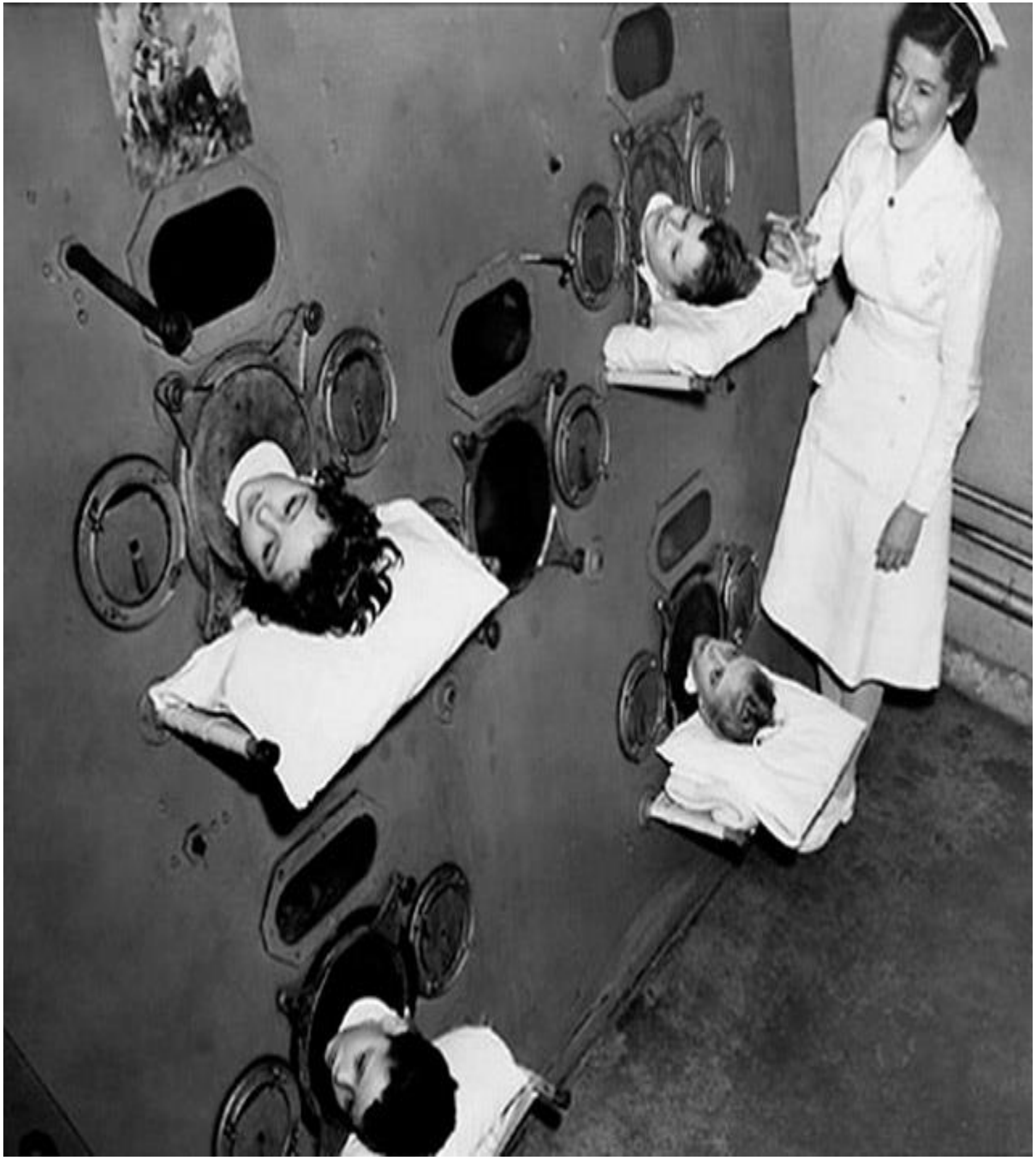
Fuchs H, Arch Dis Child Fetal Neonatal 2011

INTUBAR → Sala de parto

Apneia e/ou bradicardia

ou

BSA>6 e FiO2 maior que 60%



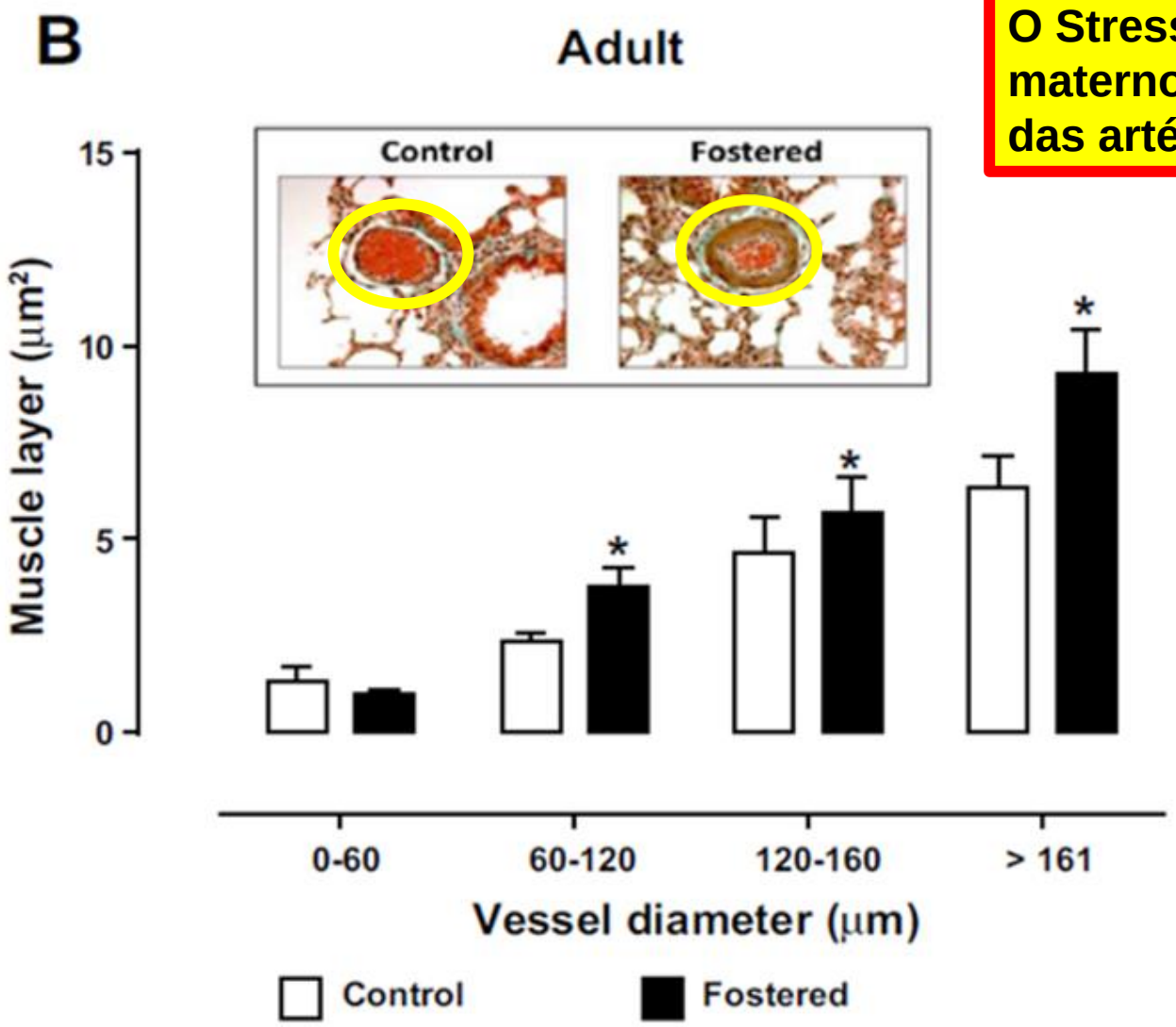
UTIN

Maternal-pup interaction disturbances induce long-lasting changes in the newborn rat pulmonary vasculature

Yulia Shifrin,[1] Sina Sadeghi,[1] Jingyi Pan,[1] Amish Jain,[2] Andres F. Fajardo,[1] Patrick J. McNamara,[1,2] and Jaques Belik[1,2]

[1]*Physiology and Experimental Medicine Program, The Hospital for Sick Children Research Institute, Toronto, Ontario, Canada; and* [2]*Department of Paediatrics and Physiology, University of Toronto, Toronto, Ontario, Canada*

O Stress do afastamento materno levou a hipertrofia das artérias pulmonares.



Evitar hiperóxia!

European Consensus Guidelines on the Management of Respiratory Distress Syndrome – 2016 Update

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Recommendations

1 In preterm babies receiving oxygen, the saturation target should be between 90 and 94% (B2).
2 To achieve this, suggested alarm limits should be 89 and 95% (D2).

Outro aliado para ajudar na tarefa de manter os pulmões protegidos....

SURFACTANTE PRECOCE

- *Aliado do CPAP*
- *Diminui a agressividade da ventilação mecânica*

ANTES DA FALHA DO CPAP PARA TENTAR EVITAR INTUBAÇÃO E VENTILAÇÃO MECÂNICA

Estudos observacionais recentes confirmaram que FiO_2 >0,30 por 2 horas de idade em CPAP é um fator preditivo de falha da CPAP em 6 horas de idade, e os que falham à CPAP têm um resultado pior.

Sweet DG et al. Neonatology 2017;111:107–125

TODOS COM 30% ≤ 26 semanas ou 40% >26 semanas.

Intubado → Surfactante

ou

CPAP

↓

MIST

Minimally-invasive surfactant therapy

LISA

Less-invasive surfactant administration

ou

INSURE

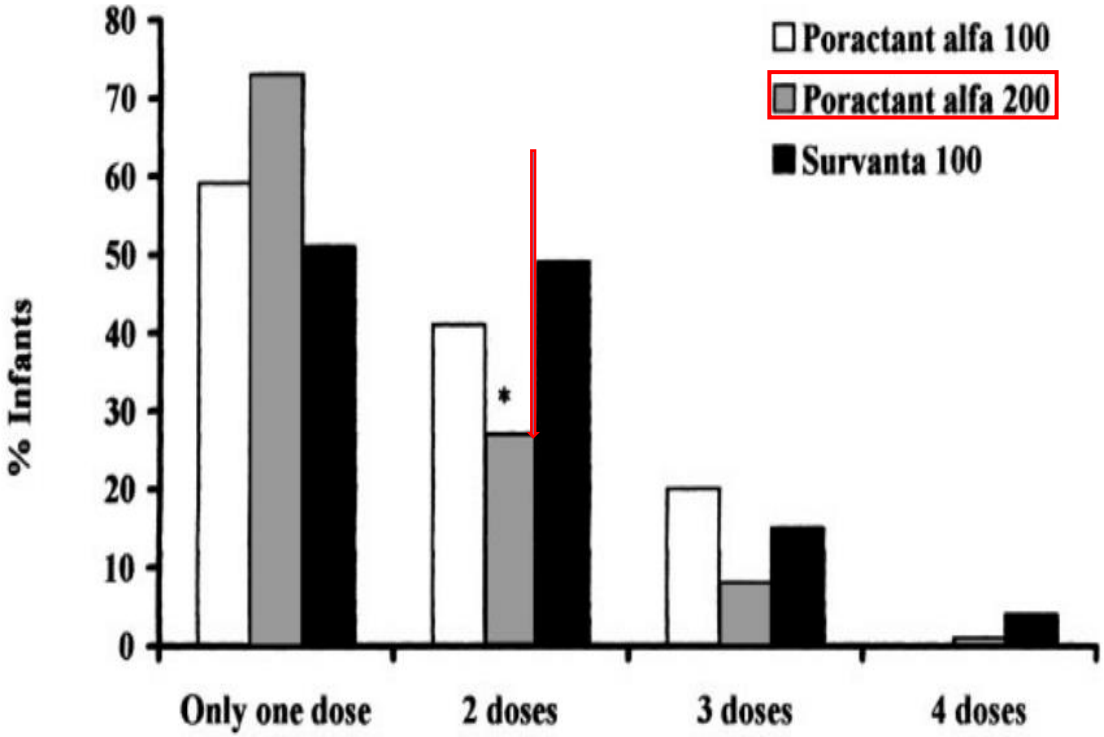
Intubation + **Surfactant** + Extubation

Am J Perinatol. 2004 Apr;21(3):109-19.

A randomized, multicenter masked comparison trial of poractant alfa (Curosurf) versus beractant (Survanta) in the treatment of respiratory distress syndrome in preterm infants.

Ramanathan R[1], Rasmussen MR, Gerstmann DR, Finer N, Sekar K; North American Study Group.

Peso entre 500 e 1999g
Idade gestacional 25-32s



Nossa realidade atual

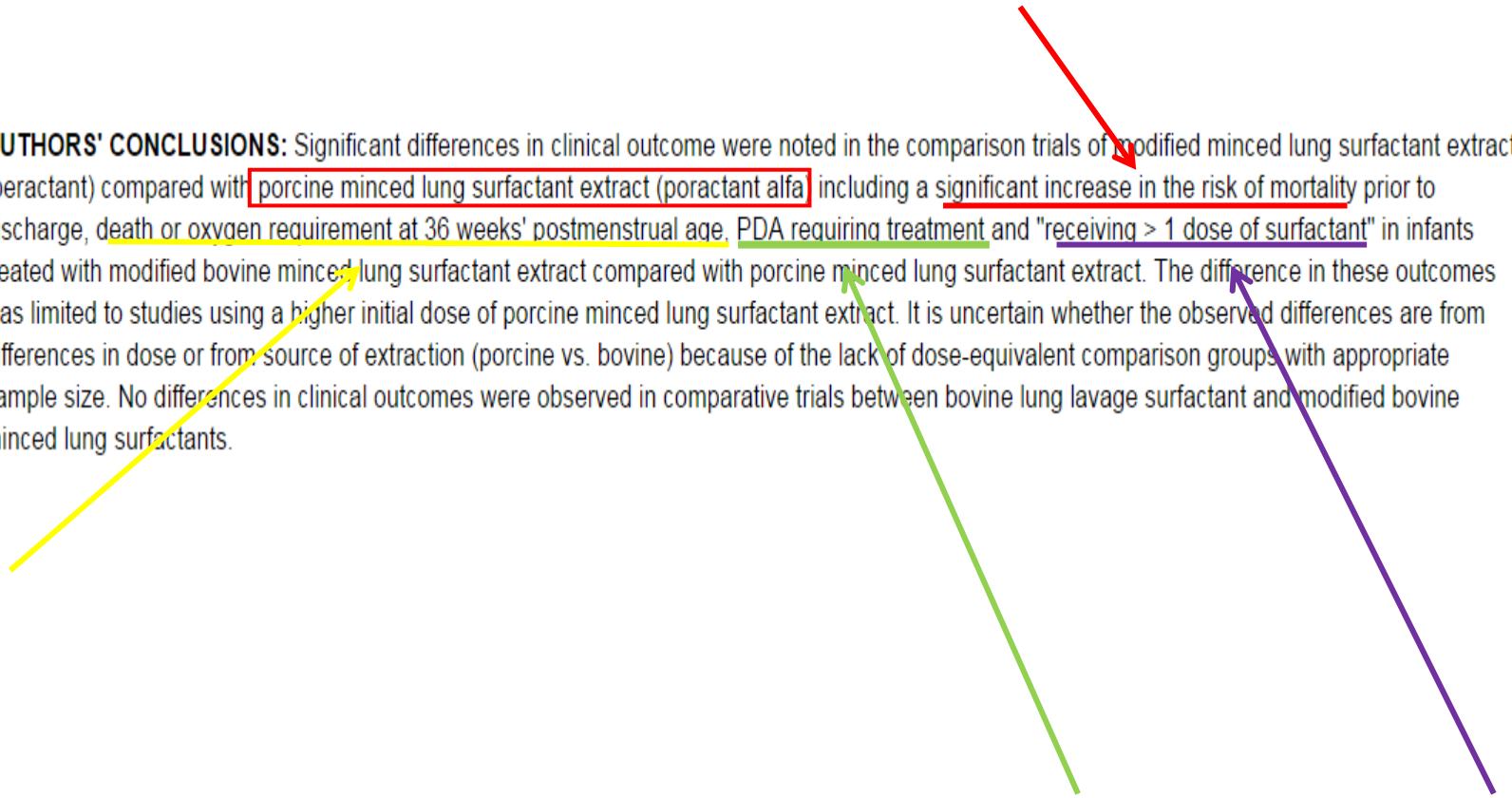
Figure 2 Percent of infants receiving one or more doses of surfactant in the three groups (n = 293). * = $p < 0.002$ poractant alfa 200 mg/kg versus beractant 100 mg/kg group.

Mortality at 36 wk PCA (n)	85	95	90			
n (%)	9 (11)	3 (3)	10 (11)	0.28 (0.07 to 1.05)	0.95 (0.36 to 2.46)	0.26 (0.07 to 0.98)*
p values from chi-square test†				0.05	0.91	0.03

Cochrane Database Syst Rev. 2015 Dec 21;12:CD010249. doi: 10.1002/14651858.CD010249.pub2.

Comparison of animal-derived surfactants for the prevention and treatment of respiratory distress syndrome in preterm infants.

Singh N[1], Halliday HL, Stevens TP, Suresh G, Soll R, Rojas-Reyes MX.



AUTHORS' CONCLUSIONS: Significant differences in clinical outcome were noted in the comparison trials of modified minced lung surfactant extract (beractant) compared with porcine minced lung surfactant extract (poractant alfa) including a significant increase in the risk of mortality prior to discharge, death or oxygen requirement at 36 weeks' postmenstrual age, PDA requiring treatment and "receiving > 1 dose of surfactant" in infants treated with modified bovine minced lung surfactant extract compared with porcine minced lung surfactant extract. The difference in these outcomes was limited to studies using a higher initial dose of porcine minced lung surfactant extract. It is uncertain whether the observed differences are from differences in dose or from source of extraction (porcine vs. bovine) because of the lack of dose-equivalent comparison groups with appropriate sample size. No differences in clinical outcomes were observed in comparative trials between bovine lung lavage surfactant and modified bovine minced lung surfactants.

Dosing of Porcine Surfactant: Effect on Kinetics and Gas Exchange in Respiratory Distress Syndrome

Peso médio 997 g
Idade gestacional 28 sem
FiO2 >40% e MAP 7

TABLE 3 DSPC Half-Life, Endogenous DSPC Pool Size, and Synthesis Rate for Preterm Newborns Treated With 200 or 100 mg/kg Porcine Surfactant Extract

	200 mg/kg ($N = 21$)	100 mg/kg ($N = 40$)	P
DSPC half-life, mean ± SD, h			
First dose	32 ± 19 ($n = 15$)	15 ± 15 ($n = 31$)	<.01
Second dose	43 ± 32 ($n = 5$)	21 ± 13 ($n = 23$)	.02
Third dose		17 ± 7 ($n = 7$)	
Endogenous DSPC pool size, median (interquartile range), mg/kg			
First dose	5.3 (1–12.7) ($n = 15$)	2.5 (0.5–6.8) ($n = 31$)	.32
Second dose	2.6 (0.7–18.5) ($n = 5$)	4.4 (1.2–16.1) ($n = 23$)	.67
DSPC synthesis, median (interquartile range), mg/kg per d			
First dose	4.8 (0.1–14.4) ($n = 15$)	7.2 (3.8–10.8) ($n = 31$)	.80
Second dose	2.4 (1.7–5.8) ($n = 5$)	4.8 (2.2–13.4) ($n = 23$)	.35

Maior consumo de surfactante...

Cogo P, Pediatrics 2009

European Consensus Guidelines on the Management of Respiratory Distress Syndrome – 2016 Update

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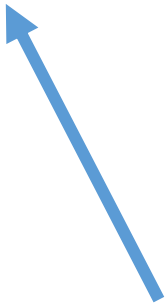
4 Poractant alfa in an initial dose of 200 mg/kg is better than 100 mg/kg of poractant alfa or beractant for rescue therapy (A1).



Recomendação A1

Como melhorar o desempenho do seu surfactante?

Tempo de administração

Indicar com FiO2 adequada

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Guidance for the Clinician in Rendering Pediatric Care

RESGATE PRECOCE

CLINICAL REPORT

Surfactant Replacement Therapy for Preterm and Term Neonates With Respiratory Distress

Early rescue surfactant treatment (<2 hours of age) in infants with RDS decreases the risk of mortality, air leak, and chronic lung disease in preterm infants (LOE 1).

European Consensus Guidelines on the Management of Respiratory Distress Syndrome – 2016 Update

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Eren Ozek[e] Richard Plavka[f] Ola Didrik Saugstad[g] Umberto Simeoni[h]
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3 Babies with RDS should be given rescue surfactant early in the course of the disease. A suggested protocol would be to treat babies ≤26 weeks' gestation when FiO_2 requirements >0.30 and babies >26 weeks' when FiO_2 requirements >0.40 (B2).

Nada deu certo...o paciente continua mal.

Quando intubar na UTIN?

BSA>6

e

FiO2>60%

Como podemos proteger o pulmão através da ventilação mecânica?

Modo ventilatório: Escolhendo o ventilador.

- Sincronização (Sensor de fluxo)

Sincronizar

Anesteziol Reanimatol. 2000 Jan-Feb;(1):71-4.

[Synchronization of the child with the respirator is the most important condition in preventing complications of artificial ventilation of the lungs in newborn infants].

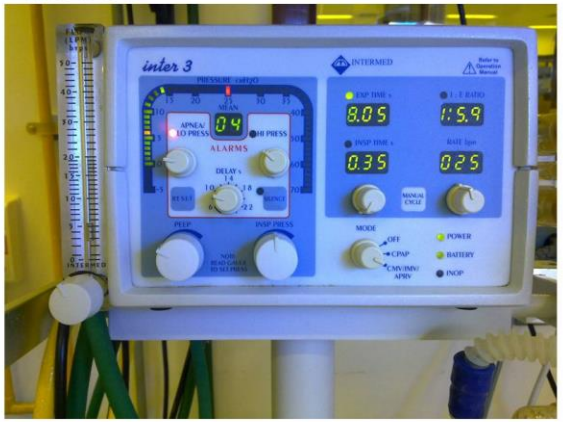
[Article in Russian]
Efimov MS, Ulanova EN, Milenin OB, Shalamov Vlu.

Crit Care Med. 1993 Jan;21(1):118-24.

Synchronous mechanical ventilation of the neonate with respiratory disease.

Amitay M[1], Etches PC, Finer NN, Maidens JM.

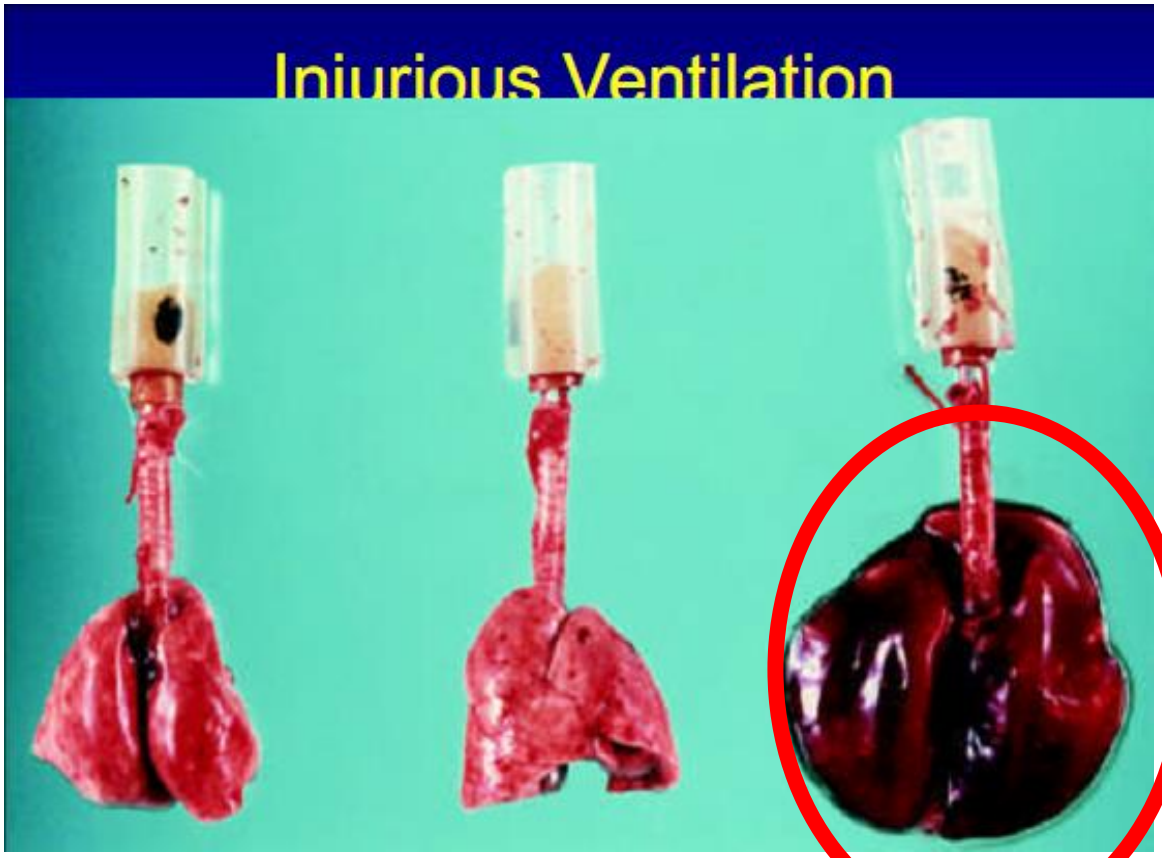
Inter 3 plus



O que causa lesão?

Volume Corrente

Será que ventilar a volume é o futuro da neonatologia?

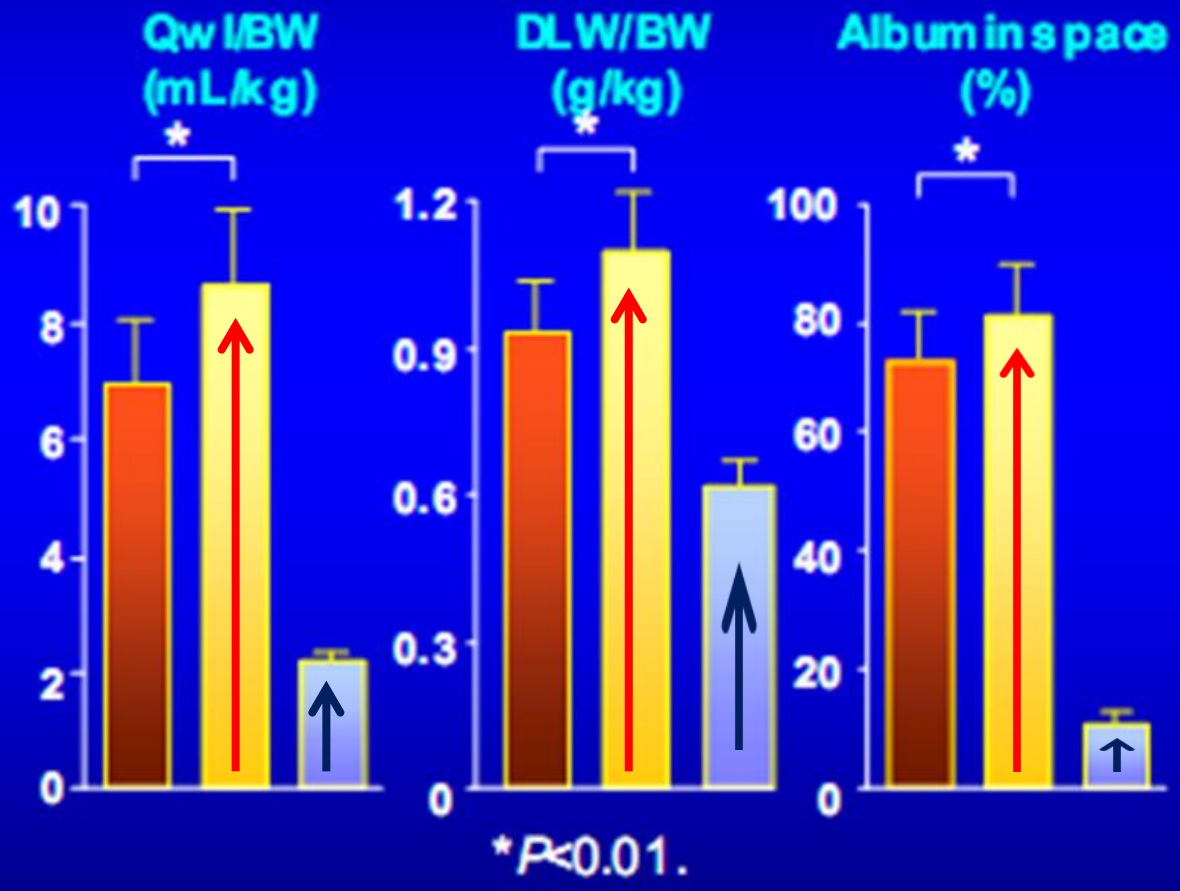


Pulmão de rato depois de 5 minutos com ventilação prejudicial e com 20 minutos, edema hemorrágico maciço nos pulmões

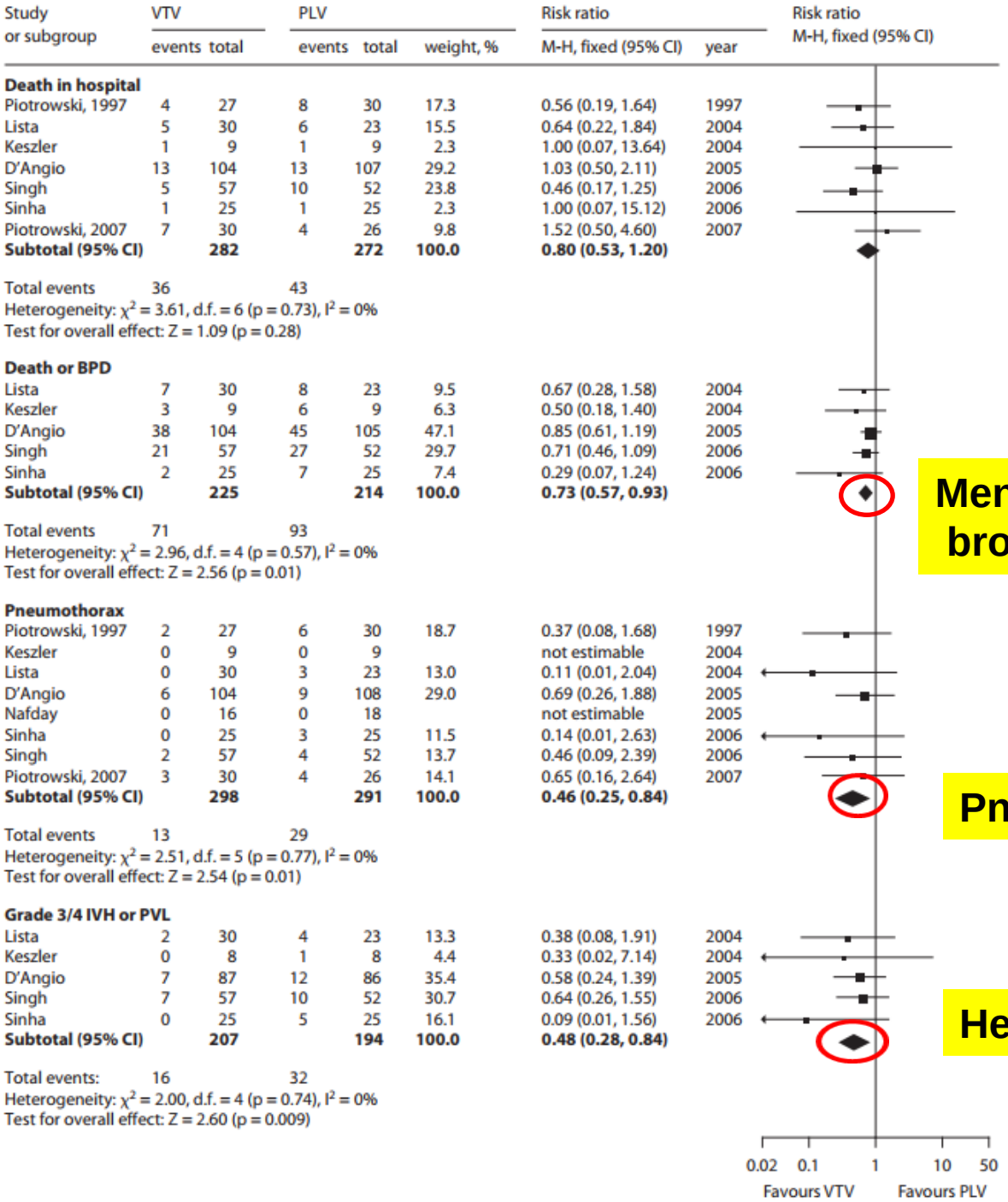
Ventilator-Induced Lung Injury: Volutrauma, *not* Barotrauma

Rodents ventilated with 3 modes:

- High pressure (45 cm H_2O), high volume
- Low (negative) pressure, high volume
- High pressure (45 cm H_2O), low volume (strapped chest & abdomen)



Dreyfuss D et al. *Am Rev Respir Dis*. 1988;137:1159-1164.



Ventilar a volume

Futuro?

Menos morte e broncopulmonar

Pneumotórax

Hemorragia grau 3 e 4

Wheeler KI. Neonatology, 2011

Volume Guarantee Ventilation: Effect on Preterm Infants with Frequent Hypoxemia Episodes

Deepak Jain Nelson Claure Carmen D'Ugard Jose Bello Eduardo Bancalari

Division of Neonatology, Department of Pediatrics, University of Miami Miller School of Medicine, Miami, Fla., USA

Table 2. Measures of oxygenation instability

	PC	VG	p
Time in hypoxemia (SpO_2 <85%), %	16±4	16±5	0.72
Frequency of HE (SpO_2 <85% for ≥20 s), n/h	6.8 (4.6–7.9)	6.5 (5.6–8.9)	0.20
Duration of HE (SpO_2 <85% for ≥20 s), s	76 (70–92)	73 (65–81)	0.02
Time in severe hypoxemia (SpO_2 <75%), %	5.0 (3.9–6.9)	4.4 (2.9–5.0)	0.44
Frequency of severe HE (SpO_2 <75% for ≥20 s), n/h	2.1 (1.3–2.6)	1.9 (1.1–2.5)	0.75
Duration of severe HE (SpO_2 <75% for ≥20 s), s	68 (57–87)	61 (54–80)	0.12
Time in hyperoxemia (SpO_2 >95%), %	44±8	40±11	0.053

Values are means ± SD or medians (IQR) unless otherwise stated.

Melhora do tempo de hipoxemia

Neonatology 2016;110:129–134

Assistência ventilatória ao prematuro na admissão em Unidades Neonatais

2016

Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto
Universidade de São Paulo-USP

Passo 1: Escolher o ventilador:

- **Sincronizado**

Passo 2: Escolher modo ventilatório:

- **AC + VG (Assistido Controlado + Volume Garantido)**
- **SIMV + PS (Mandatória Intermitente Sincronizada + Pressão de suporte)**

Modos mistos: Ajuda nas respirações espontâneas.

Entretanto, atualmente o modo ventilatório mais utilizado em neonatologia no Brasil é o limitado a pressão.

Como fazer ventilação protetora neste modo?

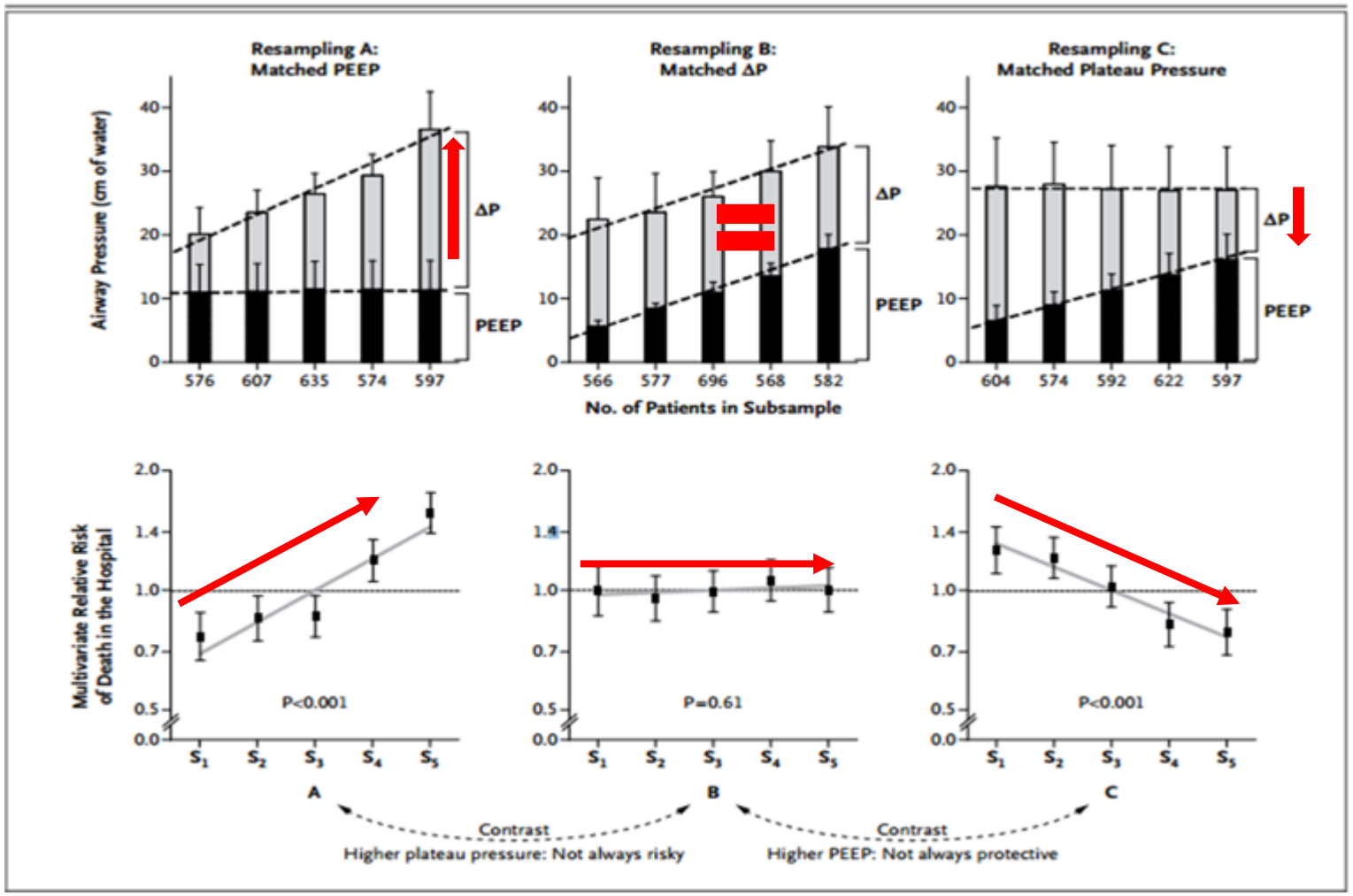
A pressão é apenas um instrumento para gerar volume.

Devemos ter medo de pressão de pico?

Driving Pressure and Survival in the Acute Respiratory Distress Syndrome

Marcelo B.P. Amato, M.D., Maureen O. Meade, M.D., Arthur S. Slutsky, M.D., Laurent Brochard, M.D., Eduardo L.V. Costa, M.D., David A. Schoenfeld, Ph.D., Thomas E. Stewart, M.D., Matthias Briel, M.D., Daniel Talmor, M.D., M.P.H., Alain Mercat, M.D., Jean-Christophe M. Richard, M.D., Carlos R.R. Carvalho, M.D., and Roy G. Brower, M.D.

Variação de Pressão de distensão:
Diretamente proporcional ao risco de morte.



Assistência ventilatória ao prematuro na admissão em Unidades Neonatais

2016

Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto
Universidade de São Paulo-USP

USP - RIBEIRÃO
assistência - ensino - pesquisa

Pressão inicia 15 mmHg

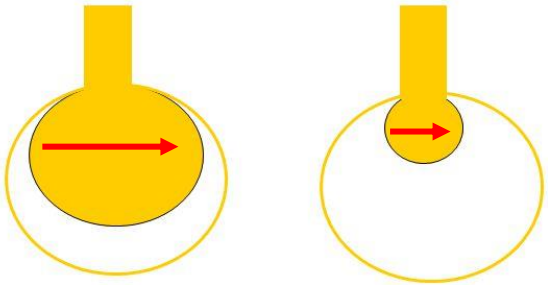
- **Observa VC e ajusta a pressão para 4-6ml/kg.**
  - **Sem sensor de fluxo: Expansão do tórax (1/3).**
  - **Manter pressão de distensão (delta de pressão) menor que 14 mmHg.**

PEEP

(Pressão Expiratória)

Ator principal: PEEP

PRINCIPIOS TEÓRICOS

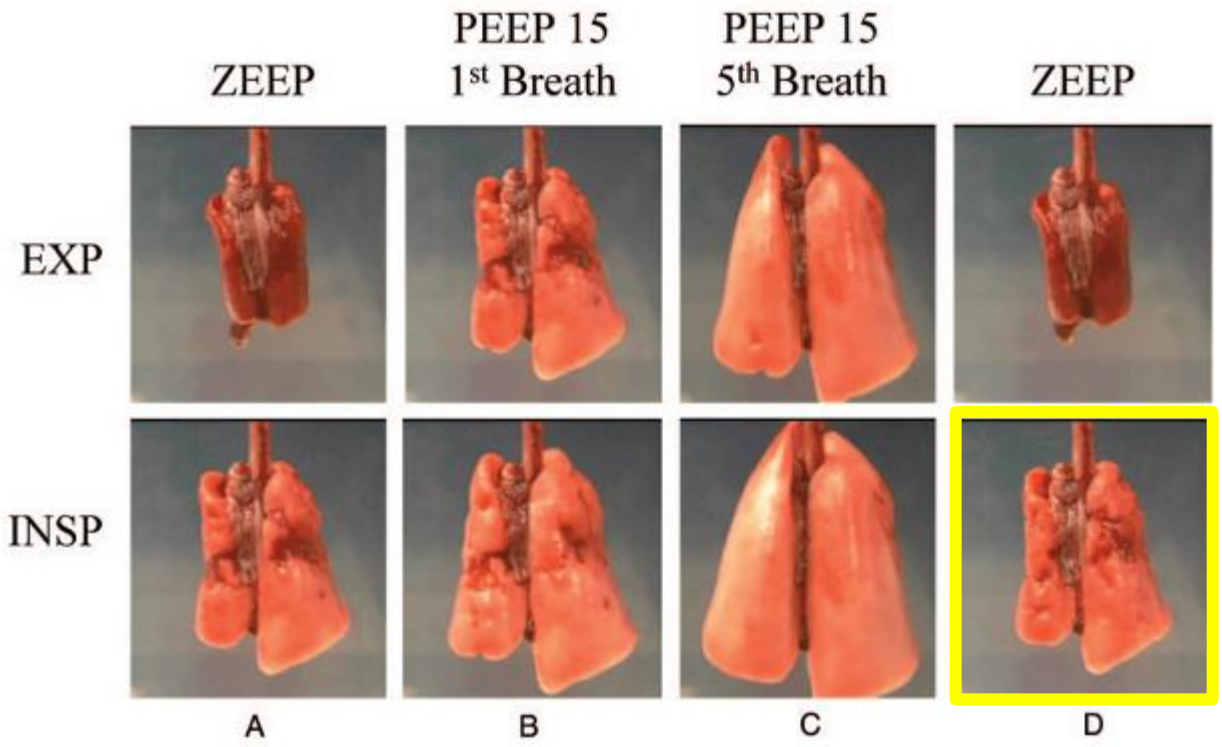


Lei de Laplace $P = \frac{2TS}{r}$

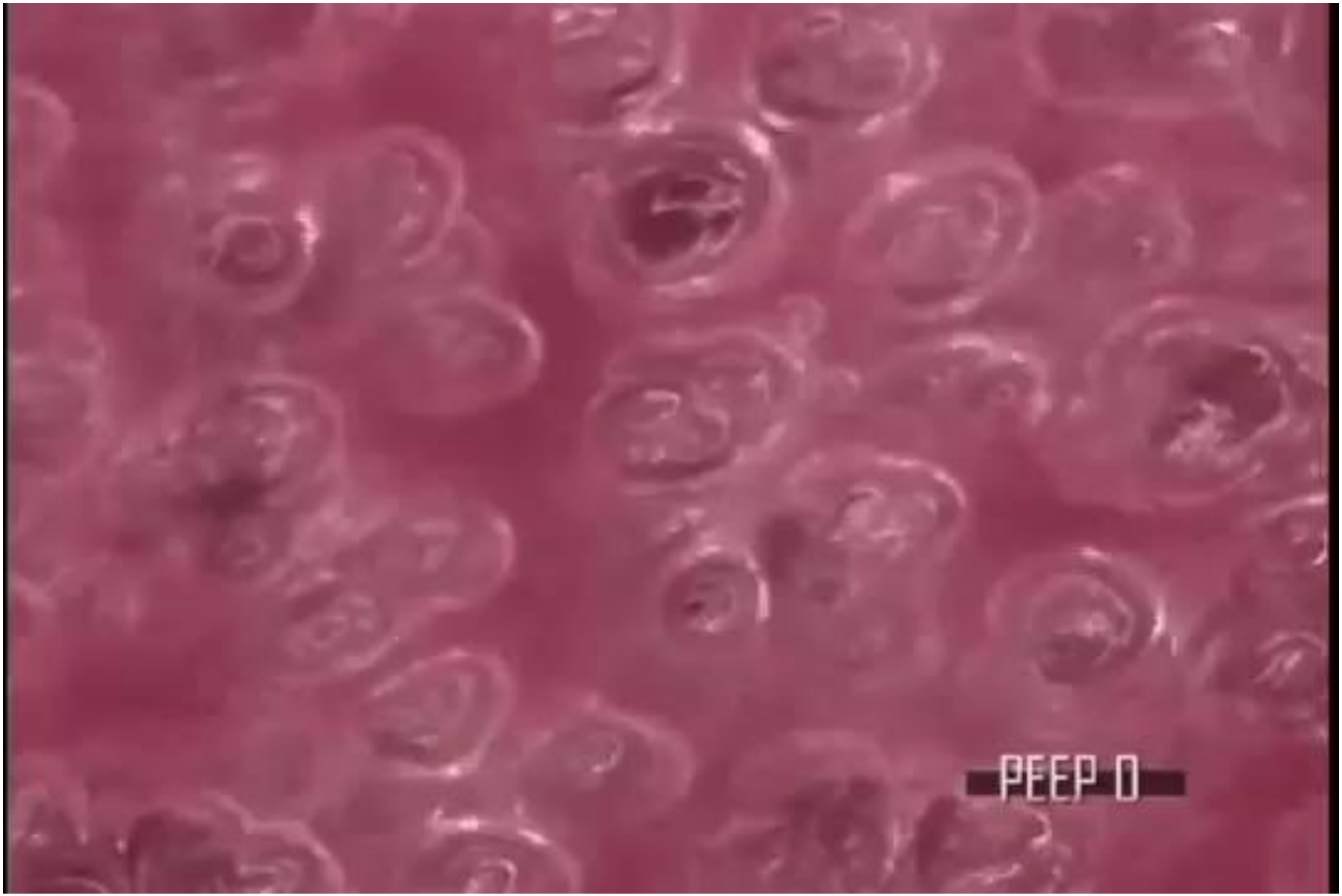
"A pressão para distender um alvéolo é diretamente proporcional À Tensão Superficial de sua parede e inversamente proporcional Ao seu raio".

Effect of PEEP on FRC

Slutsky AS. Respiratory Care 2005;May;50(5):646-59.

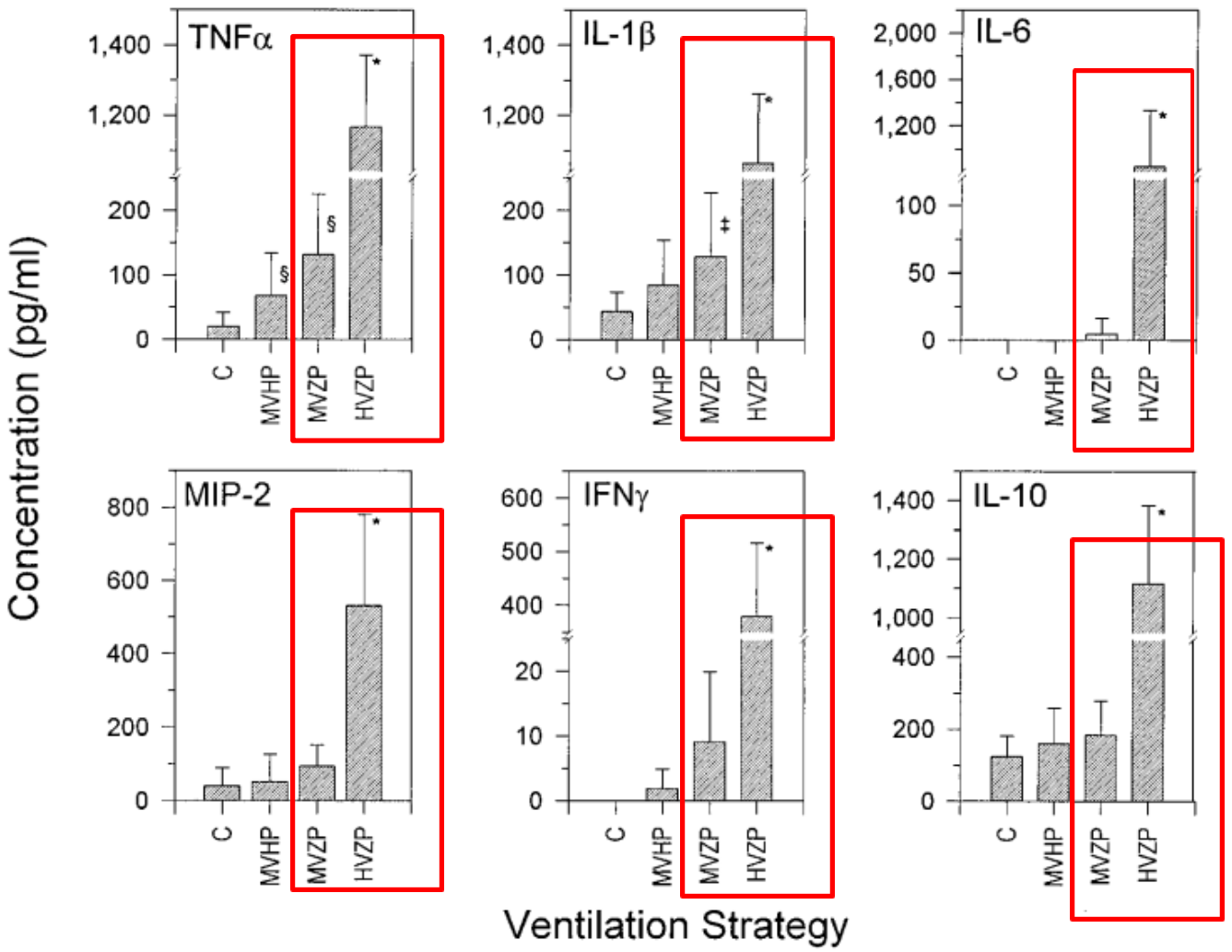


Peep adequado mantêm o pulmão recrutado.


PEEP 0

Protective Effect of PEEP

Tremblay, JCI 1997; 99:944



C: Controle

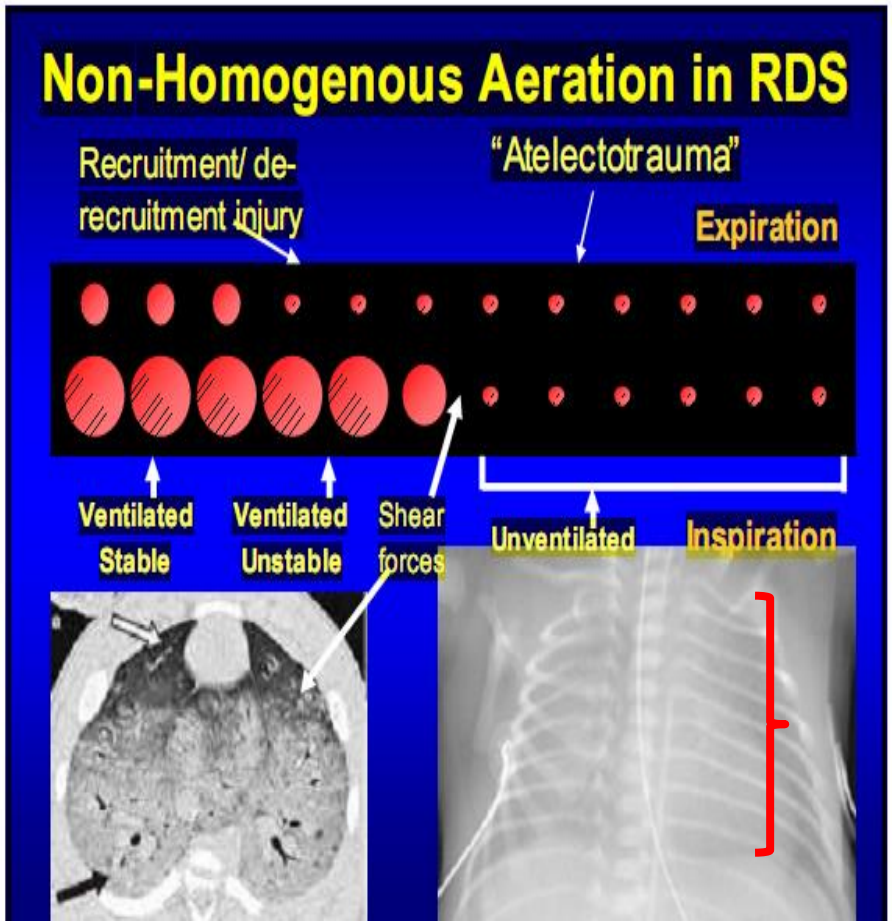
ZP: Peep zero

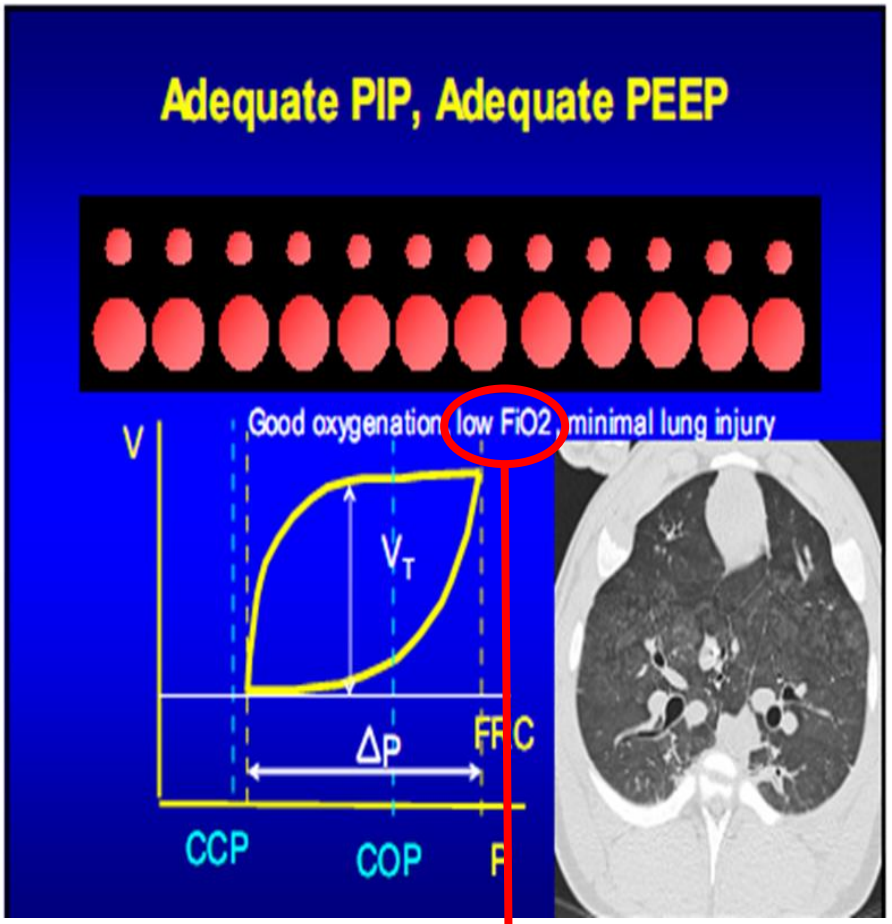
HP: Peep elevado

MV: Vol. moderado

HV: Vol. Alto

Como avaliar a Peep?
Oxigenação





Raio X: Pouca validade

Mais válido

Hemodynamic Effects of Nasal Continuous Positive Airway Pressure in Preterm Infants with Evolving Chronic Lung Disease, A Crossover Randomized Trial

Friederike Beker, MD[1,2,3], Sheryle R. Rogerson, FRACP[1], Stuart B. Hooper, PhD[4], Arvind Sehgal, FRACP[3], and Peter G. Davis, MD[1]

Table II. Hemodynamic variables on three nCPAP levels

	4 cm H_2O	6 cm H_2O	8 cm H_2O	*P*
RVO (mL/kg/min)	411 ± 110	418 ± 94	414 ± 93	.98
LVO (mL/kg/min)	407 ± 121	405 ± 140	403 ± 123	.96
SVC flow (mL/kg/min)	157 ± 53	149 ± 40	155 ± 42	.58
LPA flow (mL/kg/min)	136 ± 57	142 ± 61	136 ± 53	.45
TAPSE (mm)	7.9 ± 1.8	8.1 ± 1.5	8.0 ± 1.2	.58
BP systolic (mm Hg)	73 ± 9	71 ± 9	74 ± 13	.34
BP mean (mm Hg)	52 ± 9	53 ± 8	55 ± 11	.28
BP diastolic (mm Hg)	40 ± 10	43 ± 10	46 ± 12	.11
HR (beats/min)	163 ± 13	164 ± 13	162 ± 13	.62

BP, blood pressure; *HR*, heart rate; *LPA*, left pulmonary artery; *TAPSE*, tricuspid annular plane systolic excursion.
P value is given for ANOVA. Values given as mean ± SD.

Pacientes com idade gestacional de 28 semanas.

J Pediatr. 2015

Quanto é muito Peep? Depende da patologia. Pneumotórax?

Table of Peep1 by PNEUMOTORAX			
Peep	PNEUMOTORAX		
Frequency Row Pct	0	1	Total
5	45 93.75	3 6.25	48
7 ou mais	34 89.47	4 10.53	38
Total	79	7	86
Frequency Missing = 1			

Teste exato de Fisher: p-valor = 0,69

Table of Peep1 by DESFECHO			
Peep	DESFECHO		
Frequency Row Pct	0	1	Total
5	44 91.67	4 8.33	48
7 ou mais	33 86.84	5 13.16	38
Total	77	9	86
Frequency Missing = 1			

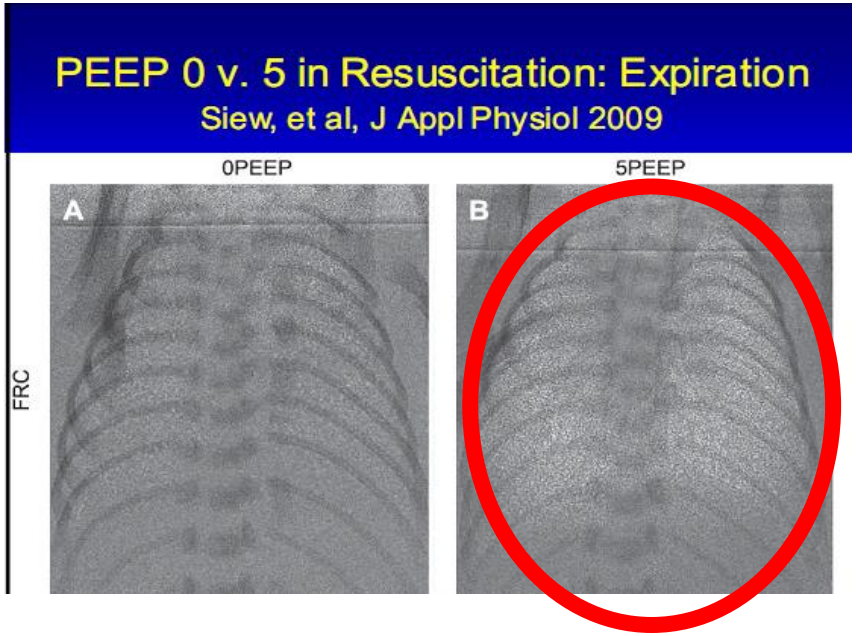
Teste exato de Fisher: p-valor = 0,50

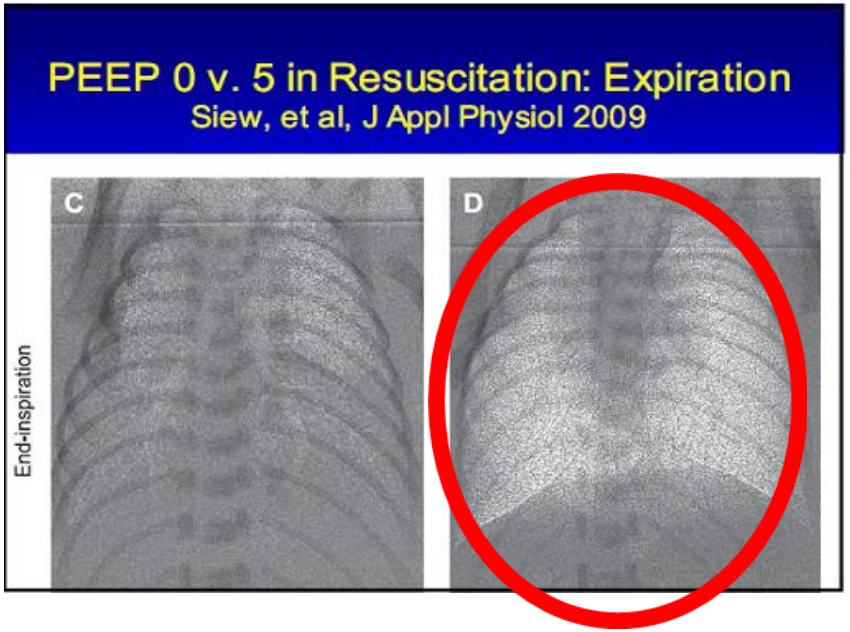
Óbito

SEM DIFERENÇA EM PNEUMOTÓRAX E ÓBITO COM ALTOS E BAIXOS PEEP

Gonçalves-Ferri, 2017.

PEEP ao nascer?
Recrutar na sala de parto





Ventilar manual com peça T : Neopuff ou Babypuff

Assistência ventilatória ao prematuro na admissão em Unidades Neonatais 2016

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- **Peep inicial: 6-8 cm** →

European Consensus Guidelines on the Management of Respiratory Distress Syndrome – 2016 Update

David G. Sweet[a] Virgilio Carnielli[b] Gorm Greisen[c] Mikko Hallman[d]
Eren Ozek[e] Richard Plavka[f] Ola Didrik Saugstad[g] Umberto Simeoni[h]
Christian P. Speer[i] Máximo Vento[j] Gerard H.A. Visser[k] Henry L. Halliday[l]

- **Se FiO2 > 40% = Aumentar 1 a 2 pontos da Peep.**
- **Observar a evolução da necessidade de FiO2.**

Tempo inspiratorio

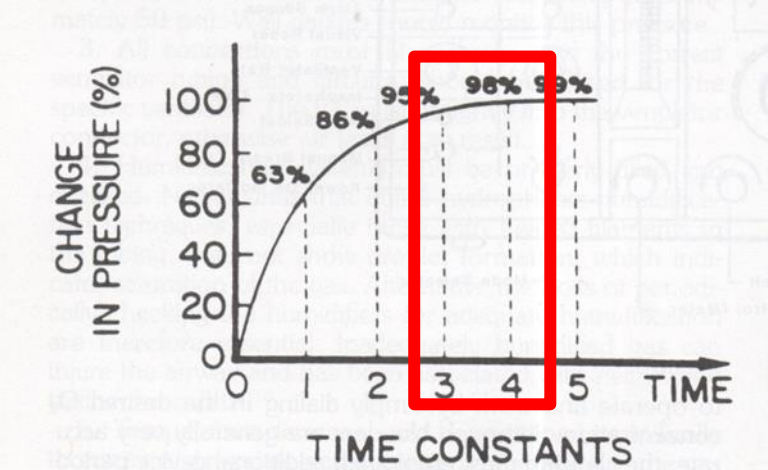


Figure 8–4. Percentage change in pressure in relation to the time (in time constants) allowed for equilibration. As a longer time is allowed for equilibration, a higher percentage change in pressure occurs. The same rule governs the equilibration for step changes in volume. (From Carlo WA, Martin RJ: Principles of assisted ventilation. Pediatr Clin North Am 33:221, 1986.)

Constante de tempo do RN pretermo: 0.15

Cochrane Library
Cochrane Database of Systematic Reviews

Cochrane Database Syst Rev. 2004 Oct 18;(4):CD004503.

Long versus short inspiratory times in neonates receiving mechanical ventilation (Review)

Kamlin COF, Davis PG

Analysis 1.2. Comparison 1 Long vs Short IT as defined by investigators (all trials), Outcome 2 Air leak.

Review: Long versus short inspiratory times in neonates receiving mechanical ventilation

Comparison: 1 Long vs Short IT as defined by investigators (all trials)

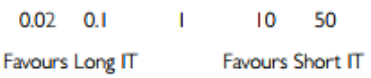
Outcome: 2 Air leak

Study or subgroup	Long IT n/N	Short IT n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Greenough 1989	2/20	0/20		0.6 %	5.00 [0.26, 98.00]
Heicher 1981	18/51	7/51		8.6 %	2.57 [1.18, 5.62]
OCTAVE 1991	44/167	32/170		38.9 %	1.40 [0.94, 2.09]
Pohlandt 1992	46/63	37/74		41.7 %	1.46 [1.11, 1.92]
Spahr 1980	13/36	8/33		10.2 %	1.49 [0.71, 3.13]
Total (95% CI)	**337**	**348**		**100.0 %**	**1.56 [1.25, 1.94]**

Total events: 123 (Long IT), 84 (Short IT)

Heterogeneity: $Chi^2 = 2.67$, df = 4 (P = 0.62); $I^2 = 0.0\%$

Test for overall effect: Z = 3.95 (P = 0.000077)



- **Tempo inspiratório inicial: 0.35 seg.**

Fluxo

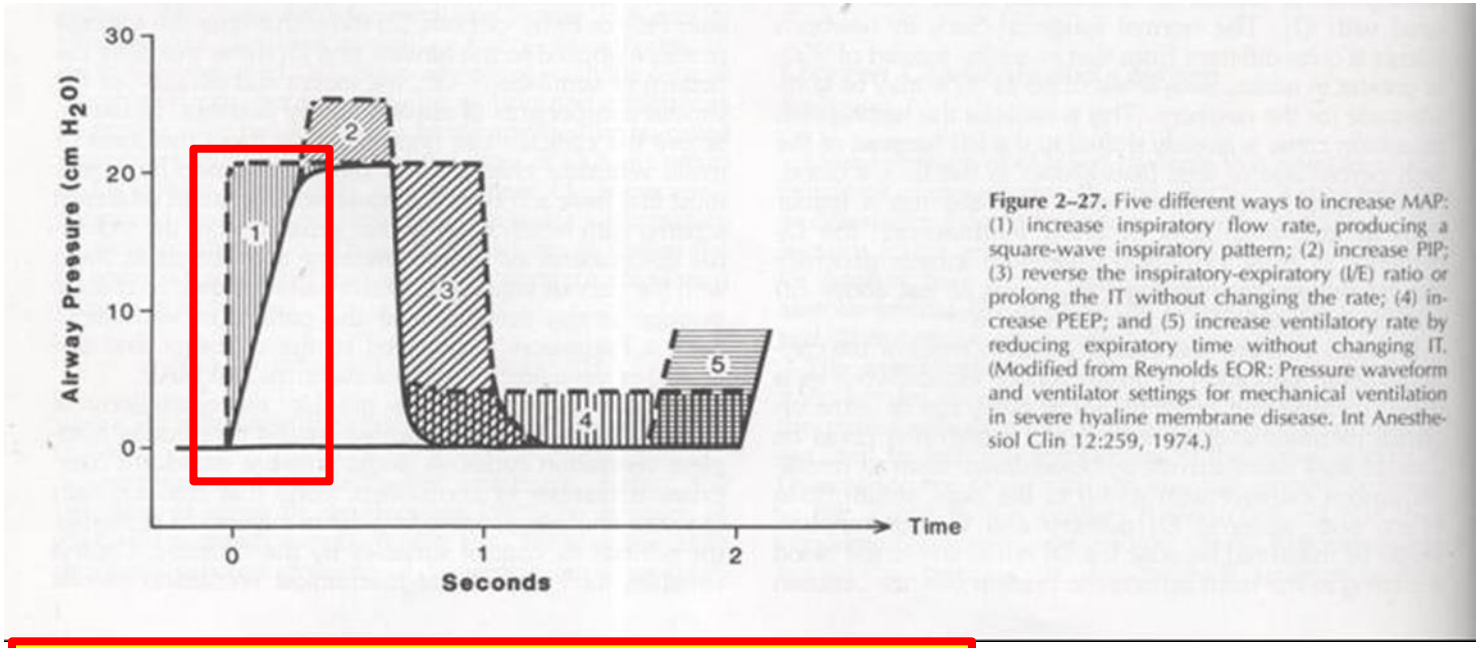


Figure 2–27. Five different ways to increase MAP: (1) increase inspiratory flow rate, producing a square-wave inspiratory pattern; (2) increase PIP; (3) reverse the inspiratory-expiratory (I/E) ratio or prolong the IT without changing the rate; (4) increase PEEP; and (5) increase ventilatory rate by reducing expiratory time without changing IT. (Modified from Reynolds EOR: Pressure waveform and ventilator settings for mechanical ventilation in severe hyaline membrane disease. Int Anesthesiol Clin 12:259, 1974.)

Fluxo laminar até:
Sondas 2,5 mm- até 3,0 L/min
Sondas 3,0 mm- até 7,5L/min

Exemplo:
Sonda 2,5mm, passando fluxo de 5 para 10 L/min causa aumento da resistência de 32 para 84 cm H2O/ L/ seg.

Goldsmith, 2011.

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Fluxo:

- **Sondas 2,5 mm- até 4,0- 6,0 L/min**
- **Sondas 3,0 mm- até 8 L/min**

Frequência ventilatória

- Último parâmetro a ser ajustado.

VM = VC x FR

Ajustar apenas quando Volume Corrente adequado.

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- Frequência respiratória: Inicia com 40 rpm.

- Ajustes de frequência ventilatória: Após ajustar todos os outros parâmetros e paciente ainda desconfortável.

- Como ajustar: Oferecer a frequência respiratória que o paciente está “pedindo”, ou seja realizando espontaneamente.

Sedation and Analgesia to Facilitate Mechanical Ventilation

Michael E. Nemergut, MD, PhD[a,b,*], Myron Yaster, MD[c,d], Christopher E. Colby, MD[e]

Para intubar recomendado.

KEY POINTS

- Intubation and mechanical ventilation have associated physiologic changes consistent with pain and stress.
- The provision of sedatives and analgesics can mollify the stress response, improve intubation conditions, and is recommended for elective intubations.
- The prophylactic delivery of sedatives for mechanical ventilation has not been demonstrated to improve short-term neurologic outcomes in neonates.

Para ventilar não parece ser necessário o uso profilático

Clin Perinatol 40 (2013) 539–558

- **Não fazer sedação profilática para recém-nascidos intubados.**

- **Avaliação diária de dor - Neonatal Infant Pain Scale (NIPS).**

Permissive hypercapnia in extremely low birthweight infants (PHELBI): a randomised controlled multicentre trial

*Ulrich H Thome, Orsolya Genzel-Boroviczeny, Bettina Bohnhorst, Manuel Schmid, Hans Fuchs, Oliver Rohde, Stefan Avenarius, Hans-Georg Topf, Andrea Zimmermann, Dirk Faas, Katharina Timme, Barbara Kleinlein, Horst Buxmann, Wilfried Schenk, Prof Hugo Segerer, Norbert Teig, Corinna Gebauer, Roland Hentschel, Matthias Heckmann, Rolf Schlösser, Jochen Peters, Rainer Rossi, Wolfgang Rascher, Ralf Böttger, Jürgen Seidenberg, Gesine Hansen, Maria Zernickel, Gerhard Alzen, Jens Dreyhaupt, Rainer Muche, Helmut D Hummler, for the PHELBI Study Group**

Intraventricular haemorrhage all grades‡§	50 (28%)	55 (31%)	0·46
Intraventricular haemorrhage present on day 1 without progress‡	9 (5%)	8 (4%)	0·63
Severe intraventricular haemorrhage (grade 3–4)‡	26 (15%)	21 (12%)	0·30
Severe intraventricular haemorrhage (grade 3–4) present on day 1 without progress‡	7 (4%)	3 (2%)	0·48
Combined death or moderate to severe bronchopulmonary dysplasia or intraventricular haemorrhage (grade 3–4)	82 (46%)	67 (37%)	0·09
Periventricular leukomalacia‡	16 (9%)	11 (6%)	0·31

Sem diferença: neurológico

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USP - RIBEIRÃO
assistência - ensino - pesquisa

- **Gasometria: Avaliar com cuidado.**
- **Coletar apenas depois de realizado todos ajustes ventilatórios.**
- **Valores admitidos: PH 7.22/ PCO2 65mmHg (Hipercapnia permissiva).**

Cuidado nas primeiras 24 horas.
Avaliar a competência do rim.

Visualização do tórax: Exame físico

JAMA Pediatr. 2017 Feb 1;171(2):165-174. doi: 10.1001/jamapediatrics.2016.3015.

Interventions to Improve Rates of Successful Extubation in Preterm Infants: A Systematic Review and Meta-analysis.

Ferguson KN[1], Roberts CT[2], Manley BJ[2], Davis PG[3].

Cafeína aumenta a chance de sucesso na extubação. (RR 0.48; 95% CI, 0.32-0.71)

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Para tratamento: Evidência A1

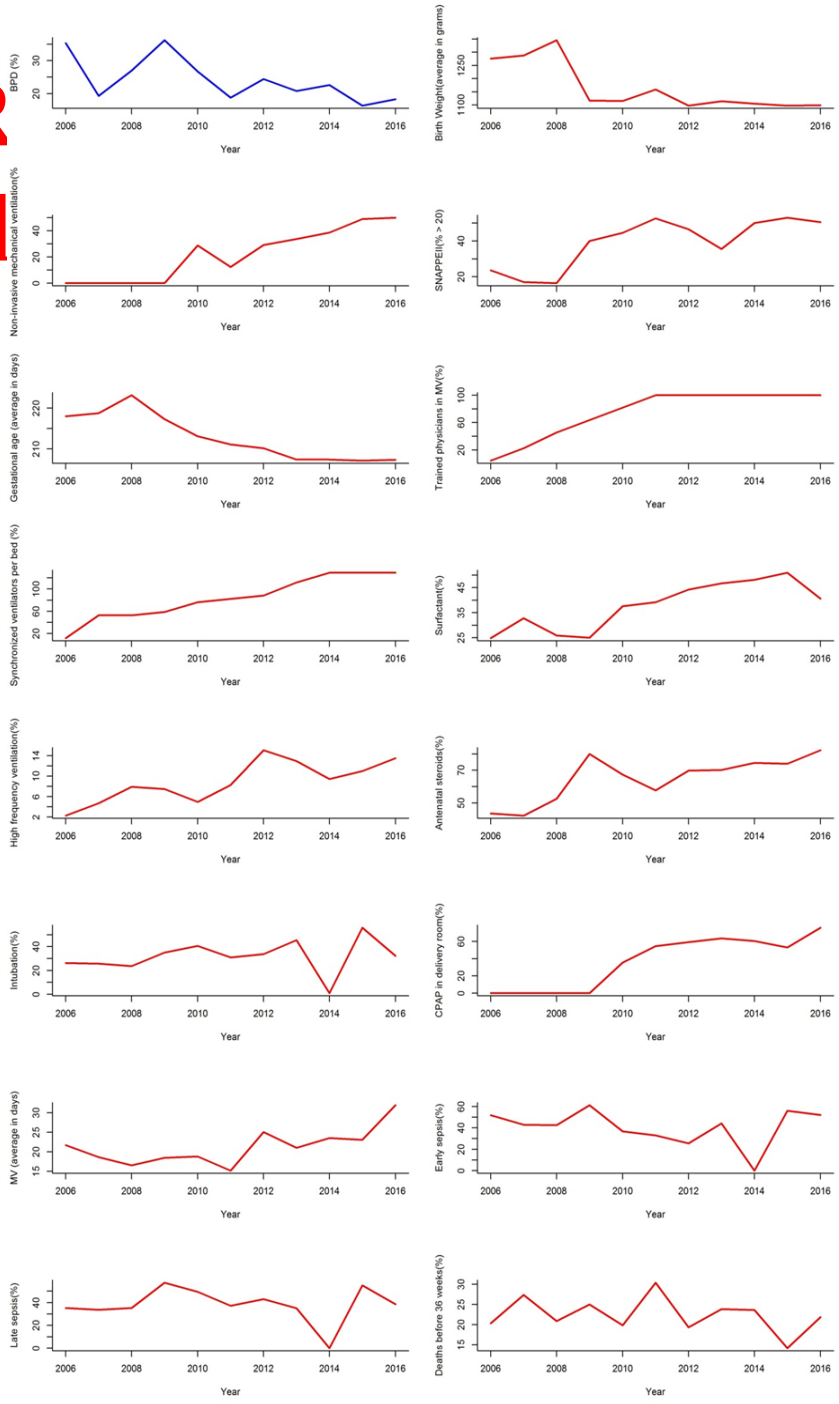
4 Caffeine should be used to facilitate weaning from MV (A1). Early caffeine should be considered for all babies at high risk of needing MV, such as those <1,250 g birth weight, who are managed on non-invasive respiratory support (C1).

Profilática deve ser considerada.

Série histórica USP-R efetivas para a red

Gráfico 4: Fatores associados com a diminuição da displasia broncopulmonar:

		IC95%		
Variável independente	Estimativa	LI	LS	p-valor
Ventilador/leito	-0,12	-0,21	-0,03	0,02
%equipe treinada	-0,11	-0,23	0,01	0,09
Esteroideantenatal	-0,07	-0,45	0,31	0,69
Pesonasc	0,02	-0,02	0,06	0,42
Idadegesdias	0,69	0,08	1,30	0,04
Intubtraqueal	-0,09	-0,44	0,26	0,59
Cpap_sala_parto	-0,14	-0,25	-0,03	0,02
Snappe	-0,19	-0,51	0,13	0,22
ventMecNinvasiva	-0,21	-0,37	-0,05	0,02
altafreq	-0,89	-1,90	0,12	0,09
tempoVMdias	-0,51	-1,55	0,53	0,31
Surfactantealgummomento	-0,50	-0,82	-0,18	< 0,01
Sepseprecoce	0,09	-0,21	0,39	0,53
Sepsetardia	0,08	-0,25	0,41	0,63



Dados em processo de publicação.

Ventilator com peça T

Normotermia

Cafeína

Stress controlado

Pressão de distensão <14

Peep 6-9

Leite Humano

FiO2 menor que 30% para pacientes menor ou igual que 26 semanas

Sat 90-94%

Surfactante

Tempo menor que 2 horas

MIST OU INSURE

FiO2 menor que 40% para pacientes maiores que 26 semanas

walusa@fmrp.usp.br