Mitteinvasiivne ventilatsioon kiirabi ja EMO praktikas,

ehk morfiinivaba kopsuturse ravi

Arkadi Popov

Põhja-Eesti Regionaalhaigla reanimobiil

A. Bobrov ja tema “aparaat”

Morfiin ja kopsutuse: kas "vennad igaveseks"?

1. Southern Medical Journal: July 1911 - Volume 4 - Issue 6 - ppg 517
2. The Movie: "Love & Doves"

Morphine in Pulmonary Edema

Stengle's article in the January number of the American Journal of the Medical Sciences, wherein he lauds morphine hypodermically as a remedy for pulmonary edema, places a valuable item of information before those members of the profession who have never seen its almost magical effect. The experience of the present writer has repeatedly shown its value. The first time he ventured to use it was in a case under his charge at a summer resort. There was valvular disease of the heart and attacks of dyspnoea in which the edema played a prominent part.

The suffering was so great that the patient begged for relief even if it ended the struggle. Finally the mother begged that he be relieved at any risk.

With many misgivings the writer injected a quarter of a grain of morphine into the biceps and then waited for results. They soon came. In one hour the young man was so relieved that he could walk about the room and not be troubled for breath. The next morning, protected by another dose, he went to his home, fifty miles distant by rail and nine by carriage, arrived in comfort and survived for several weeks, his sufferings soothed by the needle.

Since that time many cases in the writer's practice of cardiac dyspnoea and pulmonary edema, some paroxysmal, others merely fluctuating, have been benefited in greater or lesser degrees by the same expedient. Of course, not every case yields to morphine, but to those that do medicine can yield no richer boon. The question of habit can generally be ignored in such cases, for their days are too few.

In more recent years the writer has generally combined small doses of atropine with the morphine, but is not certain that much benefit accrues from such. It takes large doses of atropine, not less than a hundredth of a grain, to dry up pulmonary effusions.

Ägeda südamepuudulikkuse diagnoosimise ja ravi Eesti juhend (2007) morfiinist:

- Morfiin on näidustatud raske SP-ga hospitaliseeritud patsientidel varajases staadiumis, eriti rahutu ja hingeldava patsiendi korral (näidustus IIb, B)
- Morfiin põhjustab venodilatatsiooni ja on nõrgatoimeline arteriaalne vasodilataator, samuti langetab ta südame löögisagedust
- Enamikes uurimustes on morfiini manustatud intravenoosselt boolusena 3 mg kohe peale veenikanüüli paigaldamist
  - Vajadusel manustatakse morfiini korduvalt

Morfiin + Kopsuturse = X…

- **Morphine and outcomes in acute decompensated heart failure: an ADHERE analysis.**
  - Peacock WF, Hollander JE, Diercks DB, Lopatin M, Fonarow G, Emerman CL.
  - Emerg Med J. 2008 Apr;25(4):205-9.
- 147 362 pt. ägeda dekompenseeritud südamepuudulikkuse diagnoosiga
  - Morfiini said 20 782 (14.1%)
  - Morfiini ei ole saanud 126 580 (85.9%)

Morfiin + Kopsuturse = IRO + SURM?

	Kopsuturse ravi "+ Morfiin"	Kopsuturse ravi "- Morfiin"	P
Mehhaaniline ventilatsioon	15,4%	2,8%	<0.001
Keskmine aeg (p) haiglas	5,6	4,2	<0.001
Hospitaliseerimine IROsse	38,7%	14,4%	<0.001
SUREMUS	13%	2,4%	<0.001

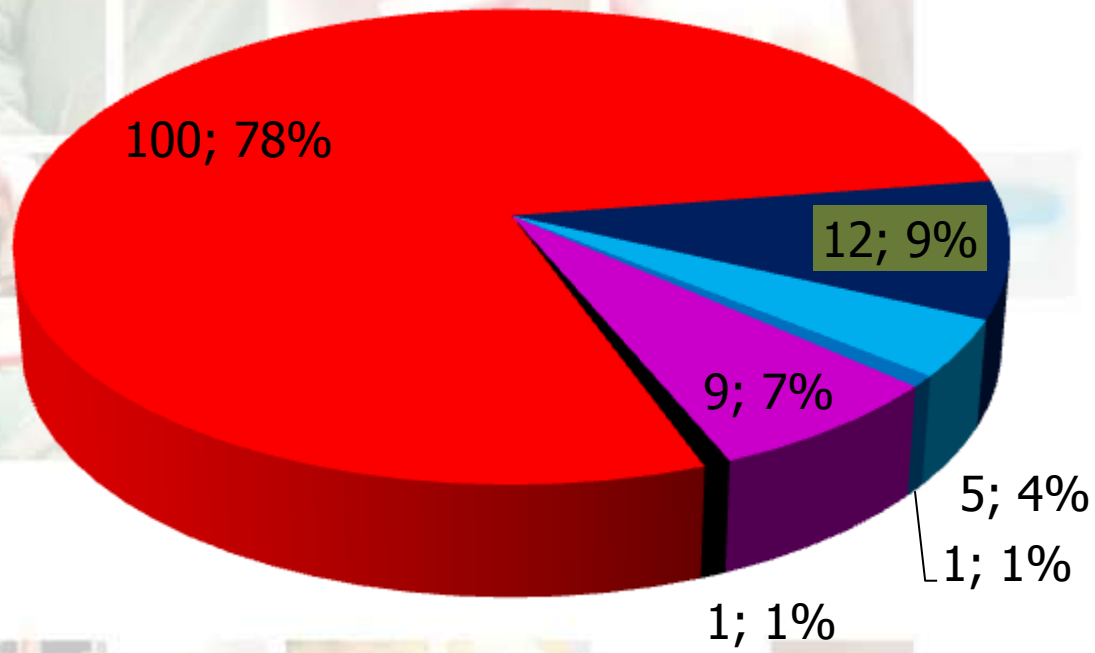
Kokkuvõtte:

Morfiini kasutamine assotsieerub järgmiste ÄSP-st indutseeritud ebasoodsate sündmustega:

- **Suurema mehhaanilise ventilatsiooni rakendamise vajadusega**
- **Pikema statsionaarse raviga**
- **Sagedasema hospitaliseerimisega IROsse**
- **Kõrgema suremusega**

Emerg Med J. 2008 Apr;25(4): 205-9.

Morfiini kasutamine patsientidel hingamispuudulikkusega EMO-intensiivravisaalis (PERH, 2010)

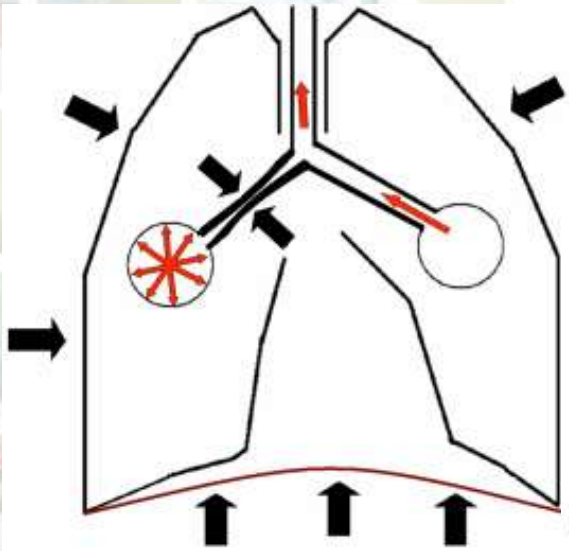


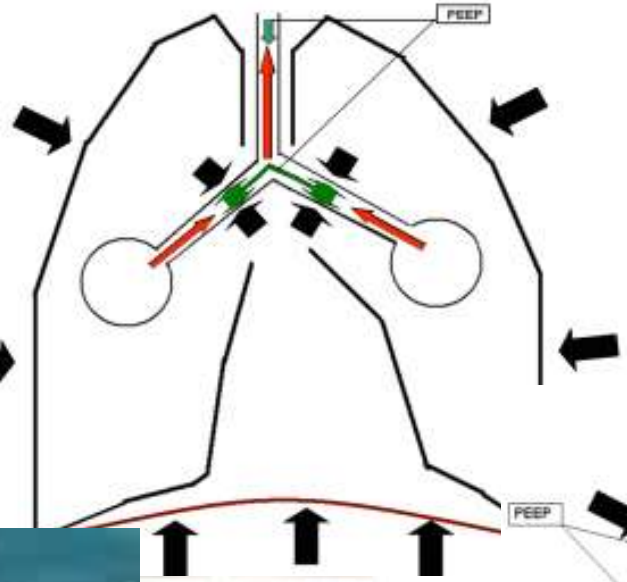
Kopsuturse ja morfiin EMOs (NPPV saanud patsiendid, PERH, 2010)

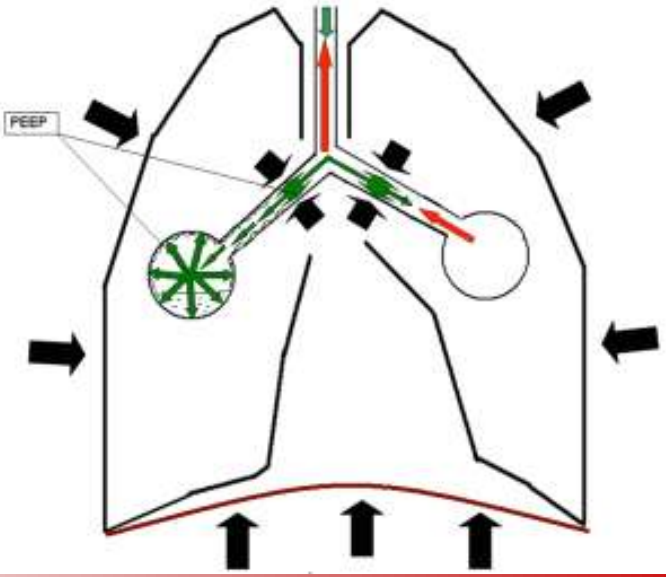
	Kopsuturse + Morfiin	Kopsuturse - Morfiin	Muu HP + Morfiin
Hospitaliseerimine KIO / IROsse	10/12 (83,3%)	26/69 (37,7%)	2/5 (40%)
Intubatsiooni vajadus	0/12 (0%)	5/69 (7,3%)	2/5 (40%)
Suremus	4/12 (33,3%)	11/69 (15,9%)	2/5 (40%)
Hingamissageduse langus	32,5 ⇨ 21,5 (31,7%)	27,3 ⇨ 23,0 (15,8%)	38,6 ⇨ 29,6 (25,3%)
SpO2 tõus	92,6 ⇨ 97,7 (5,2%)	91,4 ⇨ 96,4 (5,2%)	91,2 ⇨ 91,0 (0,2%)

ALTERNATIIV?!

CPAP põhimõtte…







Mis on ***NIV***, ehk *MITTEINVASIIVNE VENTILATSIOON* ?

- Kunstliku ventilatsiooni meetodid, mille teostamisel ei rakendata invasiivseid võtteid hingamisteedes (intubatsioon; trahheostoomia)
- Mitteinvasiivse ventilatsiooni läbiviimiseks ÄSP korral on kasutusel kaks peamist meetodit:
  - CPAP (continuous positive airway pressure)
  - NIPPV (noninvasive positive pressure ventilation)

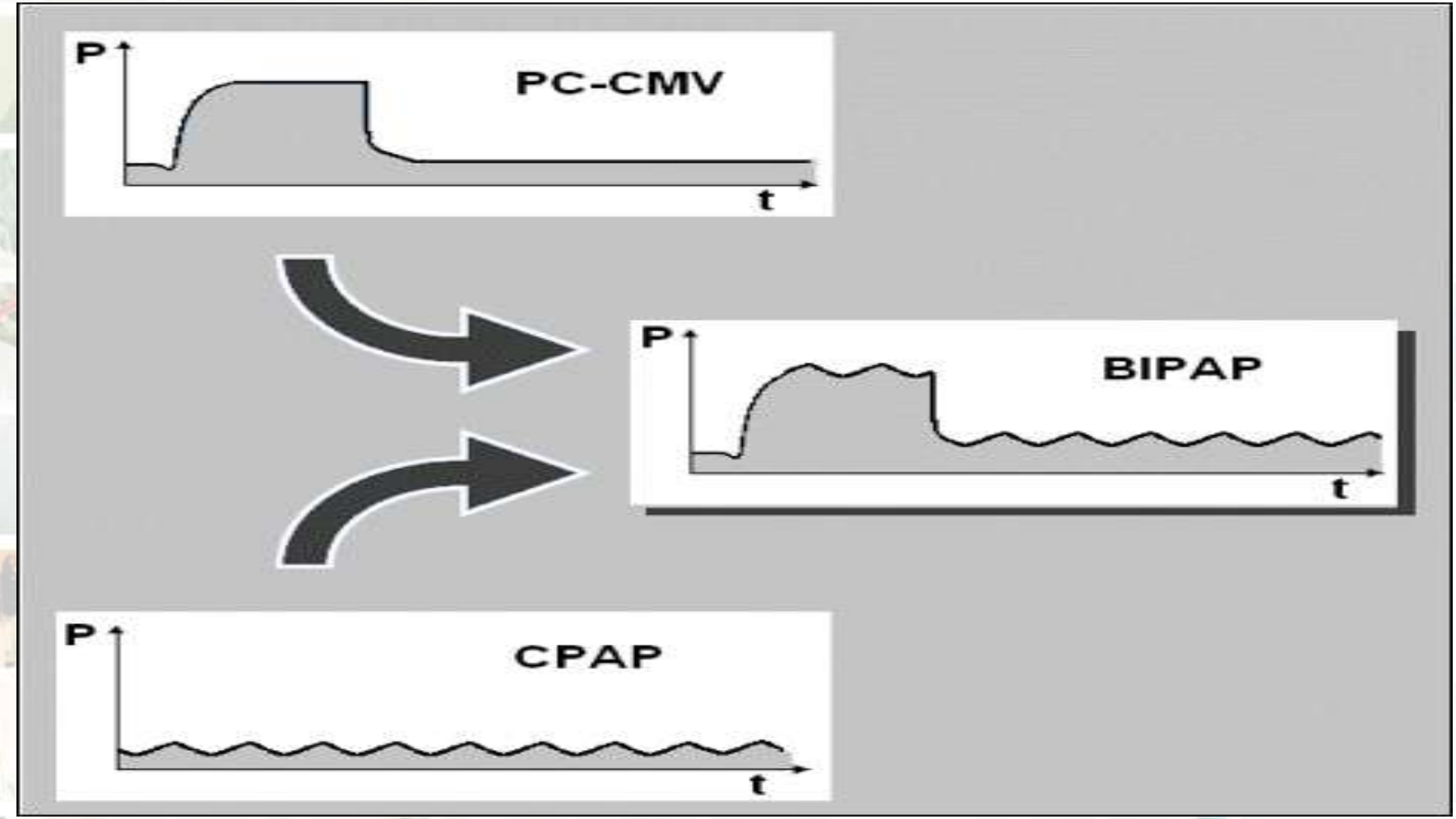
Mis on ***NIV***, ehk *MITTEINVASIIVNE VENTILATSIOON* ?

- CPAP-maski eesmärgiks on püsiva positiivse rõhu tekitamine hingamisteedes, mille tulemusena paraneb funktsionaalne residuaalkapatsiteet ja oksügenisatsioon ning väheneb hingamiseks kulutatav energia

- NIPPV on keerukam ventilatsiooni metoodika, mille korral lisaks hermeetilisele maskile kasutatakse ventilaatorit inspiiriumi ja ekspiiriumi kontrolliks ning abistamiseks

Ägeda südamepuudulikkuse diagnoosimise ja ravi Eesti juhend

CPAP vs BiPAP



NIV näidustused erakorralises meditsiinis

CPAP

- Äge südamepuudulikkus (kopsuturse)

CPAP-PS

- Kopsuturse
- KOKH
- Bronhiaalastma

BiPAP

- KOKHi ägenemine hüperkapniaga
- Kopsuturse hüperkapniaga
- Äge ja krooniline hüperkapniline HP rindkere deformatsioonide ja neuromuskulaarsete haiguste korral

NPPV (NIV) vastunäidustused

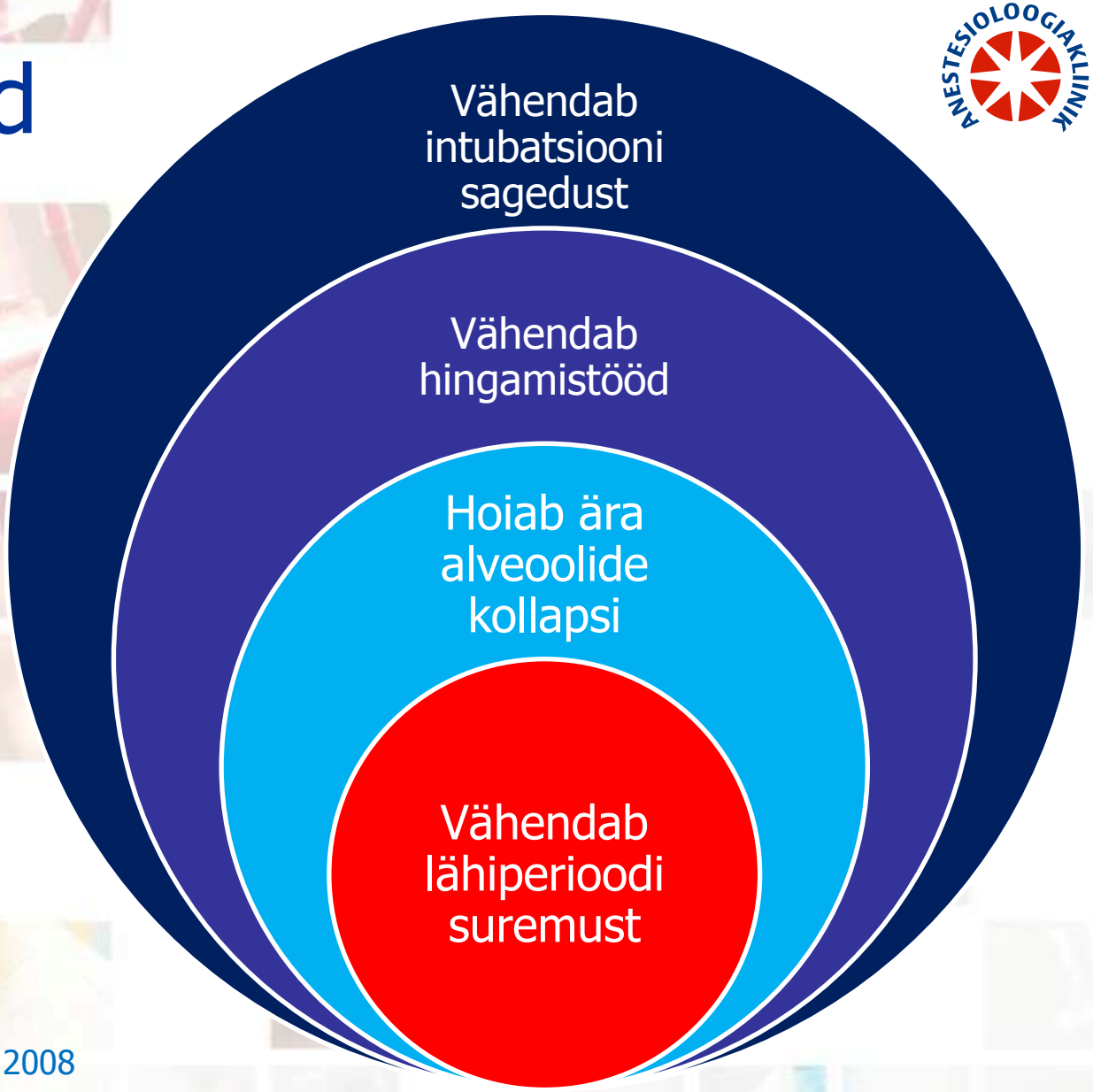
- Sügav teadvusehäire (GCS < 10)
- Neurotrauma kõrge ICP ja koljuvigastusega
- Seisund peale op. GI trakti ülaosal
- Näopõletus või muu näotrauma
- Oksendamine või soolesulgus
- Väljendunud motoorne rahutus
- Madal köharefleks ja röga retentsioon
- Lahendamata pneumotooraks

Aparatuur

CPAP

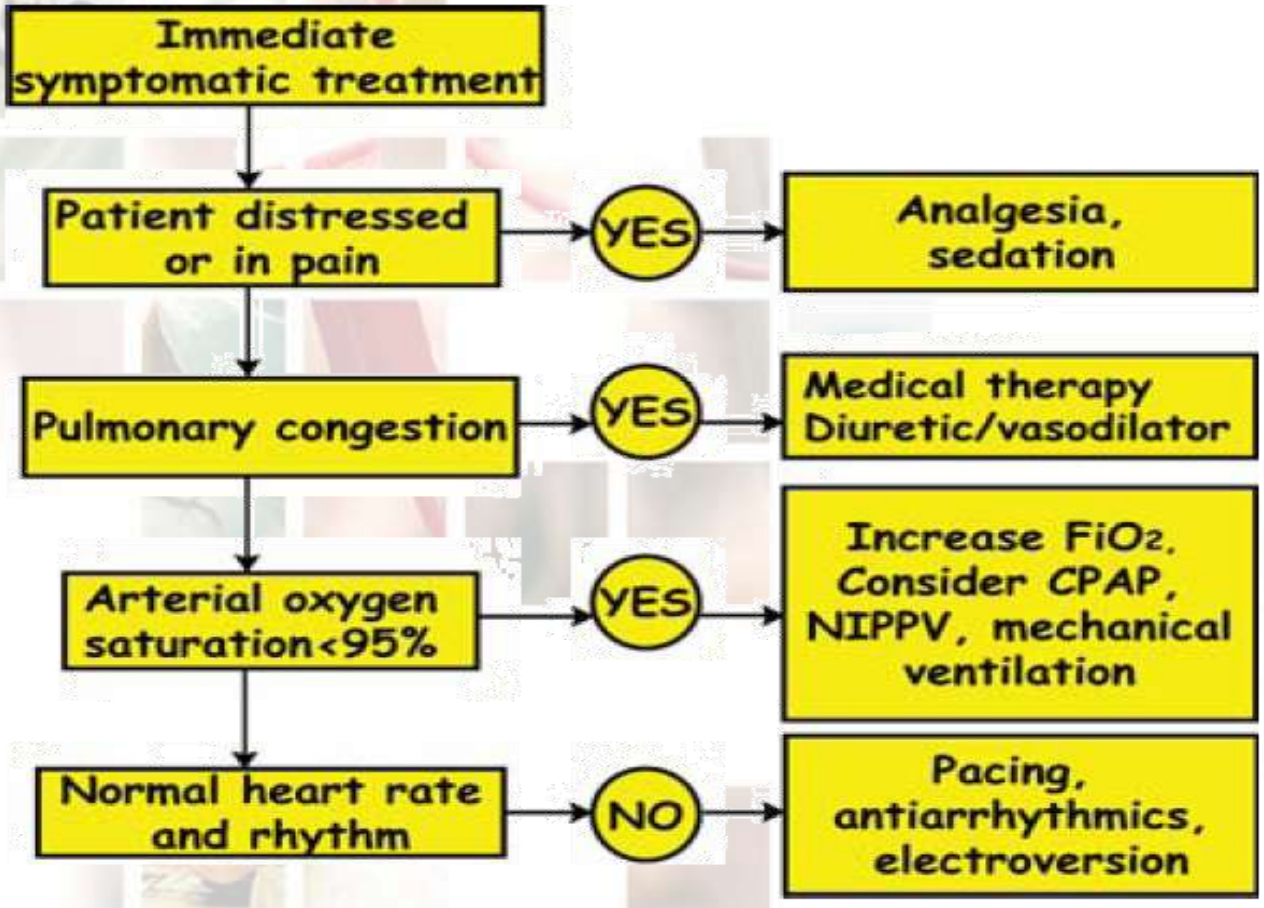
NPPV

NIV eelised



Cohrane Database Syst. Rev 2008

ESC 2008: Ägeda ja kroonilise südamepuudulikkuse diagnoosimise ja ravi juhend

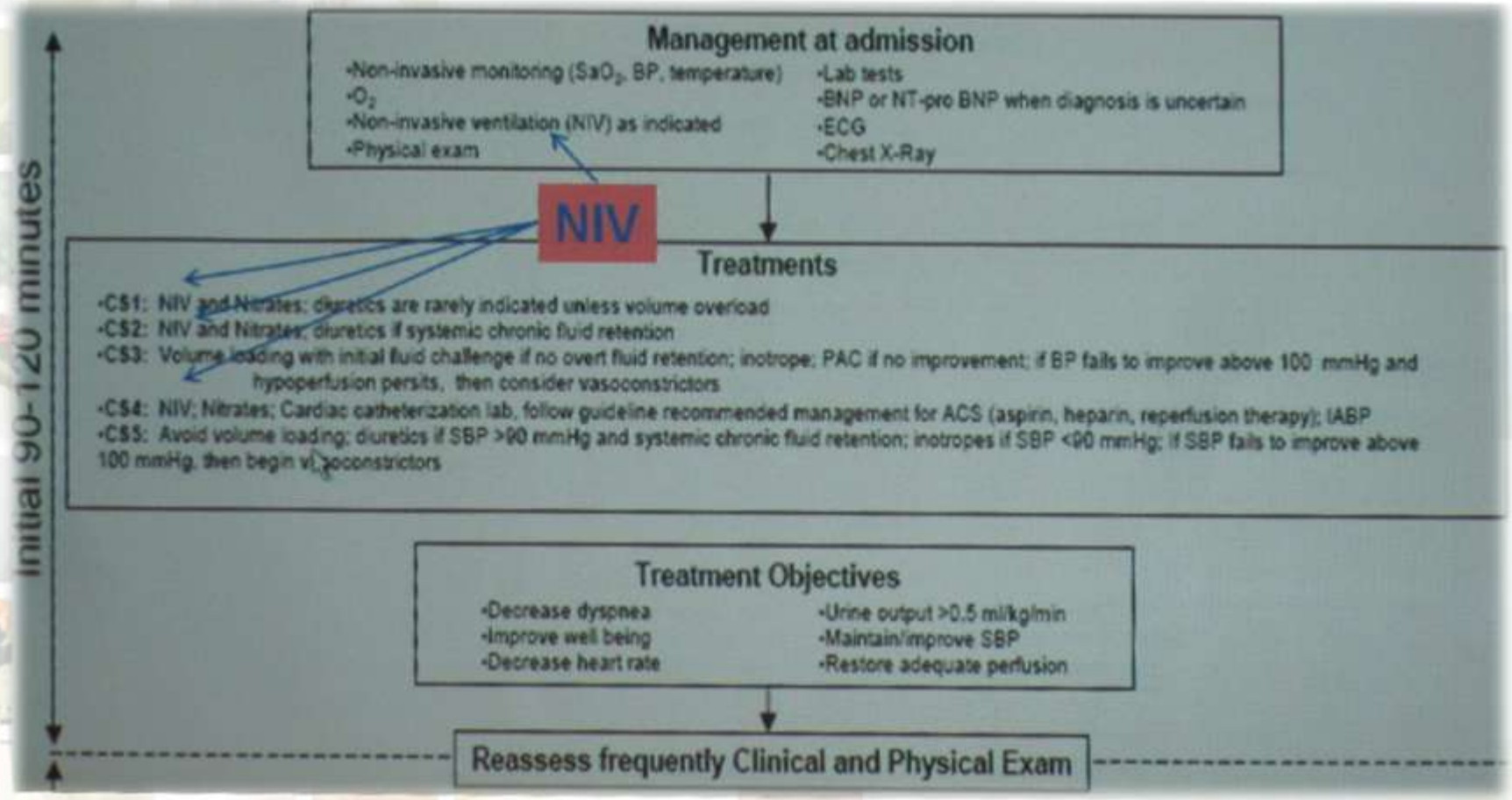


ESC Guidlines, European Heart Journal (2008) 29, 2388–2442

"NIV with positive end-expiratory pressure (PEEP) should be considered as early as possible in every patient with acute cardiogenic pulmonary oedema and hypertensive AHF…"

ESC Guidlines, European Heart Journal (2008) 29, 2388–2442

Ägeda südamepuudulikkuse käsitluse algoritm haiglaeelses etapis ja EMOs

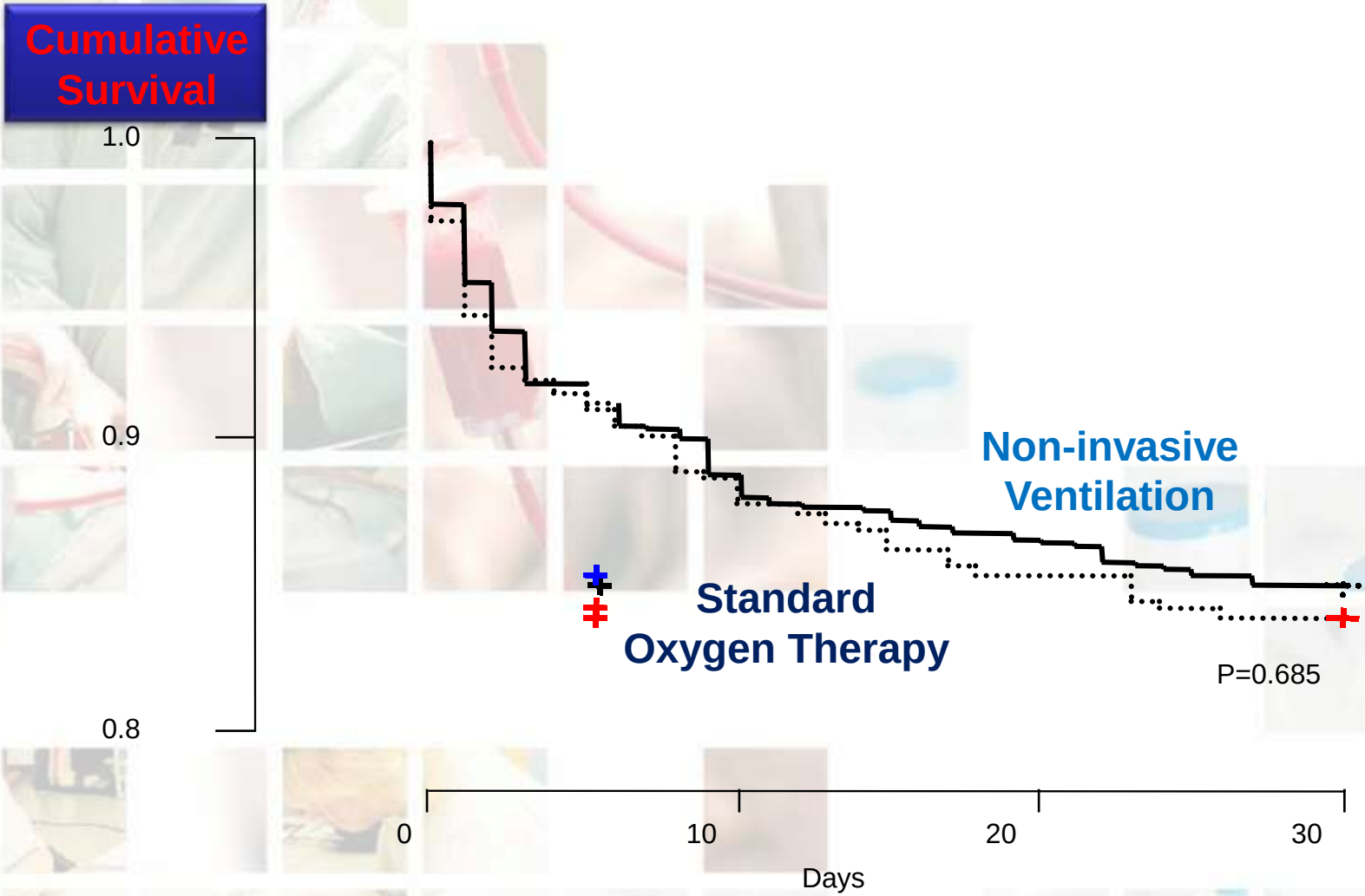


Practical recommendations for prehospital and early in-hospital management of patients presenting with acute heart failure syndromes.
Mebazaa A, & al., Crit Care Med. 2008 Jan;36(1 Suppl):S129-39

Uuring 3CPO: NPPV ja suremus

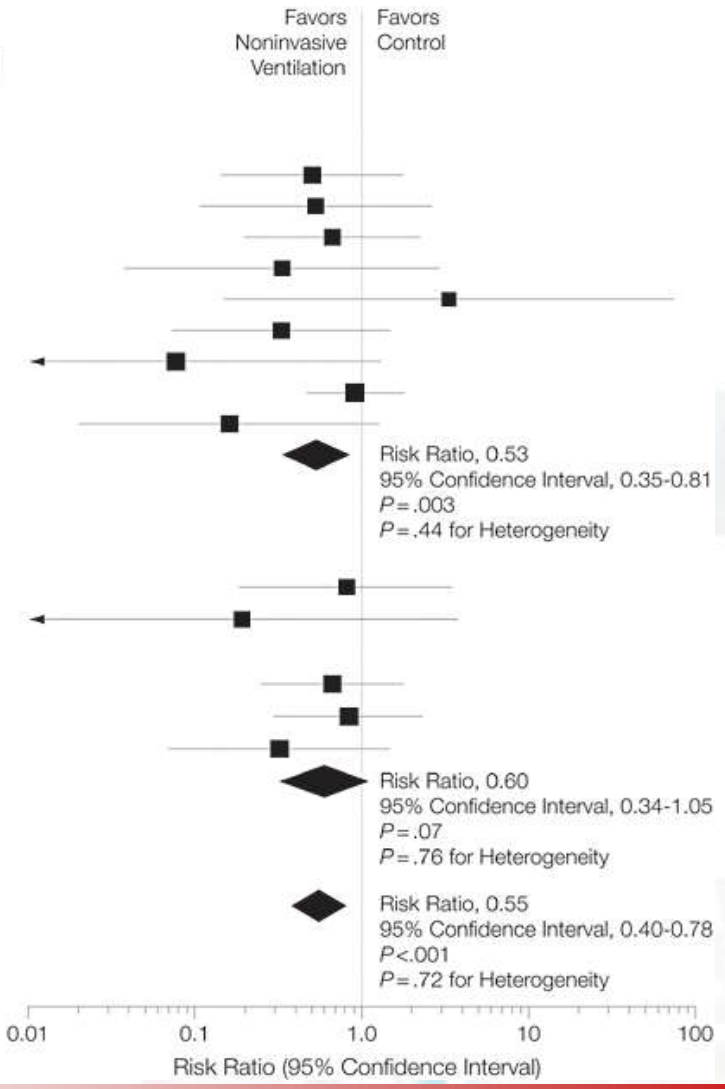
	CPAP	NIPPV	Odds Ratio	95% Confidence Intervals	P Value
7-Day Mortality	9.6%	9.4%	0.97	0.59 to 1.61	0.912
7-Day Mortality /Intubation	11.7%	11.1%	0.94	0.59 to 1.51	0.806
30-Day Mortality	15.4%	15.4%	0.99	0.65 to 1.51	0.976

Uuring 3CPO: Standardne kopsuturse ravi vs. NPPV



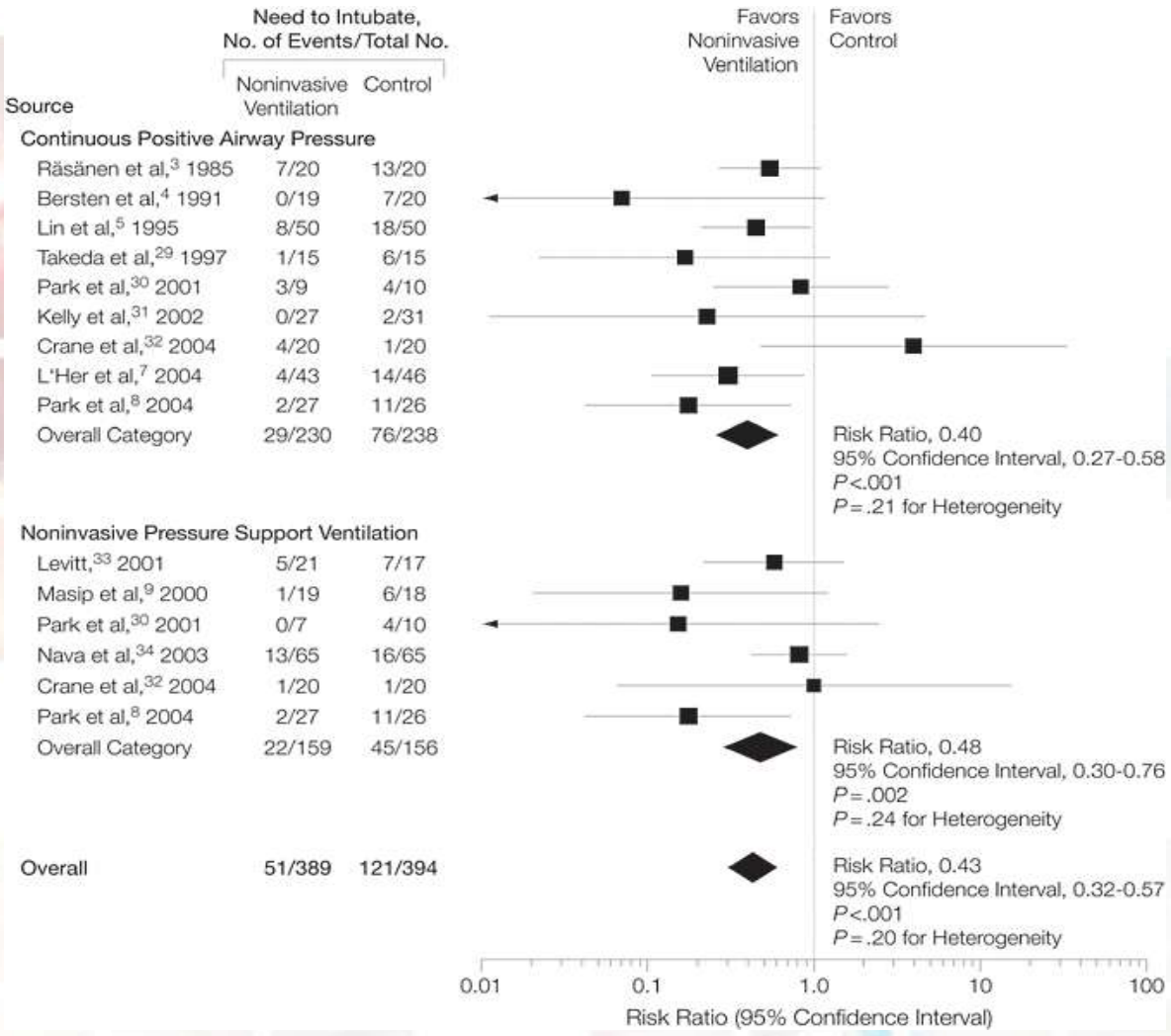
Noninvasive Ventilation in Acute Cardiogenic Pulmonary Edema (Systematic Review and Meta-analysis)

Source	Mortality, No. of Events/Total No.	
	Noninvasive Ventilation	Control
Continuous Positive Airway Pressure		
Räsänen et al,[3] 1985	3/20	6/20
Bersten et al,[4] 1991	2/19	4/20
Lin et al,[5] 1995	4/50	6/50
Takeda et al,[29] 1997	1/15	3/15
Park et al,[30] 2001	1/9	0/10
Kelly et al,[31] 2002	2/27	7/31
Crane et al,[32] 2004	0/20	6/20
L'Her et al,[7] 2004	12/43	14/46
Park et al,[8] 2004	1/27	6/26
Overall Category	26/230	52/238
Noninvasive Pressure Support Ventilation		
Levitt,[33] 2001	3/21	3/17
Masip et al,[9] 2000	0/19	2/18
Park et al,[30] 2001	0/7	0/10
Nava et al,[34] 2003	6/65	9/65
Crane et al,[32] 2004	5/20	6/20
Park et al,[8] 2004	2/27	6/26
Overall Category	16/159	26/156
Overall	42/389	78/394



Josep Masip, MD and all. JWatch Emergency Med.. 2006;2006(314):1.

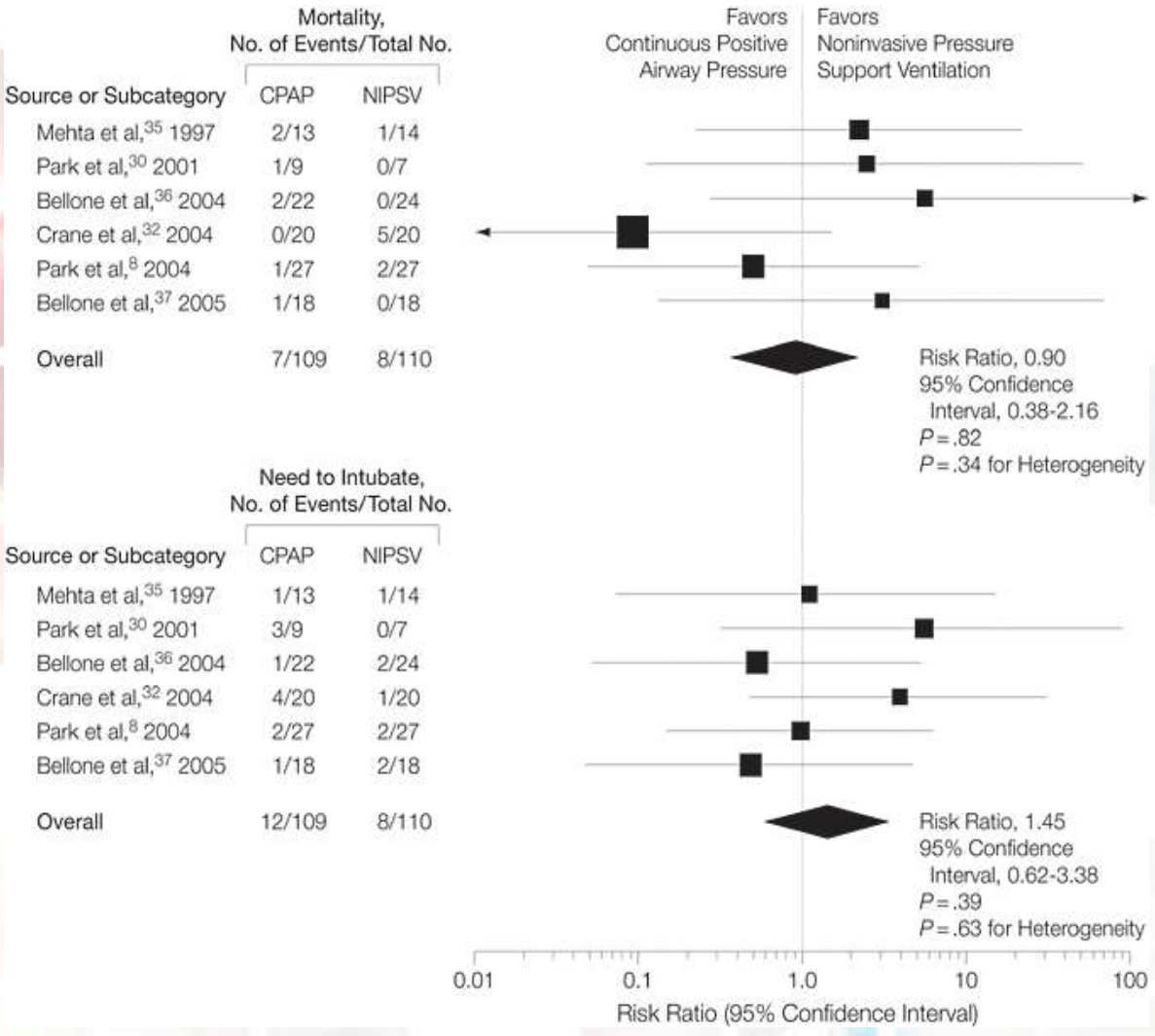
Noninvasive Ventilation in Acute Cardiogenic Pulmonary Edema (Systematic Review and Meta-analysis)



Josep Masip, MD and all. JWatch Emergency Med.. 2006;2006(314):1.

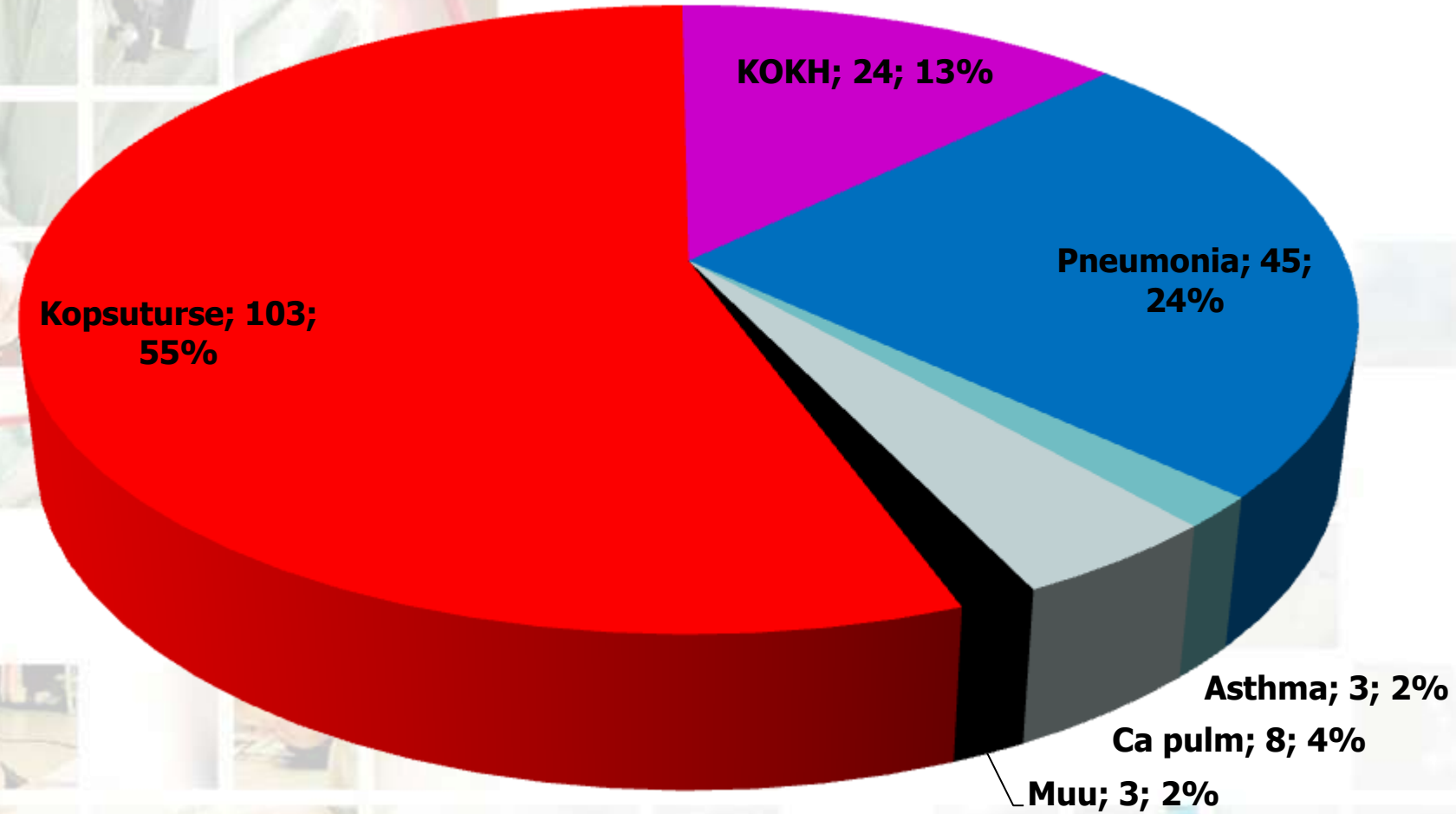
Noninvasive Ventilation in Acute Cardiogenic Pulmonary Edema (Systematic Review and Meta-analysis)

Regionaalhaigla

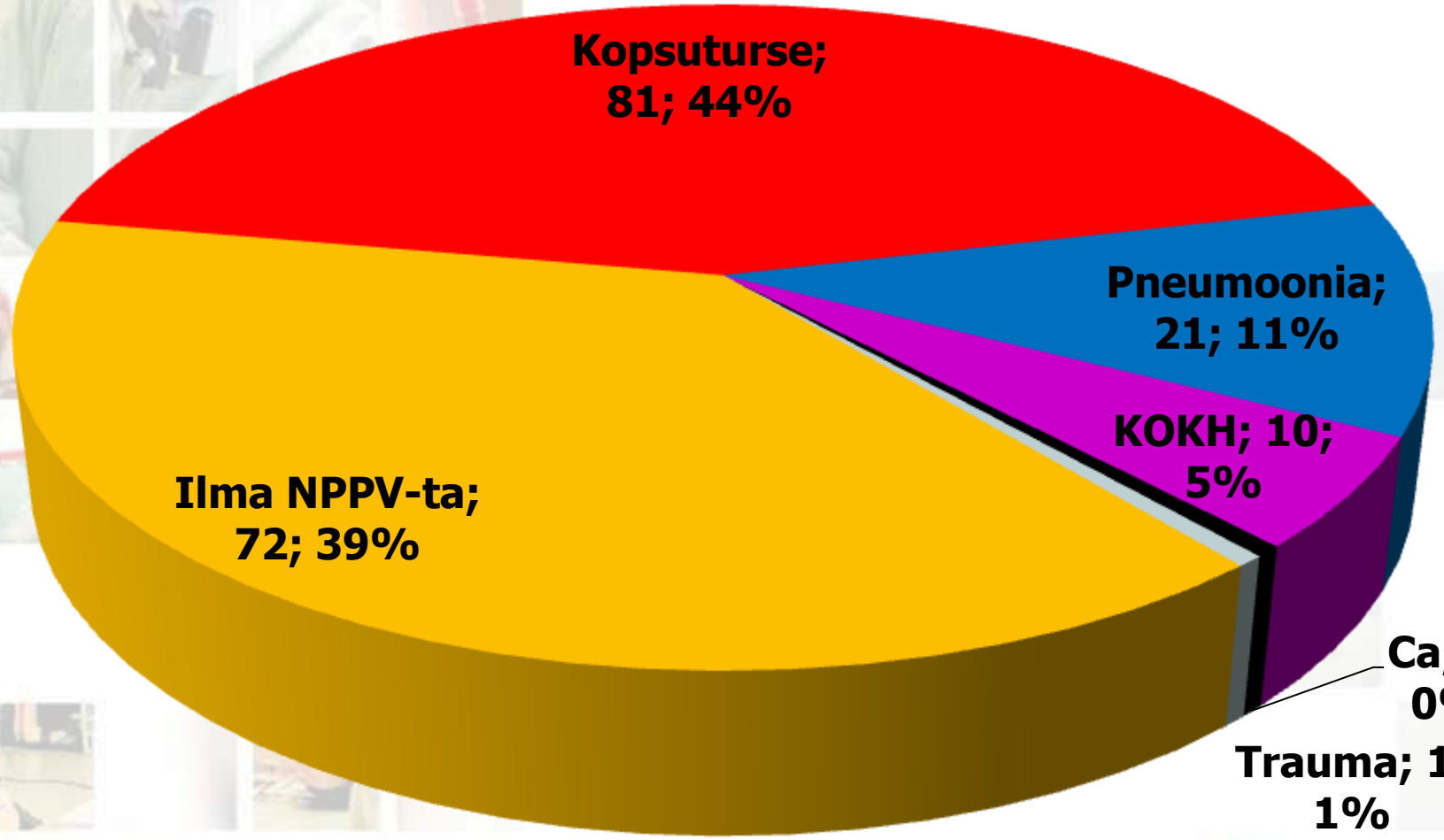


Josep Masip, MD and all. JWatch Emergency Med.. 2006;2006(314):1.

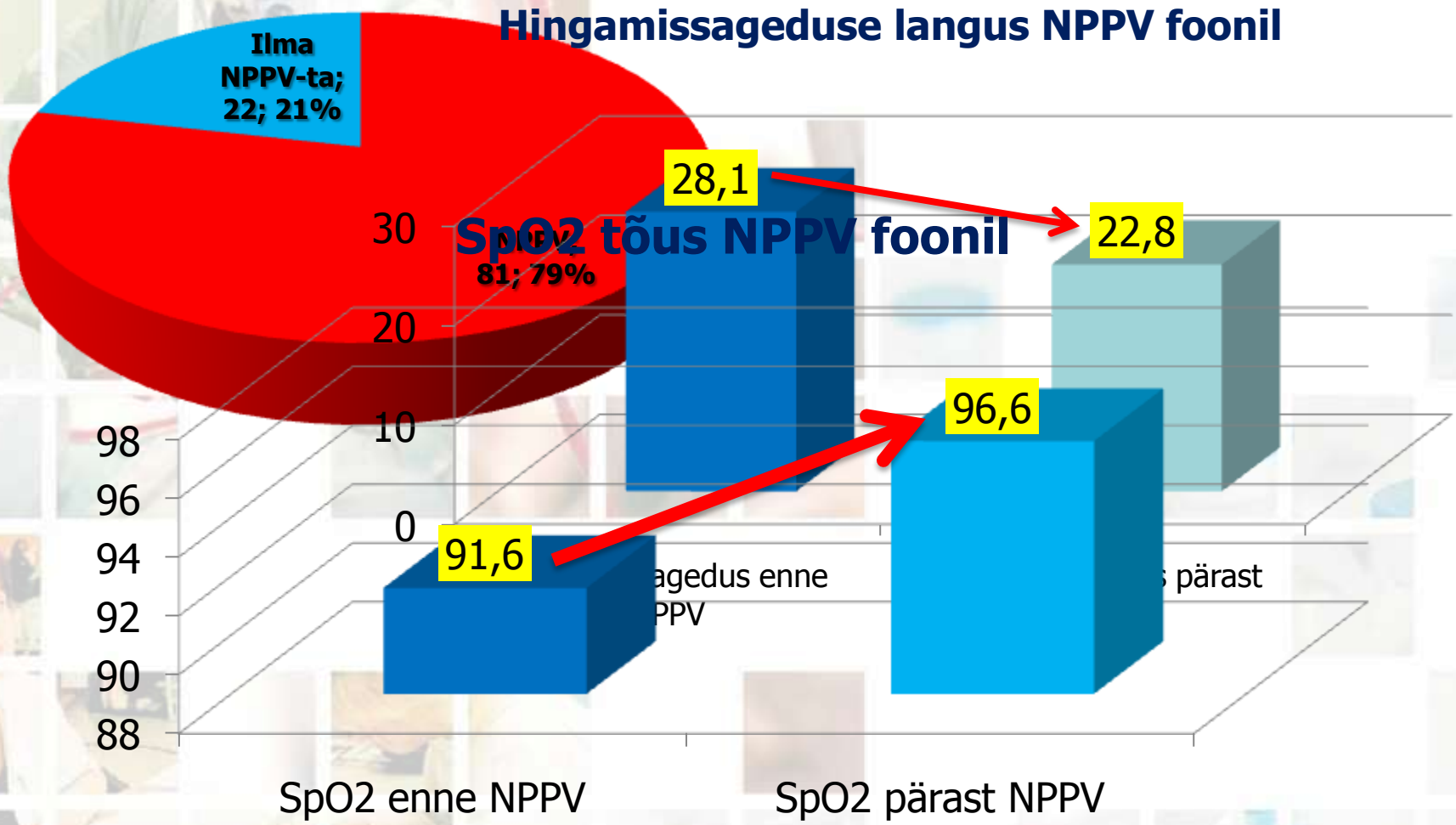
Patsiendid hingamispuudulikkusega EMO-intensiivravisaalis (PERH, 2010)



NPPV rakendamine patsientidel hingamispuudulikkusega EMOs (PERH, 2010)



Kopsuturse ja NPPV EMOs (PERH, 2010)



NIVi PLUSSID ja MIINUSED…

- PLUSSID:
  - Kiire ja efektiivne hüpoksia kõrvaldamine
  - Prognoosi parandamine
  - Komfortne transport
- MIINUSED:
  - Aparatuur
    - Hind? Portatiivsus? Lihtne kasutuses?
  - Personali ettevalmistus
    - Koolitus? Praktika? Kogemus?