

MARDAN PALACE HOTEL - ANTALYA

Non Invasive ventilation: only in ICU?



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Chief of the Emergency Department and prehospital EMS (SAMU-SMUR- Chartres (France) French Society of Emergency Medicine (SFMU) European Society of Emergency Medicine (EuSEM)



18-21 MAY 2017



No Conflict of Interest



Thanks to Dr Khoury

70 yo complaining of progressive dyspnea came to the ED by ambulance in sitting position

- Past Medical History : Hypertension, COPD (heavy smoker) <u>Physical exam</u>
- > Sleepy, GCS = 10/15 Not answering simple orders
- > cyanosis / extremities before O2
- HR = 130/min, ABP = 180/120, SpO2 88 % RR = 29/min

> O2 6L (Rebreathing Mask)



What you would do?

- Monitor, Veinous access
- > ABG's :

≻pH = 7.09

≻pCO2 = 12.6 kPA

≻pO2 = 22.8 kPA

>Bicarbonates = 29.3 mmol/L

≻BE = - 0.3 mmol/L

- ➤ ECG
- Chest X-ray





Therapeutical option 1 :

INTUBATION



YES

- ✓ Respiratory Acidosis (pH <7,10 & RR 35/min)
- ✓ Impaired Consciousness✓ Hypoxemia



- \checkmark Glasgow > 8
- ✓ Hemodynamically stable
- Other non invasive treatment

Therapeutical option 2 :



Indications for NIV : Respiratory distress or failure

Noninvasive positive pressure ventilation in acute respiratory failure: report of an International Consensus Conference in intensive care medicine, Paris, France, 13–14 April 2000*

Critical Care Assembly of the American Thoracic Society (ATS) European Respiratory Society (ERS) European Society of Intensive Care Medicine (ESICM) Société de Réanimation de Langue Française (SRLF) Société Française de Médecine d'Urgence Royal College of Physicians British Thoracic Society The Intensive care Society



COPD Cardiogenic Pulmonary Oedema

Others?

Noninvasive Positive Pressure Ventilation for Acute Respiratory Failure Patients With Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis



Qualité des services de santé Ontario

	NPP	NPPV UMC		2		Risk Ratio	Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	M-H, Random, 95% Cl
Barbe 1996	0	10	0	14		Not estimable	
Bott 1993	0	30	5	30	1.0%	0.09 [0.01, 1.57]	<
Brochard 1995	11	43	31	42	27.9%	0.35 [0.20, 0.60]	
Carrera 2009	5	37	13	38	9.5%	0.40 [0.16, 1.00]	
Dhamija 2005	0	14	1	15	0.8%	0.36 [0.02, 8.07]	
Dikensoy 2002	2	17	7	17	4.0%	0.29 [0.07, 1.18]	
Keenan 2005	2	25	5	27	3.4%	0.43 [0.09, 2.03]	
Khilnani 2010	3	20	12	20	6.7%	0.25 [0.08, 0.75]	
Kramer 1995	1	11	8	12	2.2%	0.14 [0.02, 0.92]	
Plant 2000	18	118	32	118	30.4%	0.56 [0.34, 0.94]	
Wang 2005	8	171	26	171	14.0%	0.31 [0.14, 0.66]	
Total (95% CI)		496		504	100.0%	0.38 [0.28, 0.50]	•
Total events	50		140				
Heterogeneity: Tau ² =	0.00; Chi ²	= 5.49,	df = 9 (P	= 0.79); l ² = 0%		
Test for overall effect:	Eavours NDD\/ Eavours LIMC						

Pooled Results for the **Need for Endotracheal Intubation** (NPPV (noninvasive positivepressure ventilation) Plus UMC Versus UMC (Usual Medical Care) Alone)*

Ontario Health Technology Assessment Series; Vol. 12: No. 8, pp. 1–102, March 2012

Noninvasive Positive Pressure Ventilation for Acute Respiratory Failure Patients With Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis



Qualité des services de santé Ontario

		NPPV			JMC			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
Barbe 1996	10.6	0.9	14	11.3	1.3	10	12.7%	-0.70 [-1.63, 0.23]	-
Bott 1993	9	5.25	30	9	9.5	30	7.9%	0.00 [-3.88, 3.88]	_ + _
Brochard 1995	23	17	43	35	33	42	2.0%	-12.00 [-23.20, -0.80]	-
Carrera 2009	10	5	37	12	6	38	10.4%	-2.00 [-4.50, 0.50]	
Dhamija 2005	9.77	3.32	14	10.2	5.64	15	8.9%	-0.43 [-3.77, 2.91]	-+-
Dikensoy 2002	8	2.1	17	12.3	3.3	17	11.5%	-4.30 [-6.16, -2.44]	
Keenan 2005	6.5	5.6	25	9.1	7.3	27	8.6%	-2.60 [-6.12, 0.92]	
Khilnani 2010	9.4	4.3	20	17.8	2.6	20	10.9%	-8.40 [-10.60, -6.20]	
Kramer 1995	14.9	3.3	11	17.3	3	12	10.2%	-2.40 [-4.99, 0.19]	
Plant 2000	10	22.167	118	10	19.5	118	5.9%	0.00 [-5.33, 5.33]	+
Wang 2005	16	9	171	18	11	171	11.0%	-2.00 [-4.13, 0.13]	
Total (059/ CI)			500			500	400.00/	2 60 1 4 44 0 0 41	
Total (95% CI)			500			500	100.0%	-2.68 [-4.41, -0.94]	· · · · ▼ · · · · · ·
Heterogeneity: Tau ² = 5.91; Chi ² = 51.27, df = 10 (P < 0.00001); l ² = 80%								-20 -10 0 10 20	
Test for overall effect: Z = 3.03 (P = 0.002)								Favours NPPV Favours UMC	

Pooled Results for Mean Hospital Length of Stay (NPPV Plus UMC Versus UMC Alone Comparison)3 *

Ontario Health Technology Assessment Series; Vol. 12: No. 8, pp. 1–102, March 2012

Noninvasive Positive Pressure Ventilation for Acute Respiratory Failure Patients With Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis



Qualité des services de santé Ontario

NPP\	/	UMC	:	Risk Ratio		Risk Ratio		
Events	Total	Events	Total	Welght	M-H, Random, 95% Cl	M-H, Rando	m, 95% CI	
0	14	0	10		Not estimable			
4	43	12	42	15.5%	0.33 [0.11, 0.93]			
3	37	4	38	8.4%	0.77 [0.18, 3.21]			
0	14	1	15	1.8%	0.36 [0.02, 8.07]			
1	17	2	17	3.2%	0.50 [0.05, 5.01]			
1	25	2	27	3.1%	0.54 [0.05, 5.59]			
3	20	2	20	6.1%	1.50 [0.28, 8.04]			
12	118	24	118	41.2%	0.50 [0.26, 0.95]	-=-		
7	171	12	171	20.7%	0.58 [0.24, 1.45]		-	
	459		458	100.0%	0.53 [0.35, 0.81]	•		
31		59						
0.00; Chi ²	= 2.71,	df = 7 (P	= 0.91); I² = 0%			10	100
Z = 2.98 (F	P = 0.00	03)		-		Eavours NPPV	Favours LIM	C
	NPP Events 0 4 3 0 1 1 3 12 7 31 0.00; Chi ² Z = 2.98 (F	NPPV Events Total 0 14 4 43 3 37 0 14 1 17 1 25 3 20 12 118 7 171 459 31 0.00; Chi² = 2.71, Z = 2.98 (P = 0.00)	NPPV UMC Events Total Events 0 14 0 4 43 12 3 37 4 0 14 1 1 17 2 1 25 2 3 20 2 12 118 24 7 171 12 459 31 59 0.00; Chi ² = 2.71, df = 7 (P Z Z = 2.98 (P = 0.003) 2	NPPV UMC Events Total Events Total 0 14 0 10 4 43 12 42 3 37 4 38 0 14 1 15 1 17 2 17 1 25 2 27 3 20 2 20 12 118 24 118 7 171 12 171 459 458 31 59 0.00; Chi² = 2.71, df = 7 (P = 0.91 2 2.91 Z = 2.98 (P = 0.003) 3 3.91 3.91	NPPV UMC Events Total Events Total Weight 0 14 0 10 10 4 43 12 42 15.5% 3 37 4 38 8.4% 0 14 1 15 1.8% 1 17 2 17 3.2% 1 25 2 27 3.1% 3 20 2 20 6.1% 12 118 24 118 41.2% 7 171 12 171 20.7% 459 458 100.0% 31 59 0.00; Chi² = 2.71, df = 7 (P = 0.91); l² = 0% Z = 2.98 (P = 0.003) 2 2	NPPV UMC Risk Ratio Events Total Events Total Weight M-H, Random, 95% Cl 0 14 0 10 Not estimable 4 43 12 42 15.5% 0.33 [0.11, 0.93] 3 37 4 38 8.4% 0.77 [0.18, 3.21] 0 14 1 15 1.8% 0.36 [0.02, 8.07] 1 17 2 17 3.2% 0.50 [0.05, 5.01] 1 25 2 27 3.1% 0.54 [0.05, 5.59] 3 20 2 20 6.1% 1.50 [0.28, 8.04] 12 118 24 118 41.2% 0.50 [0.26, 0.95] 7 171 12 171 20.7% 0.58 [0.24, 1.45] 31 59 0.00; Chi ² = 2.71, df = 7 (P = 0.91); l ² = 0% Z 2.98 (P = 0.003)	NPPV UMC Risk Ratio Risk F Events Total Events Total Weight M-H, Random, 95% CI M-H, Random 0 14 0 10 Not estimable M-H, Random, 95% CI M-H, Random 4 43 12 42 15.5% 0.33 [0.11, 0.93] Image: Comparison of the stimable 3 37 4 38 8.4% 0.77 [0.18, 3.21] Image: Comparison of the stimable 0 14 1 15 1.8% 0.36 [0.02, 8.07] Image: Comparison of the stimable 1 17 2 17 3.2% 0.50 [0.05, 5.01] Image: Comparison of the stimable 1 25 2 27 3.1% 0.54 [0.05, 5.59] Image: Comparison of the stimable Image: Comparis Image: Comp	NPPV UMC Risk Ratio Risk Ratio $\overline{\text{Events}}$ Total Events Total Weight M-H, Random, 95% CI M-H, Random, 95% CI 0 14 0 10 Not estimable M-H, Random, 95% CI 4 43 12 42 15.5% 0.33 [0.11, 0.93] M-H, Random, 95% CI 3 37 4 38 8.4% 0.77 [0.18, 3.21] M-H, Random, 95% CI 0 14 1 15 1.8% 0.36 [0.02, 8.07] M-H, Random, 95% CI 1 17 2 17 3.2% 0.50 [0.05, 5.01] M-H, Random, 95% CI 1 17 2 17 3.2% 0.50 [0.05, 5.01] M-H, Random, 95% CI 1 125 2 27 3.1% 0.54 [0.05, 5.59] M-H, France 3 20 2 20 6.1% 1.50 [0.26, 0.95] M-H, France 459 458 100.0% 0.53 [0.35, 0.81] M-H, France M-H, France 31 <t< td=""></t<>

Pooled Results for Inhospital Mortality (NPPV Plus UMC Versus UMC Alone Comparison)*

Ontario Health Technology Assessment Series; Vol. 12: No. 8, pp. 1–102, March 2012

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Vital FMR, Ladeira MT, Atallah ÁN, 2013 issue 5

Study or subgroup	NPPV		SMC		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	Ν	Mean(SD)	IV,Random,95% CI	5	IV,Random,95% Cl
Bautin 2005	П	14.7 (1.9)	П	19 (2.5)		28.6 %	-4.30 [-6.16, -2.44]
Bersten 1991	19	26.32 (5.93)	15	28.67 (9.37)		3.3 %	-2.35 [-7.79, 3.09]
Kelly 2002	27	22.74 (5.93)	31	25.73 (6.84)		9.1 %	-2.99 [-6.28, 0.30]
L'Her 2004	43	27 (7)	46	31 (8)		10.1 %	-4.00 [-7.12, -0.88]
Lin 1991	20	23 (3)	20	24 (4)		20.5 %	-1.00 [-3.19, 1.19]
Masip 2000	19	24.8 (4)	18	26.3 (8)		5.8 %	-1.50 [-5.61, 2.61]
Nava 2003	65	29.3 (7.1)	65	32.3 (7.1)		16.5 %	-3.00 [-5.44, -0.56]
Räsänen 1985	13	22 (5)	7	24 (5)		4.7 %	-2.00 [-6.59, 2.59]
Weitz 2007	3	19.3 (6.4)	5	19.3 (4.5)		1.4 %	0.0 [-8.25, 8.25]
Total (95% CI)	220		218		•	100.0 %	-2.86 [-3.85, -1.87]
Heterogeneity: Tau ² =	0.0; Chi ² =	6.66, df = 8 (P = 0	0.57); I ² =0.	0%			
Test for overall effect: Z	Z = 5.66 (P ·	< 0.00001)			L Prooth	Data	ftor 1 hour
Test for subgroup differ	ences: Not	applicable			v preau	I Rale a	inter i nour
					-10 -5 0 5 1	0	
					Favours NPPV Favours SMC		



Vital FMR, Ladeira MT, Atallah ÁN, 2013 issue 5

Study or subgroup	NPPV	SMC	Risk Ratio	Weight	Risk Ratio	
	n/N	n/N	H.Random,95%		H,Random,95%	
Agmy 2008	8/88	10/41	-	7.6 %	0.37 [0.16, 0.87]	
Bautin 2005	1/11	4/11		2.7 %	0.25 [0.03, 1.90]	
Bersten 1991	0/20	7/20		1.5 %	0.07 [0.00, 1.09]	
Crane 2004	2/40	0/20		1.4 %	2.56 [0.13, 50.95]	
Delclaux 2000	6/22	6/20	+	6.9 %	0.91 [0.35, 2.36]	
Ferrer 2003	1/15	2/15		2.2 %	0.50 [0.05, 4.94]	
Frontin 2010	2/62	3/62		3.3 %	0.67 [0.12, 3.85]	
Kelly 2002	0/27	0/31			Not estimable	
L1-ler 2004	2/43	4/46		3.6 %	0.53 [0.10, 2.77]	
Levitt 2001	5/21	7/21	-	6.7 %	0.71 [0.27, 1.89]	
Lin 1991	7/40	17/40	-	8.2 %	0.41 [0.19, 0.88]	
Lin 1995	8/50	18/50	+	8.4 %	0.44 [0.21, 0.93]	
Masip 2000	1/20	6/20		2.7 %	0.17 [0.02, 1.26]	
Nava 2003	13/65	16/65	+	9.1 %	0.81 [0.43, 1.55]	
Park 2001	3/16	4/10	-	5.1 %	0.47 [0.13, 1.67]	
Park 2004	4/56	11/27		6.3 %	0.18 [0.06, 0.50]	
Räsänen 1985	6/20	12/20	-	8.2 %	0.50 [0.23, 1.07]	
Sharon 2000	16/20	4/20	-	7.2 %	4.00 [1.62, 9.87]	
Takeda 1997	1/15	6/15	<u> </u>	2.7 %	0.17 [0.02, 1.22]	
Takeda 1998	2/11	8/11		4.9 %	0.25 [0.07, 0.92]	
Thys 2002	0/3	0/5			Not estimable	
Weitz 2007	0/10	1/16		1.3 %	0.52 [0.02, 11.54]	V Decreasing EII
Total (95% CI) Total events: 88 (NPPV), 1 Heterogeneity: Tau ² = 0.2 Test for overall effect: Z = Test for subgroup differen	675 146 (SMC) 9: Chi ² = 35.66, df = : 3.48 (P = 0.00051) ces: Not applicable	586 19 (P = 0.01); I ² =47	*	100.0 %	0.52 [0.36, 0.75]	

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Favours NPPV Favours SMC



Vital FMR, Ladeira MT, Atallah ÁN, 2013 issue 5

Study or subgroup	NPPV		SMC		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	_	IV,Random,95% CI
Bautin 2005	П	17.3 (2.3)	П	19.4 (2.5)		12.5 %	-2.10 [-4.11, -0.09]
Bersten 1991	19	8.7 (8.3)	20	7.9 (4.1)		6.4 %	0.80 [-3.34, 4.94]
Kelly 2002	27	13.7 (2)	29	15 (2.7)	-=-	15.4 %	-1.30 [-2.54, -0.06]
L'Her 2004	43	12 (11)	46	9 (7)		7.0 %	3.00 [-0.86, 6.86]
Levitt 2001	21	7.3 (8)	17	8.1 (6.4)		5.6 %	-0.80 [-5.38, 3.78]
Lin 1995	50	8.5 (4.5)	50	9 (4.5)		13.5 %	-0.50 [-2.26, 1.26]
Masip 2000	19	14.2 (5)	18	14.3 (4)	_ + _	9.4 %	-0.10[-3.01, 2.81]
Nava 2003	65	5.4 (3)	65	5.1 (2.3)	+	16.4 %	0.30 [-0.62, 1.22]
Thys 2002	3	29 (18.52)	5	10 (8.66)		0.3 %	19.00 [-3.29, 41.29]
Weitz 2007	10	8.2 (2.3)	13	12.5 (1.8)	-•-	13.6 %	-4.30 [-6.03, -2.57]
Total (95% CI)	268		274		•	100.0 %	-0.80 [-2.10, 0.51]
Heterogeneity: Tau ² =	2.47; Chi ² =	31.14, df = 9 (P =	0.00028); I ²	2 =71%			
Test for overall effect: Z	Z = 1.20 (P =	0.23)				longth store	
Test for subgroup differ	rences: Not a	pplicable				spital	length stay
					-10 -5 0 5 10		
					Favours NPPV Favours SMC		



Vital FMR, Ladeira MT, Atallah ÁN, 2013 issue 5

			0.01 0.1 1 10 10	0	
	and the second se				
Test for subgroup difference	s: Not applicable				
Heterogeneity: Tau ² = 0.05; Test for overall effect: 7 = 2	$Ch^{\mu} = 21.42, df = 0.0072$	19 (P = 0.31); P =	11%5		
Total events: 72 (NPPV), 10	4 (SMC)	10 /0 - 0213 /2 -			
Total (95% CI)	598	509	•	100.0 %	0.66 [0.48, 0.89]
Agmy 2008	2/88	6/41	- _	3.6 %	0.16 [0.03, 0.74]
Weitz 2007	1/10	1/16		1.3 %	1.60 [0.11, 22.80]
Bautin 2005	1/11	2/11		1.8 %	0.50 [0.05, 4.75]
Crane 2004	5/40	6/20	-•	7.1 %	0.42 [0.14, 1.20]
Park 2004	3/56	6/27		4.9 %	0.24 [0.07, 0.89]
L'Her 2004	12/43	14/46	+	15.1 %	0.92 [0.48, 1.76]
Nava 2003	6/65	9/65	-+	8.2 %	0.67 [0.25, 1.77]
Kelly 2002	1/27	7/31		22%	0.16 [0.02, 1.25]
Thys 2002	0/3	1/5		1.1 %	0.50 [0.03, 9.46]
Levitt 2001	3/21	3/21	+	3.9 %	1.00 [0.23, 4.40]
Park 2001	1/16	0/10		1.0 %	1.94 [0.09, 43.50]
Delclaux 2000	7/22	7/20	+	10.1 %	0.91 [0.39, 2.14]
Masip 2000	0/20	2/20		1.0 %	0.20 [0.01, 3.92]
Sharon 2000	2/20	0/20		1.0 %	5.00 [0.26, 98.00]
Takeda 1998	1/11	7/11		24%	0.14 [0.02, 0.98]

Favours NPPV Favours SMC



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Non-invasive positive pressure ventilation (CPAP or bilevel NPPV) for cardiogenic pulmonary oedema (Review)

Vital FMR, Ladeira MT, Atallah ÁN, 2013 issue 5

Study or subgroup	NPPV	SMC	Risk Ratio	Weight	Risk Ratio
	n/N	n/N	H,Random,95%		H,Random,95% Cl
Agmy 2008	2/88	6/41		7.2 %	0.16 [0.03, 0.74]
Crane 2004	5/40	6/20		13.8 %	0.42 [0.14, 1.20]
Kelly 2002	1/27	7/31		4.4 %	0.16 [0.02, 1.25]
L'Her 2004	12/43	14/46	+	27.4 %	0.92 [0.48, 1.76]
Levitt 2001	3/21	3/21	+	7.8 %	1.00 [0.23, 4.40]
Lin 1995	4/50	6/50		11.2 %	0.67 [0.20, 2.22]
Nava 2003	6/65	9/65		15.7 %	0.67 [0.25, 1.77]
Park 2004	3/56	6/27		9.7 %	0.24 [0.07, 0.89]
Weitz 2007	1/10	1/16		2.7 %	1.60 [0.11, 22.80]
Total (95% CI)	400	317	•	100.0 %	0.55 [0.36, 0.86]
Total events: 37 (NPPV), 9	58 (SMC)				
Heterogeneity: $Tau^2 = 0.0$	08; Chi ² = 9.61, df = 8	3 (P = 0.29); I ² = I 7%	6		
Test for overall effect: Z =	2.64 (P = 0.0084)				
Test for subgroup differen	ces: Not applicable		↓ ↓	Morta	lity/ ED
			0.001 0.01 0.1 1 10 100 1000		
			Favours NPPV Favours SMC		

The patient: Which Indications?

- Exacerbated COPD (Brochard NEJM 90, 95)
- Cardiogenic Pulmonary Oedema (Masip, Lancet 2001; Nava AJRCCM 2004)
- Severe Hypoxemia:
 - Hematology (Hilbert, NEJM 2001)
 - Early Extubation (Girault, AJRCCM 98)
 - Prophylaxy of post extubation Respiratory Distress (Nava CCM 2005; Ferrer AJRCCM 2006)
 - Pneumonia (AM Brambilla, Intensive Care Med 2014; Nicolini A, Community Acquir Infect 2015;2:46-50
 - Asthma (Lim, Cochrane dec 2012; Diehl, Minerva Anestesiol. 2013)

Post-operative (preventive, curative)

Helmet Continuous Positive Airway Pressure vs Oxygen Therapy To Improve Oxygenation in Community-Acquired Pneumonia CHEST 2010; 138(1):114–120

A Randomized, Controlled Trial

Roberto Cosentini, MD; Anna Maria Brambilla, MD; Stefano Aliberti, MD; Angelo Bignamini, PhD; Stefano Nava, MD; Antonino Maffei, MD; Renato Martinotti, MD; Paolo Tarsia, MD; Valter Monzani, MD; and Paolo Pelosi, MD







Improved outcomes

- While the use of NIV in asthma, PNA and ARDS <u>has not been</u> shown to improve outcomes it maybe reasonable to use
- in the EMS setting, NIV may allow providers to bridge the patient to the hospital where intubation may be safer.



Minerva Anestesiol. 2013 Aug;79(8):926-33. Epub 2013 Mar 19. Non-invasive ventilation in severe asthma attacks. Diehl JL¹, Guérot E.

When to use Non-Invasive Mechanical Ventilation : Indications

- COPD exacerbation: Excellent
- Cardiogenic pulmonary edema: Excellent
- Post-extubation failure: OK
- Transplant: OK
- Post-op respiratory failure: OK
- Neuromuscular disease: OK
- Obesity hypoventilation: OK
- Asthma: No Proven Benefit
- ARDS: No Proven Benefit
- Pneumonia: No Proven Benefit



Noninvasive positive pressure ventilation in acute respiratory failure: report of an International Consensus Conference in intensive care medicine, Paris, France, 13–14 April 2000*

Contraindications for NIV "ACUTE"

- Airways obstruction Aspiration risk vomiting
- Cardiac arrest
- Unconscious GCS < 10 Uncooperative Uncontrolled bleeding
- Trauma or facial abnormality
- Encephalopathy

How (and Where) to use NIV ?



In the Emergency Departement...



Several patients Not enough personnel Quick Turnover



Noninvasive ventilation in the emergency department: are protocols the key?

Antonio M. Esquinas^a, Paolo Groff^b and Roberto Cosentini^c, ^aIntensive Care Unit, Hospital Morales Meseguer, Murcia, Spain, ^bEmergency Department, Hospital Civile Madonna del Soccorso, San Benedetto Tronto and ^cNoninvasive Ventilation UO Emergency Medicine, Fondazione Ca' Granda IRRCS Policlinico Milano, Milan, Italy

there are no international regulations or policies on how NIV must be organized outside the ICU

European Journal of Emergency Medicine 2014, 21:240–241

Even scientific societies have still not carried out studies on this subject.

Hill NS. Respir Care 2009; 54:62–70

Failure of noninvasive mechanical ventilation: could we assess determining factors in emergency department?

Antonio M. Esquinas^a, Antonio Dominguez-Petit^b and Andrea Purro^c, ^aIntensive Care Unit, Hospital Morales Meseguer, Murcia, ^bEmergency Department, Hospital Virgen del Rocio, Sevilla, Spain and ^cEmergency Department, Gradenigo Hospital, Turin, Italy

European Journal of Emergency Medicine 2015, 22:66–70

NIV in the ED...

Yes but...

- •By Experienced physicians
- •Work load in ED?
- •Adapted environment & structure?
- •Good quality Ventilators?

Resuscitation Room High Acuity Zone

Dedicated Area in the ED Dedicated personnel Good performance Ventilators





Unfortunately... In the Emergency Department...





Servo 900 D



Bird

Puritan Bennett 7200

3rd Generation Transport Ventilators



Weinmann medumat



Elisée 250



Monnal T 60



Hamilton T1







Cardiogenic Pulmonary Oedema COPD

Mas & Masip, International Journal of COPD 2014:9

Pressure, cmH₂O



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European Heart Journal (2007) 28, 2895-2901
doi:10.1093/eurheartj/ehm502
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Harnais 4 brins : tension homogène = étanchéité Débilitre: commencer 91., puis augmenter 02 pour atteindre une pression de 5 à 10 sur e manomètre Clinical research Heart failure/cardiomyopathy Connecteur CPAP Masque pulmonary oedema: physiological and clinical effects Manomètre

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positive airway pressure for acute cardiogenic

A randomized study of out-of-hospital continuous

C P A P de Boussignac

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CPAP for acute cardiogenic pulmonary oedema from out-of-hospital to cardiac intensive care unit: a randomised multicentre study.

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Continuous positive airway pressure for cardiogenic

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Take Home Messages

- NIV should be considered if ARF unless contraindications
- For markedly Hypercapnic or severely Acidotic patients ++++
- COPD & ACPE are the best indications in ED
- The earliest its used, the better outcomes
- NIV is relatively simple and inexpensive
- Impacts long time survival



Thank you

I am your father !!



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