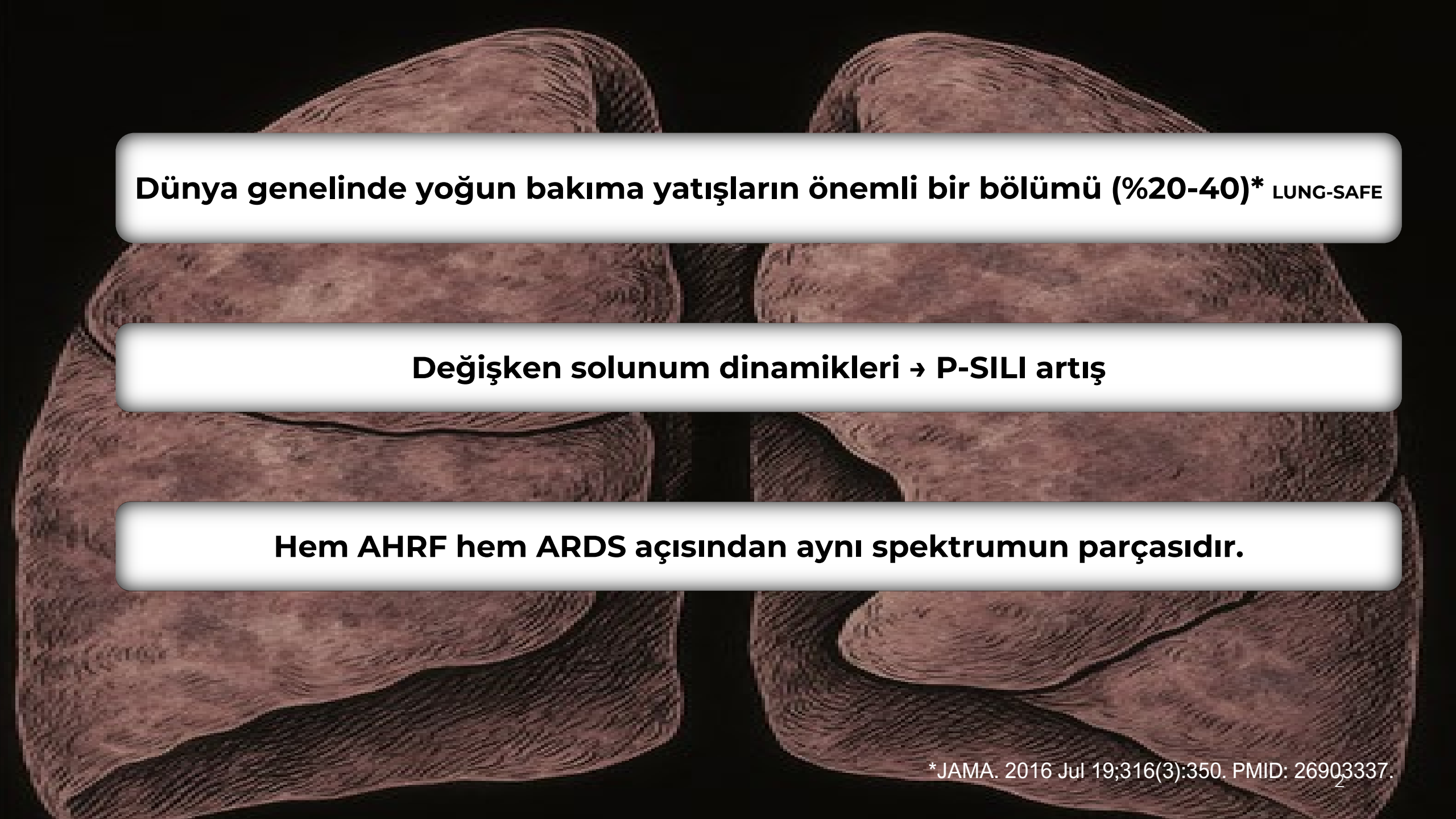


Dünya genelinde yoğun bakıma yatışların önemli bir bölümü (%20-40)* LUNG-SAFE

Değişken solunum dinamikleri → P-SILI artış

Hem AHRF hem ARDS açısından aynı spektrumun parçasıdır.

*JAMA. 2016 Jul 19;316(3):350. PMID: 26903337.

Ketcham *et al. Critical Care* (2020) 24:391
https://doi.org/10.1186/s13054-020-03108-w

Critical Care

RESEARCH Open Access

Causes and characteristics of death in patients with acute hypoxemic respiratory failure and acute respiratory distress syndrome: a retrospective cohort study

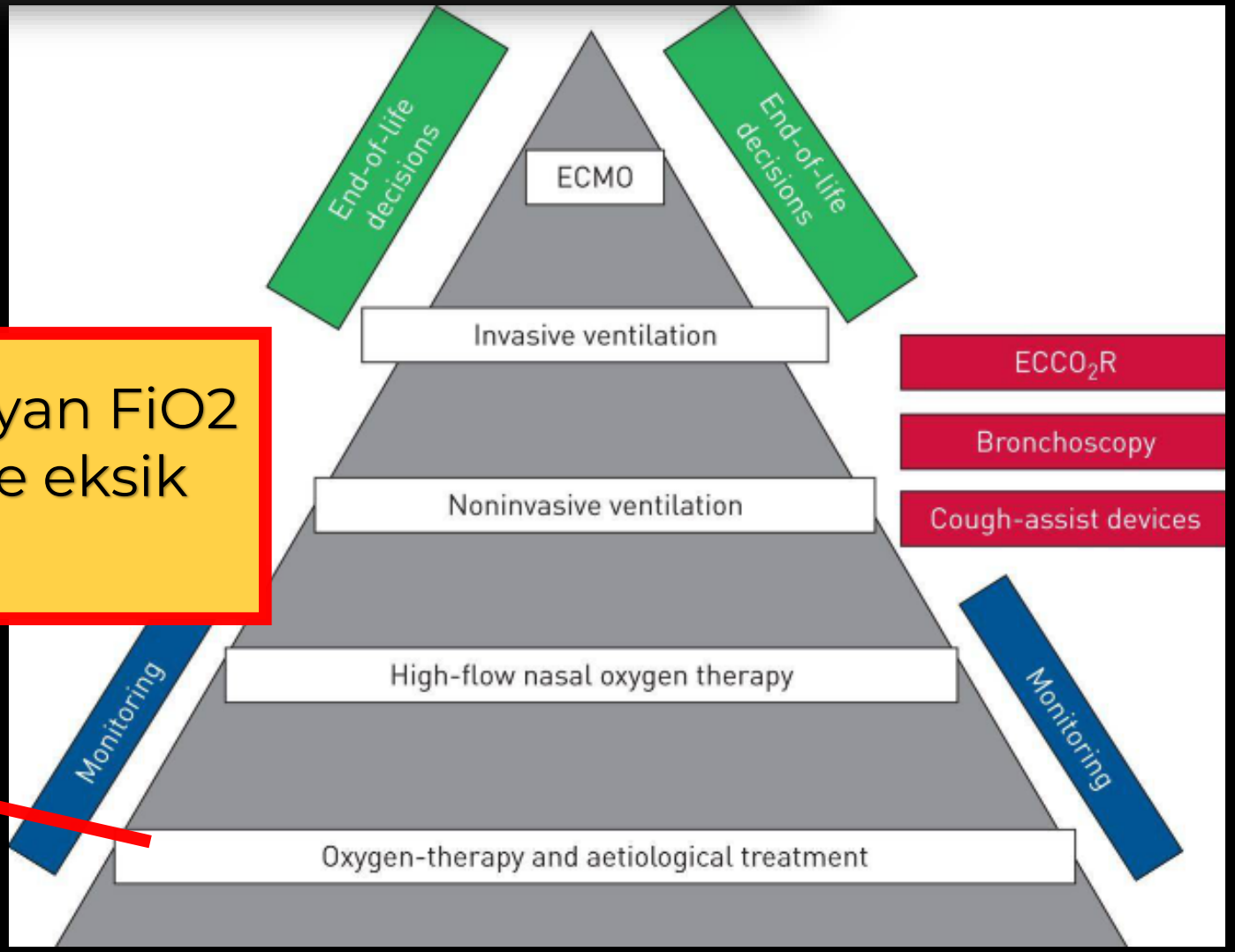
Sepsis (%26),
Pulmoner disfonksiyon (%22)
Nörolojik disfonksiyon (%19)

ARDS ve non ARDS arasında fark yok

Highlights in acute respiratory failure

Raffaele Scala[1] and Leo Heunks[2]

Güvenilir olmayan FiO2
Nemlendirme eksik
P-SILI



Spontan Solunum: İki Ucu Keskin Bıçak

↑ respiratory drive
(hypoxia, lung edema, reduced compliance inflammation, agitation)

lung inhomogeneity
(gravitational forces, regional inflammation)

↑ inspiratory effort

occult pendelluft
(Ventral to dorsal shift of gas at the beginning of inspiration)

solid-like behaviour of dorsal collapse

↑ transpulmonary pressure swings

↑↑ dorsal tidal volume

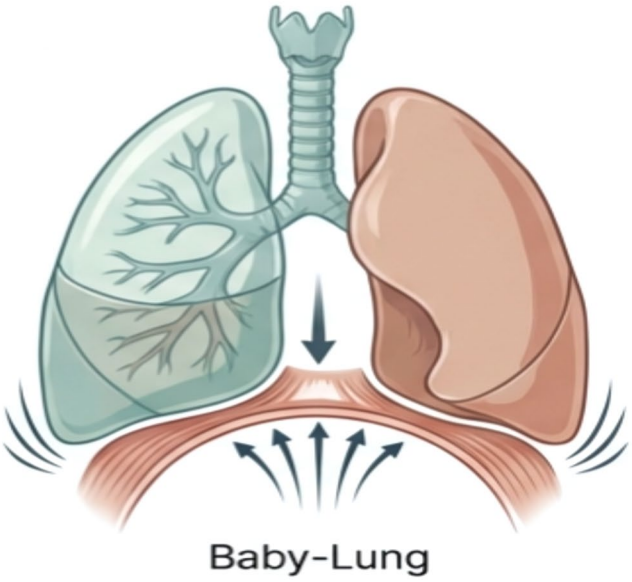
↑↑ dorsal transpulmonary pressure swings

↑ tidal volume

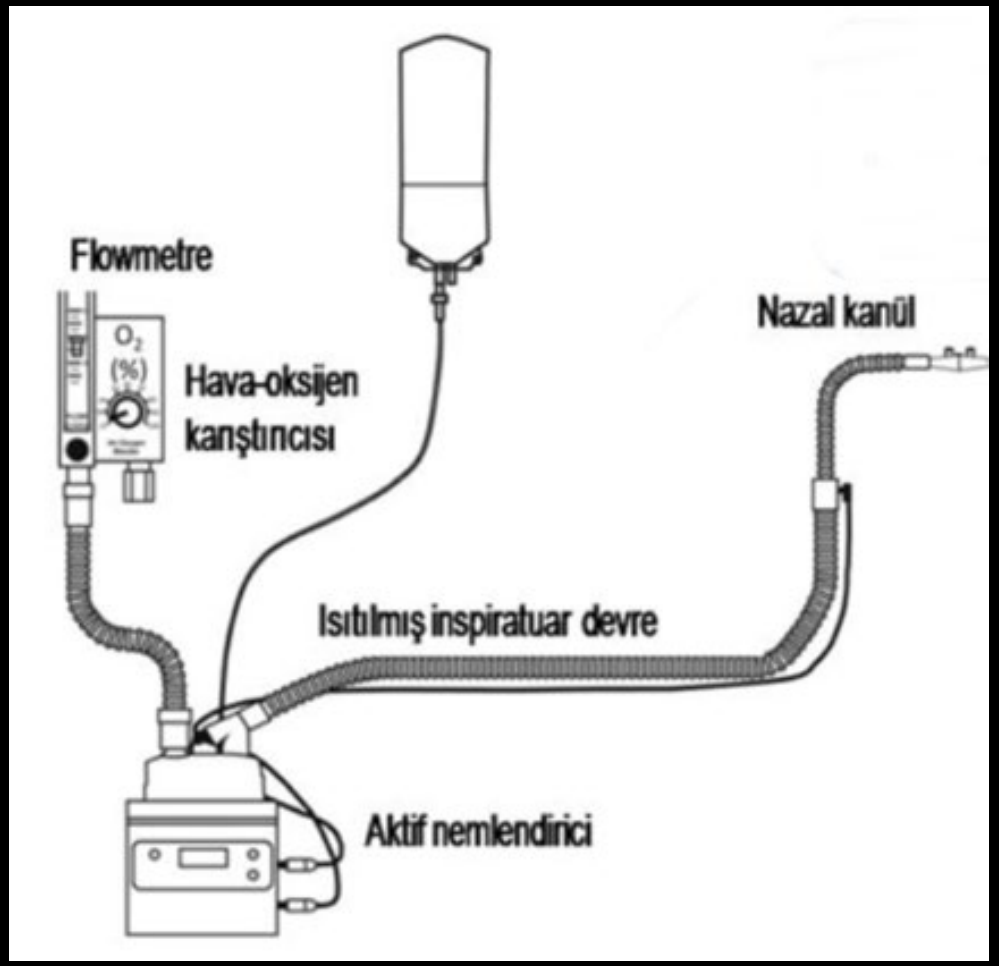
↑ respiratory rate

Volutrauma
Barotrauma
Atelectrauma

Patient Self-inflicted lung injury



Yüksek Akışlı Nazal Oksijen



PEEP

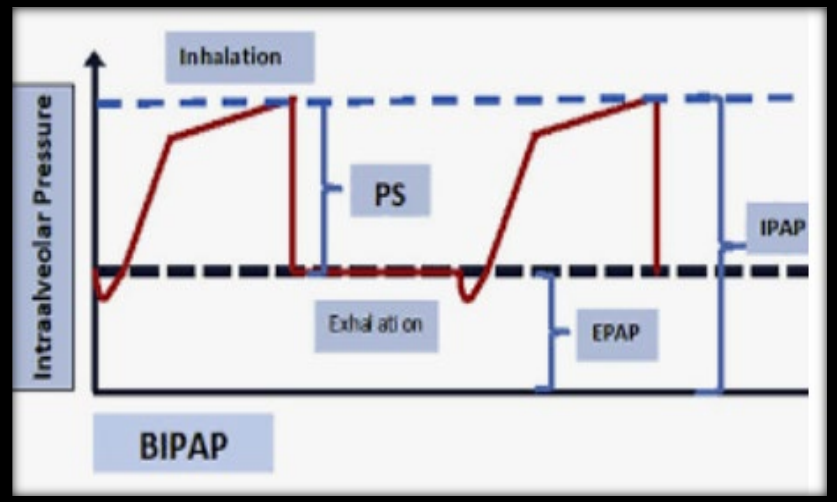
CO2 washout

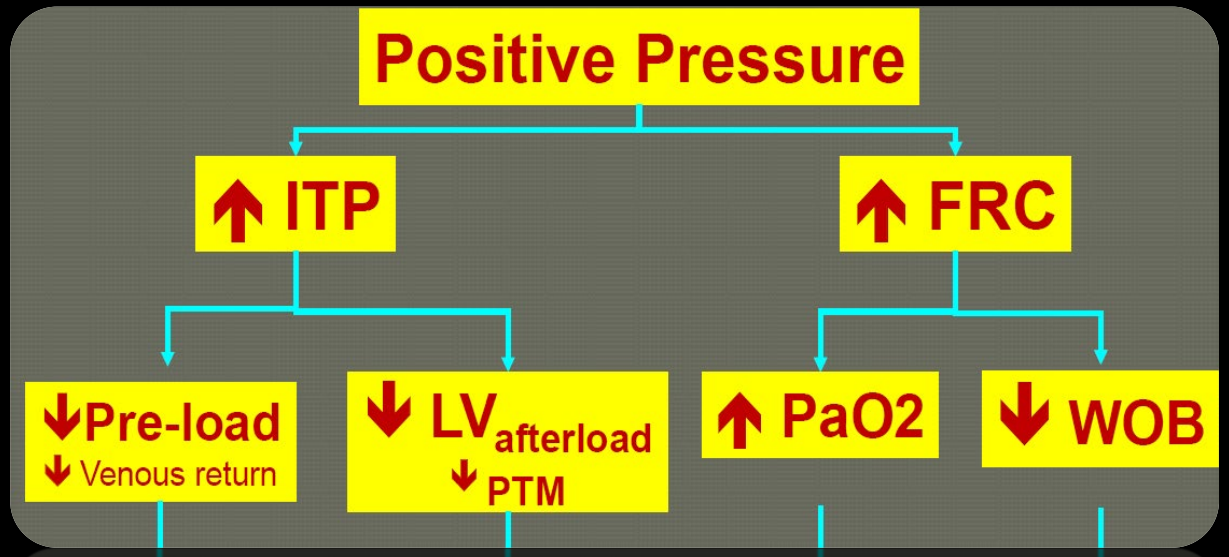
Stabil FiO2

Nemlendirme

P-SILI azalması

NIV





CPAP ve BPAP

Maske / Helmet

Daha iyi PEEP

P-SILI riski

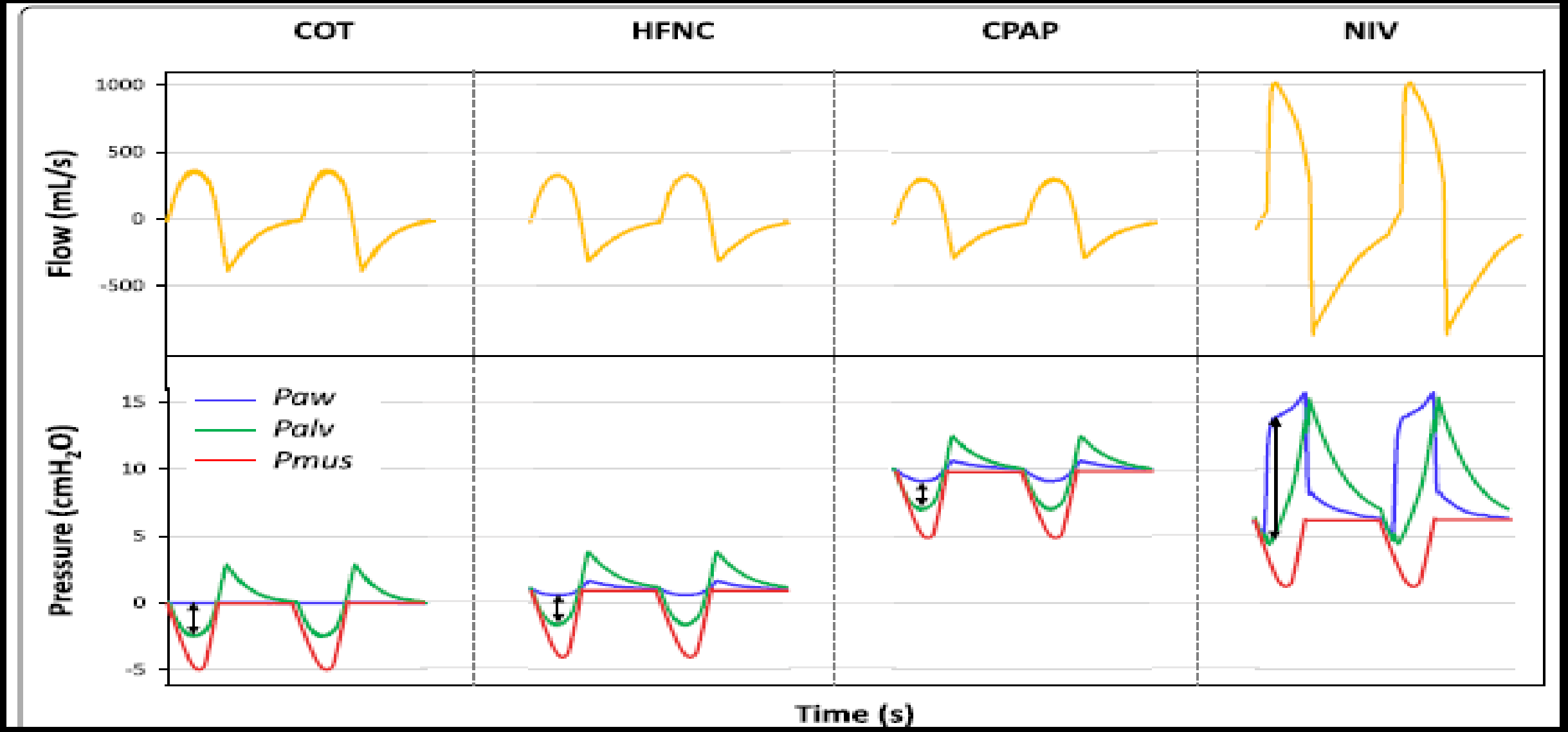
Haudebourg et al. Annals of Intensive Care (2023) 13:116
https://doi.org/10.1186/s13613-023-01200-2

Annals of Intensive Care

RESEARCH Open Access

Influence of different noninvasive oxygenation support devices on tidal volume

İnspiratuar basınç gradyanı üzerine etki: en yüksek NIV



The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 JUNE 4, 2015 VOL. 372 NO. 23

High-Flow Oxygen through Nasal Cannula in Acute Hypoxemic

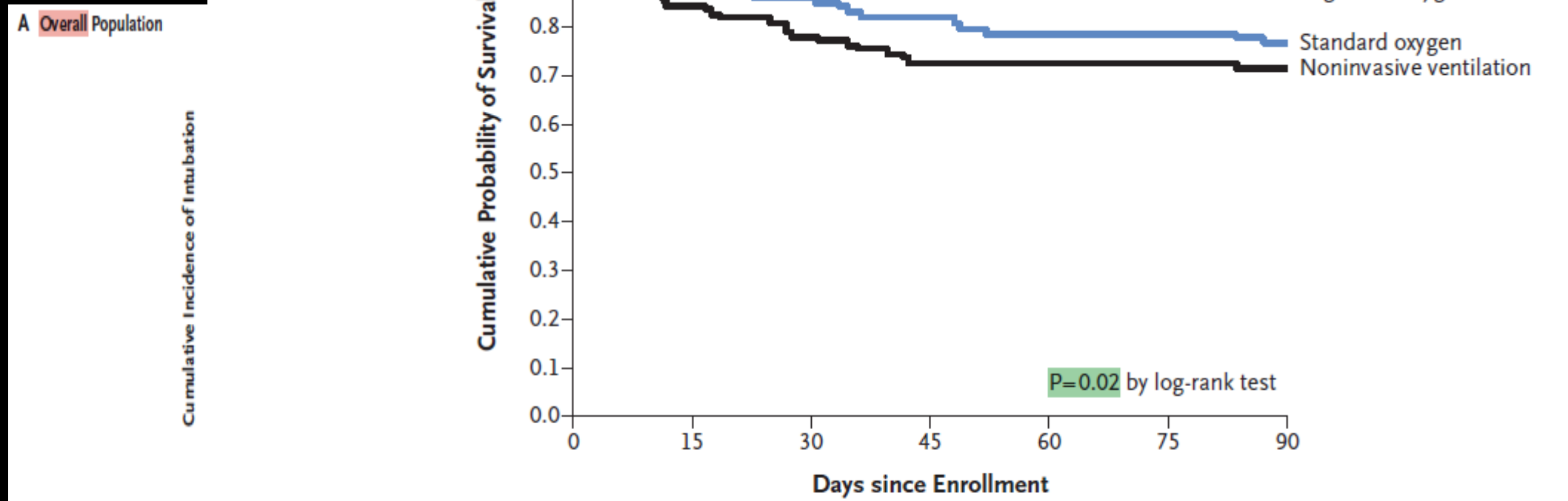


Figure 3. Kaplan–Meier Plot of the Probability of Survival from Randomization to Day 90.

HFNO / COT ?

Intensive Care Med (2019) 45:563–572
https://doi.org/10.1007/s00134-019-05590-5

SYSTEMATIC REVIEW

High flow nasal cannula compared with conventional oxygen therapy for acute hypoxemic respiratory failure: a systematic review and meta-analysis

- **9 RKÇ, n= 2093**
- **Mortaliteyi azaltmaz**
- **Entübasyon ihtiyacını azaltır**

ventilation in either group) favouring HFNC-treated patients (RR 0.71, 95% CI 0.51–0.98), although certainty in both outcomes was low due to imprecision and issues related to risk of bias. HFNC had no effect on intensive care unit length of stay (mean difference [MD] 1.38 days more, 95% CI 0.90 days fewer to 3.66 days more, low certainty), hospital length of stay (MD 0.85 days fewer, 95% CI 2.07 days fewer to 0.37 days more, moderate certainty), patient reported comfort (SMD 0.12 lower, 95% CI 0.61 lower to 0.37 higher, very low certainty) or patient reported dyspnea (standardized mean difference [SMD] 0.16 lower, 95% CI 1.10 lower to 1.42 higher, low certainty). Complications of treatment were variably reported amongst included studies, but little harm was associated with HFNC use.

ERS clinical practice guidelines: high-flow nasal cannula in acute respiratory failure

Eur Respir J 2022; 59: 2101574

COT yerine HFNO tedavisi: koşullu öneri, orta düzeyde kanıt

Entübasyon riskini azaltabilir (0.89)

NIV'e eskalasyon gereksinimi HFNO ile biraz daha düşük

28 ve 90 günlük mortalitede fark yok

Intensive Care Med (2023) 49:727–759
https://doi.org/10.1007/s00134-023-07050-7

CONFERENCE REPORTS AND EXPERT PANEL

ESICM guidelines on acute respiratory distress syndrome: definition, phenotyping and respiratory support strategies

Recommendation 3.1

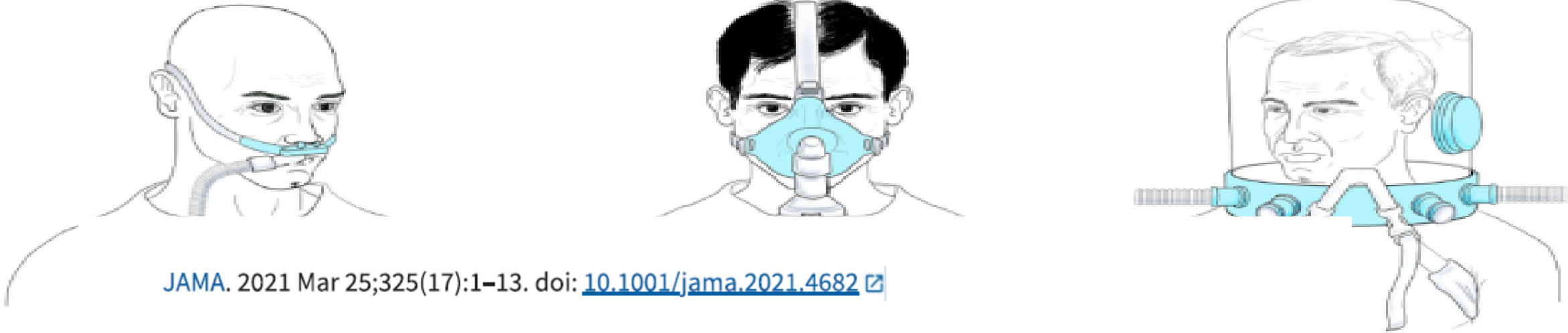
We **recommend** that non-mechanically ventilated patients with AHRF not due to cardiogenic pulmonary edema or acute exacerbation of COPD receive HFNO as compared to conventional oxygen therapy to reduce the risk of intubation
Strong recommendation; moderate level of evidence in favor

We are **unable to make a recommendation** for or against the use of HFNO over conventional oxygen therapy to reduce mortality
No recommendation; high level of evidence of no effect

This recommendation applies also to AHRF from COVID-19
Strong recommendation; low level of evidence in favor for intubation and no recommendation; moderate level of evidence of no effect for mortality, for indirectness.

HFNO, COT'a göre entübasyon oranlarını düşürüyor (güçlü öneri)

Mortalitede fark yok



JAMA. 2021 Mar 25;325(17):1–13. doi: 10.1001/jama.2021.4682

Effect of Helmet Noninvasive Ventilation vs High-Flow Nasal Oxygen on Days Free of Respiratory Support in Patients With COVID-19 and Moderate to Severe Hypoxemic Respiratory Failure

The HENIVOT Randomized Clinical Trial

JAMA, 315(22), 2435-2441

Daha düşük entübasyon oranı + ancak 28-gün ventilatörsüz gün sayısında fark yok

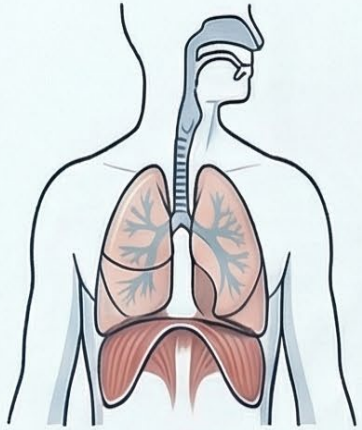
Pitfalls

- Small amount of PEEP delivered

volume

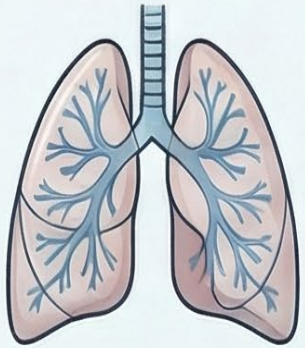
- Poor tolerability: need for treatment interruptions

Kask Arayüzünün Temel Avantajları



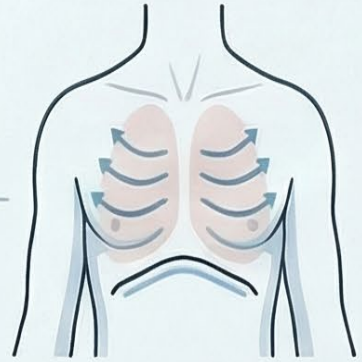
Kas İş Yükünün Azaltılması

Spesifik ayarlar sayesinde solunum kaslan üzerindeki yükü belirgin şekilde hafifletir.



Homojen Ventilasyon ve Yüksek PEEP

Akciğerde eşit hava dağılımı sağlar ve 10-12+ cm H2O PEEP seviyelerinde yüksek konfor sunar.



Spontan Eforun Korunması

Yüksek PEEP uygulamasıyla hastanın spontan solunum çabasının akciğer üzerindeki yıkıcı etkilerini önler.

Performans Karşılaştırması: Kask vs. Yüz Maskesi

Basınç Desteği (PS) Etkinliği

Kask arayüzünde basınç dağılması nedeniyle, aynı PS desteği maskeye göre daha düşük iş yükü azalması sağlar.

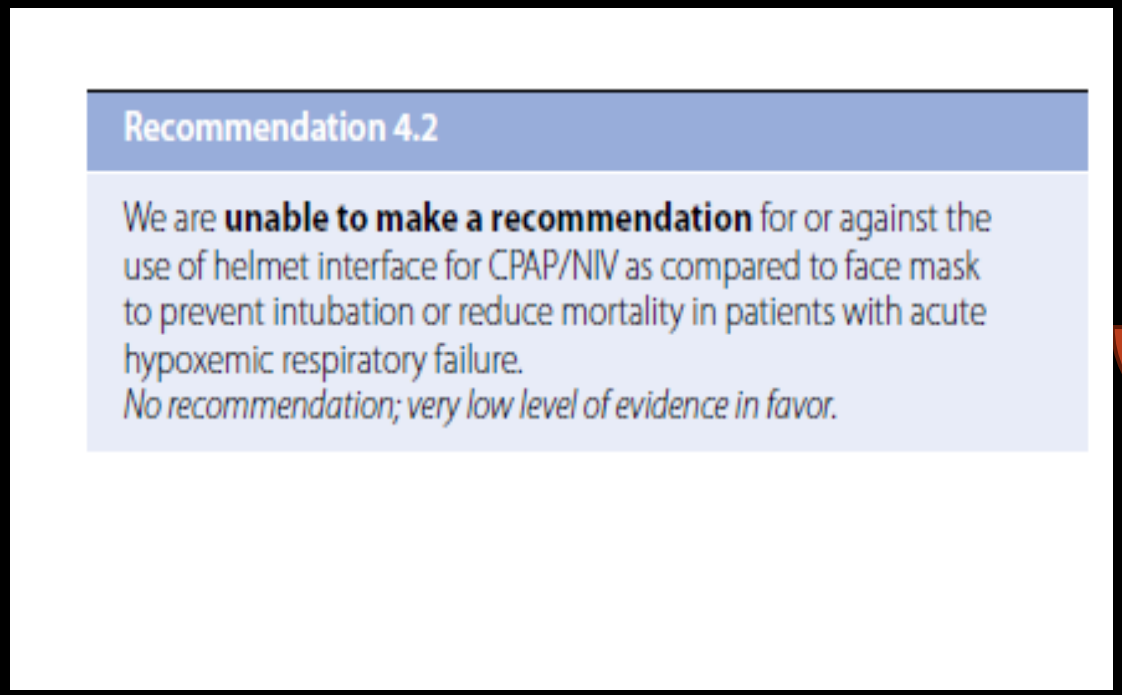
10 cm H2O Basınç Desteği (PS) Altında Solunum İşindeki Azalma Oranları

Arayüz Tipi	Solunum İşindeki Azalma (%)	Temel Neden
Yüz Maskesi	50%	Doğrudan basınç iletimi
Kask (Helmet)	30%	Basınç dağılması (dispersiyon)

Intensive Care Med (2023) 49:727–759
https://doi.org/10.1007/s00134-023-07050-7

CONFERENCE REPORTS AND EXPERT PANEL

ESICM guidelines on acute respiratory distress syndrome: definition, phenotyping and respiratory support strategies



Recommendation 4.2

We are **unable to make a recommendation** for or against the use of helmet interface for CPAP/NIV as compared to face mask to prevent intubation or reduce mortality in patients with acute hypoxemic respiratory failure.
No recommendation; very low level of evidence in favor.

Helmet arayüzün yüz maskesine üstünlüğü konusunda öneri yapılamaz. (çok düşük düzey kanıt)

ERS clinical practice guidelines: high-flow nasal cannula in acute respiratory failure

Eur Respir J 2022; 59: 2101574

NIV yerine HFNO tedavisi: koşullu öneri, çok düşük kanıt

Kanıtlarda:

& aralıklı uygulama

Hospitalizasyonda fark yok

Intensive Care Med (2023) 49:727–759
https://doi.org/10.1007/s00134-023-07050-7

CONFERENCE REPORTS AND EXPERT PANEL

ESICM guidelines on acute respiratory distress syndrome: definition, phenotyping and respiratory support strategies

Recommendation 3.2

We are **unable to make a recommendation** for or against the use of HFNO compared to continuous positive airway pressure (CPAP)/NIV to reduce intubation or mortality in the treatment of unselected patients with acute hypoxemic respiratory failure not due to cardiogenic pulmonary edema or acute exacerbation of COPD.
No recommendation; moderate level of evidence for mortality, low level of evidence for intubation, not in favor nor against.

We **suggest** that CPAP/NIV can be considered instead of HFNO for the treatment of AHRF due to COVID-19 to reduce the risk of intubation (*weak recommendation, high level of evidence*), but **no recommendation** can be made for whether CPAP/NIV can decrease mortality compared to HFNO in COVID-19.
No recommendation; high level of evidence of no effect.

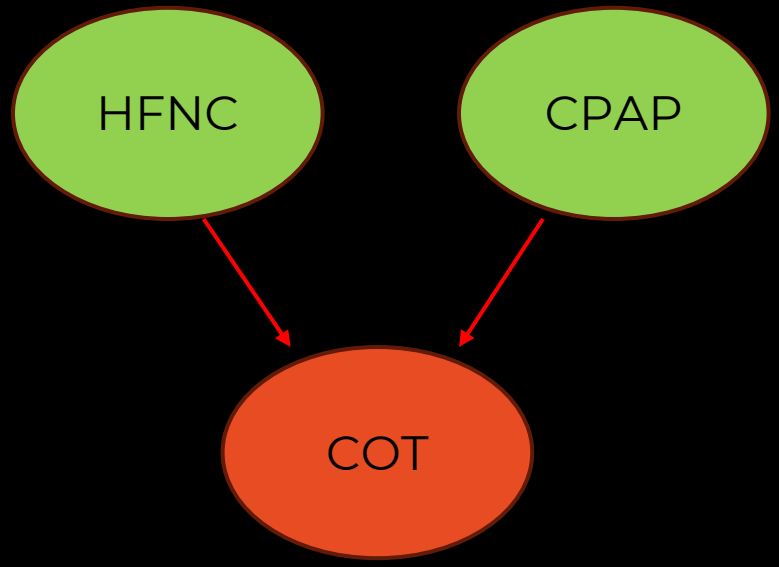
HFNO ile CPAP/NIV arasında lehine ya da aleyhine öneri yapılamaz (mortalite: orta düzey kanıt, entübasyon: düşük düzey kanıt)

COVID-19'da entübasyonu azaltmak için CPAP/NIV düşünülebilir (Zayıf öneri; yüksek düzey kanıt)

JAMA. 2022 Jan 24;327(6):546–558. doi: 10.1001/jama.2022.0028

Effect of Noninvasive Respiratory Strategies on Intubation or Mortality Among Patients With Acute Hypoxemic Respiratory Failure and COVID-19

The RECOVERY-RS Randomized Clinical Trial



n=1273

CPAP; entübasyon /ölümden oluşan kompozit sonlanımı yaklaşık %8 mutlak risk azalması ile azaltmıştır; bu etki esas olarak entübasyon oranındaki düşüşten kaynaklanmaktadır

HFNO'de fark yok

Intensive Care Med (2023) 49:727–759
https://doi.org/10.1007/s00134-023-07050-7

CONFERENCE REPORTS AND EXPERT PANEL

ESICM guidelines on acute respiratory distress syndrome: definition, phenotyping and respiratory support strategies

Recommendation 4.1

We are **unable to make a recommendation** for or against the use of CPAP/NIV compared to conventional oxygen therapy for the treatment of AHRF (not related to cardiogenic pulmonary edema or acute exacerbation of COPD) to reduce mortality or to prevent intubation.
No recommendation; high level of evidence for mortality, moderate level of evidence for intubation.

We **suggest** the use of CPAP over conventional oxygen therapy to reduce the risk of intubation in patients with acute hypoxemic respiratory failure due to COVID-19.
Weak recommendation; low level of evidence in favor.

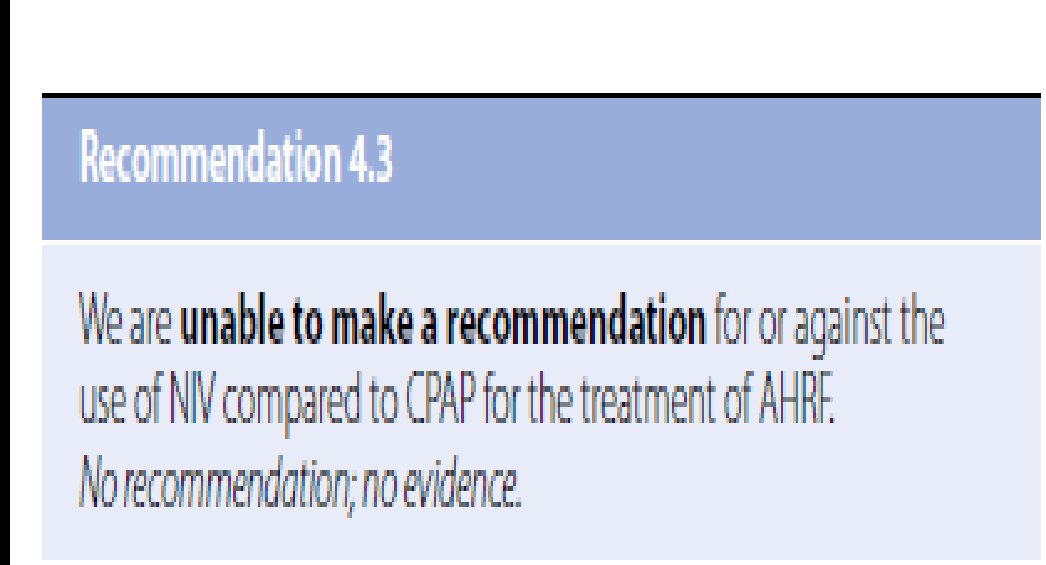
In this population, we are **unable to make a recommendation** for or against the use of CPAP over conventional oxygen therapy to reduce mortality.
No recommendation; moderate level of evidence of no effect.

Mortaliteyi azaltmak veya entübasyonu önlemek için CPAP/NIV'nin COT'a üstünlüğü konusunda öneri yapılamaz.

Intensive Care Med (2023) 49:727–759
https://doi.org/10.1007/s00134-023-07050-7

CONFERENCE REPORTS AND EXPERT PANEL

ESICM guidelines on acute respiratory distress syndrome: definition, phenotyping and respiratory support strategies



Recommendation 4.3

We are **unable to make a recommendation** for or against the use of NIV compared to CPAP for the treatment of AHRF.

No recommendation; no evidence.

AHRF tedavisinde NIV'nin CPAP'a üstün ya da daha kötü olduğuna dair öneri yapılamaz.
(kanıt yok)

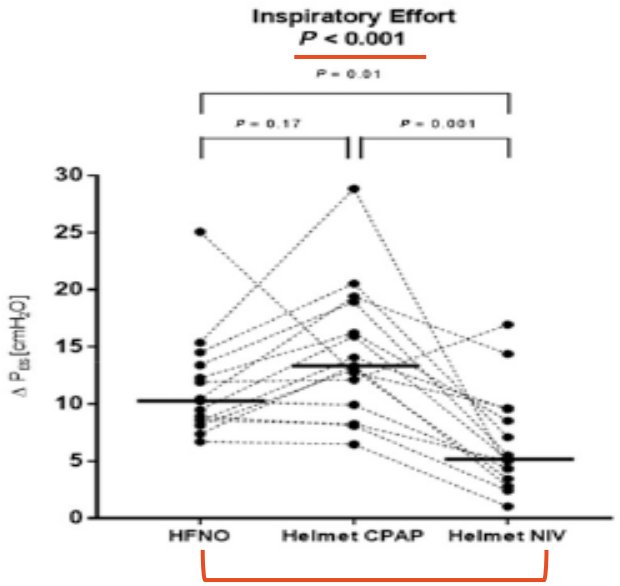
AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE

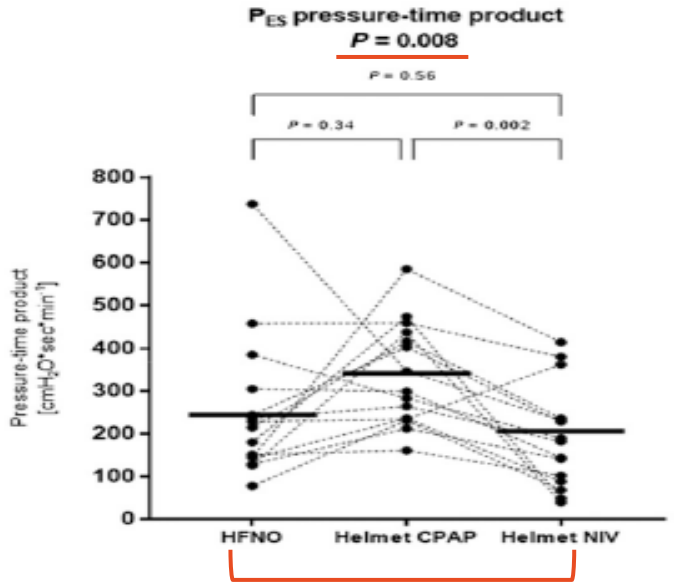
Respective Effects of Helmet Pressure Support, Continuous Positive Airway Pressure, and Nasal High-Flow in Hypoxemic Respiratory Failure

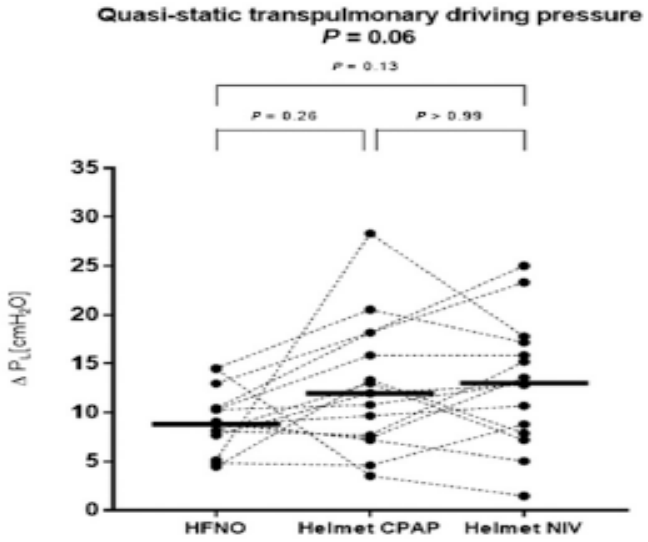
A Randomized Crossover Clinical Trial

HFNO- Helmet CPAP- Helmet PS

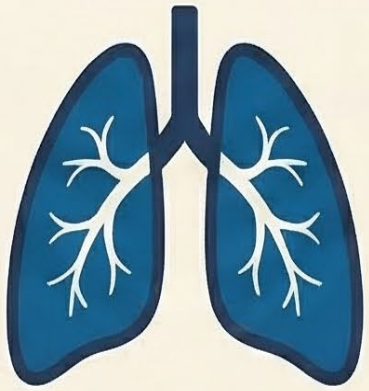
N=15

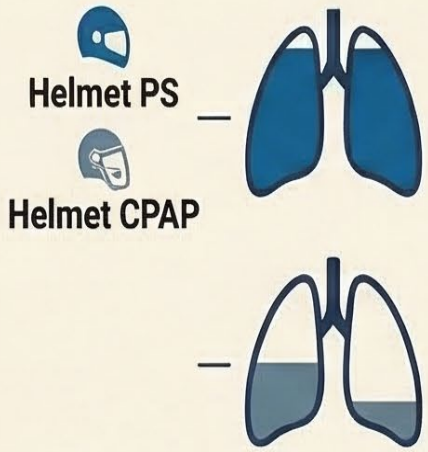






Alveoler Rekrütmanda Helmet Üstünlüğü

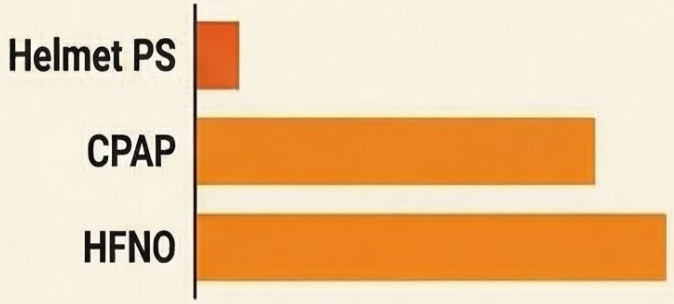




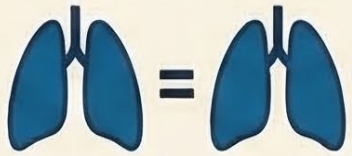
Hem Helmet CPAP hem de Helmet PS, HFNO'ya kıyasla EELV'de anlamlı artış sağlayarak daha etkin rekrütman gerçekleştirir.

En Düşük Solunum İş Yükü

Hastanın inspiratuar eforu ve toplam solunum iş yükü, Helmet PS modunda en düşük seviyeye iner.



PS vs. CPAP: Rekrütman Benzerliği



Akciğer rekrütmanı açısından Helmet PS ve CPAP arasında belirgin bir fark saptanmamıştır; fark efor yönetimindedir.

P-SILI Riskine Karşı En Koruyucu Strateji

«NIV herkeste kesin olarak daha güvenlidir» şeklinde düz bir sonuç çıkarılamaz. «hasta fenotipi»ne bağlı

Helmet PS, hem akciğer rekrütmanı sağlar hem de inspiratuar eforu en aza indirerek **P-SILI riskine karşı en güçlü korumayı** sunar.

High-Flow Nasal Oxygen vs Noninvasive Ventilation in Patients With Acute Respiratory Failure

The RENOVATE Randomized Clinical Trial

JAMA 2025 Mar 11;333(10):875-890.

Noninferiority tasarımlı, RKÇ

Brezilya- 33 merkez ; n=1766

Nonimmünsüprese
İmmünsüprese
Solunumsal asidozlu KOAH Akut kardiyojenik pulmoner ödem COVID-19

7 günde entübasyon / ölüm

High-Flow Nasal Oxygen vs Noninvasive Ventilation in Patients With Acute Respiratory Failure

The RENOVATE Randomized Clinical Trial

JAMA 2025 Mar 11;333(10):875-890.

Nonimmünsüprese (n=485)
Solunumsal asidozlu KOAH alevlenmesi (n=77)

Akut kardiyojenik pulmoner ödem (n=272)
COVID-19 (n=882)

Entübasyon / Ölümde HFNO NIV'e non-inferior

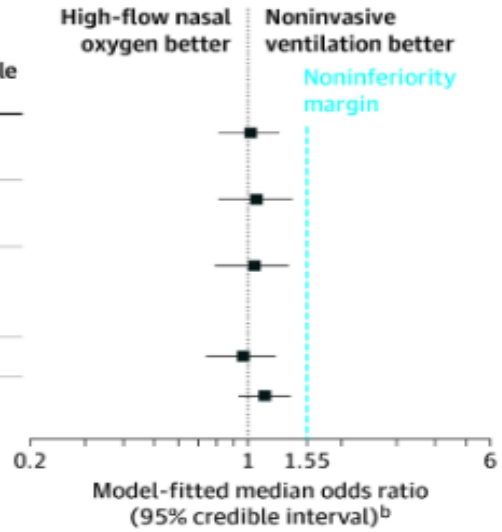
High-Flow Nasal Oxygen vs Noninvasive Ventilation in Patients With Acute Respiratory Failure

JAMA

The RENOVATE Randomized Clinical Trial 2025 Mar 11;333(10):875-890

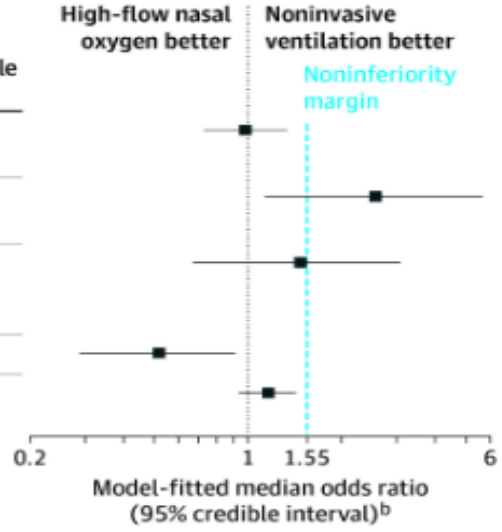
A Analysis of the primary outcome[a]

Patients with acute respiratory failure	No./total (%) High-flow nasal oxygen	No./total (%) Noninvasive ventilation	Model-fitted median odds ratio (95% credible interval)[b]	Posterior probability[c] Noninferiority[d]	Posterior probability[c] Superiority[e]
Nonimmunocompromised with hypoxemia	81/249 (32.5)	78/236 (33.1)	1.02 (0.81-1.26)	0.999	0.433
Immunocompromised with hypoxemia	16/28 (57.1)	8/22 (36.4)	1.07 (0.81-1.39)	0.989	0.334
Chronic obstructive pulmonary disease exacerbation with respiratory acidosis	10/35 (28.6)	11/42 (26.2)	1.05 (0.79-1.36)	0.992	0.375
Acute cardiogenic pulmonary edema	14/136 (10.3)	29/136 (21.3)	0.97 (0.73-1.23)	0.997	0.575
Hypoxemic COVID-19	223/435 (51.3)	210/447 (47.0)	1.13 (0.94-1.38)	0.997	0.136



B Post hoc analysis of the primary outcome[f]

Patients with acute respiratory failure	No./total (%) High-flow nasal oxygen	No./total (%) Noninvasive ventilation	Model-fitted median odds ratio (95% credible interval)[b]	Posterior probability[c] Noninferiority[d]	Posterior probability[c] Superiority
Nonimmunocompromised with hypoxemia	81/249 (32.5)	78/236 (33.1)	0.98 (0.73-1.33)	0.996	0.542
Immunocompromised with hypoxemia	16/28 (57.1)	8/22 (36.4)	2.56 (1.14-5.68)	0.144	0.023
Chronic obstructive pulmonary disease exacerbation with respiratory acidosis	10/35 (28.6)	11/42 (26.2)	1.48 (0.67-3.09)	0.549	0.192
Acute cardiogenic pulmonary edema	14/136 (10.3)	29/136 (21.3)	0.52 (0.29-0.91)	0.999	0.970
Hypoxemic COVID-19	223/435 (51.3)	210/447 (47.0)	1.16 (0.94-1.43)	0.992	0.111



<u>İmmünsuprese grup</u>: Entübasyon /ölüm HFNO %57.1, NIV %36.4

Intensive Care Med (2025) 51:731–741
https://doi.org/10.1007/s00134-025-07890-5

ORIGINAL

Outcomes in immunocompromised patients with acute hypoxemic respiratory failure treated by high-flow nasal oxygen

RESPIR-OH, IVNICTUS, HIGH ve retrospektif kohort (EFRAIM) birleştirilmiştir.

n=986

28 günde IMV gereksinimi

28-gün mortalite ve ROX indeksinin öngörüsü

HFNO sonrası IMV oranı %46, 28-gün mortalite %33
ROX için AUC ≈ 0.67
İmmünkompromize AHSY hastalar heterojen
SOT'lı hastalar en iyi sonuçlara sahipken, hematolojik ve özellikle miyeloid malignitelerde HFNO başarısızlığı ve mortalite yüksektir.

Is there still a place for noninvasive ventilation in acute hypoxemic respiratory failure?

Intensive Care Med (2018) 44:2248–2250

Table 1 Benefit–risk ratio assessment in favor or against NIV use in hypoxemic ARF patients

Indications for NIV use
Acute exacerbation of COPD
Acute cardiogenic pulmonary edema
Hypoxemia post-abdominal surgery
Chest trauma
Preoxygenation before intubation
Against NIV use
(Late or moderate–severe) ARDS
High tidal volumes during the NIV session
Leaks during the NIV session despite changes of interface
Lack of patient adherence
Dyspnea during NIV sessions
Impossibility of close monitoring
Absence of rapid clinical improvement (signs of respiratory distress including elevated respiratory rate) and gas exchange improvement after 1 h of NIV session

5 günden uzun NIV uygulaması sonrası entübasyon mortaliteyi %75'e yükseltmiştir.*

TV>9–9.5 mL/kg PBW olması başarısızlık öngörücüsü

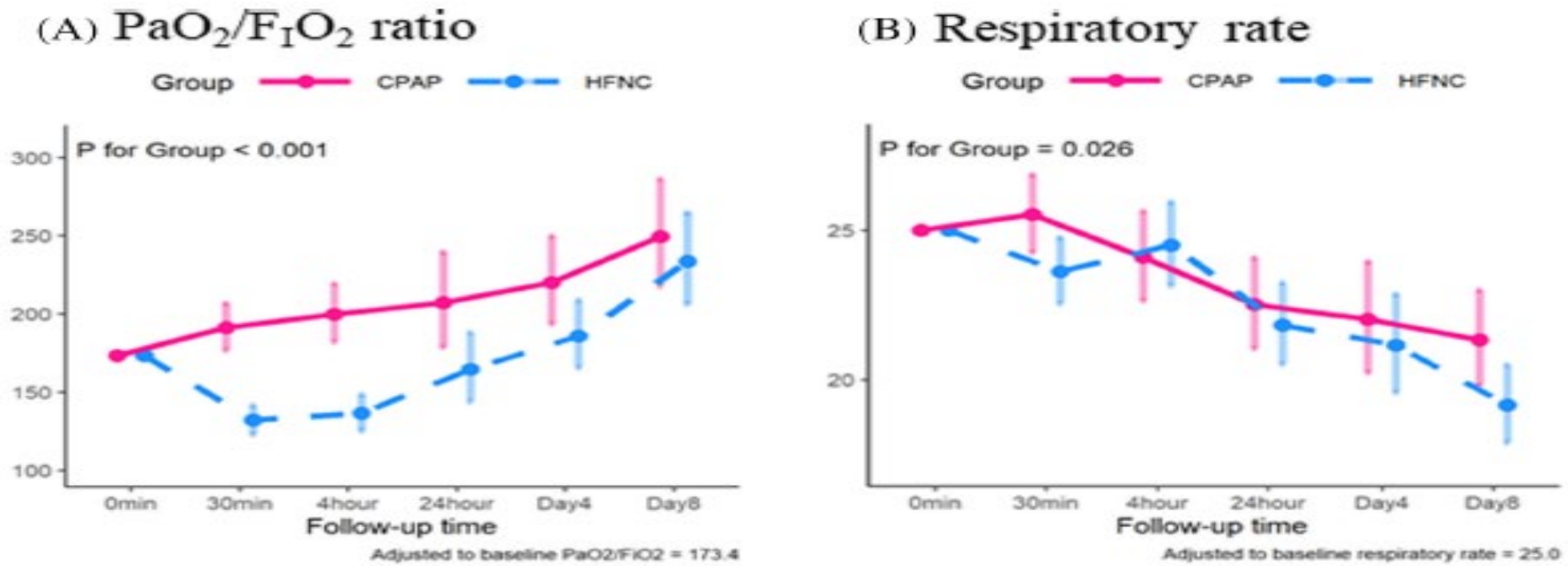
*Pneumologie. 2021 Jun;75(6):424-431. German. Epub 2021 May 11. PMID: 33975371.

Received: 1 February 2023|
DOI: 10.1111/resp.14588

ORIGINAL ART

TABLE 3 P

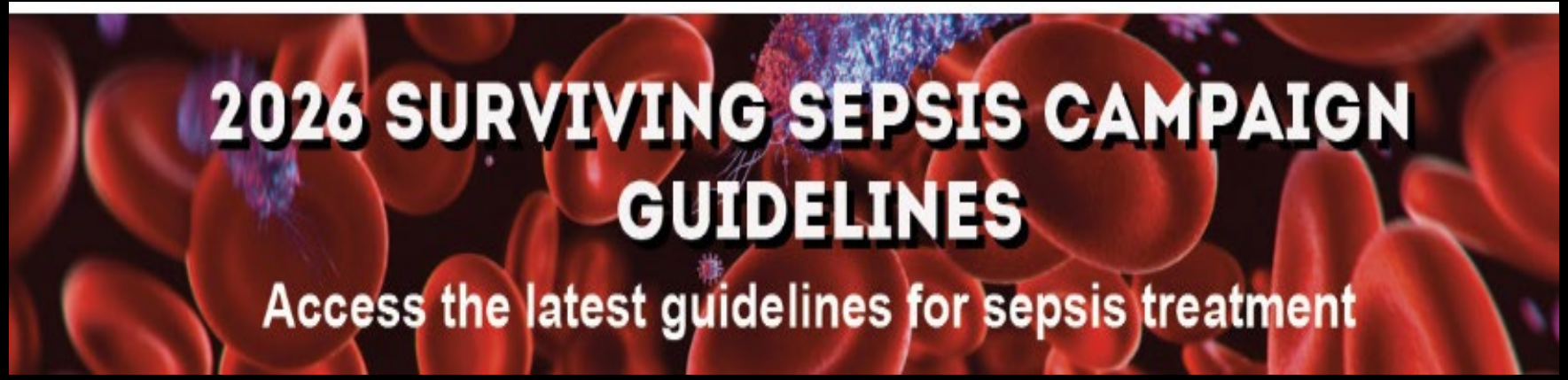
Outcomes	p-value
Primary outcor	
Met the intubat (No. of ever	0.006
Secondary outc	
Intubation with	0.385
Mortality withi	0.363
In-hospital mo	0.378
Ventilator-free	0.744
Duration of the	0.405
Duration of ho	0.741
Need for contir	



Non-invasive ventilatory support and high-flow nasal oxygen as first-line treatment of acute hypoxemic respiratory failure and ARDS

Intensive Care Med (2021) 47:851–866

The role of non-invasive respiratory support (high-flow nasal oxygen and noninvasive ventilation) in the management of acute hypoxemic respiratory failure and acute respiratory distress syndrome is debated. The oxygenation improvement coupled with lung and diaphragm protection produced by non-invasive support may help to avoid endotracheal intubation, which prevents the complications of sedation and invasive mechanical ventilation. However, spontaneous breathing in patients with lung injury carries the risk that vigorous inspiratory effort, combined or not with mechanical increases in inspiratory airway pressure, produces high transpulmonary pressure swings and local lung overstretch. This ultimately results in additional lung damage (patient self-inflicted lung injury), so that patients intubated after a trial of noninvasive support are burdened by increased mortality. Reducing inspiratory effort by high-flow nasal oxygen or delivery of sustained positive end-expiratory pressure through the helmet interface may reduce these risks. In this physiology-to-bedside review, we provide an updated overview about the role of noninvasive respiratory support strategies as early treatment of hypoxemic respiratory failure in the intensive care unit. Noninvasive strategies appear safe and effective in mild-to-moderate hypoxemia ($PaO_2/FiO_2 > 150$ mmHg), while they can yield delayed intubation with increased mortality in a significant proportion of moderate-to-severe ($PaO_2/FiO_2 \leq 150$ mmHg) cases. High-flow nasal oxygen and helmet noninvasive ventilation represent the most promising



COT yerine HFNO

NIV yerine HFNO

Dönüşümlü NIV+ HFNO yerine HFNO

Sedasyonsuz Uyanık Pron

Klasik Parametrelerin Sınırları

- **Solunum sayısı, ROX indeksi ve HACOR skorları = inspiratuvar eforun dolaylı yansıması**

- **Özefagus manometrisi (Δpe) altın standart , ama..**

ROX İndeksi: Yüksek Akışlı Oksijen Tedavisinin Başarısını Öngörmek

ROX indeksi, Yüksek Akışlı Nazal Oksijen (HFNO) tedavisi gören hastalarda tedavinin başarısız olma olasılığını ve entübasyon ihtiyacını tahmin etmek için kullanılan basit, non-invaziv bir yatak başı aracıdır. Zaman içindeki değeri, hastanın klinik gidişatı hakkında önemli bilgiler sunar.

ROX İndeksi Nedir?

SpO2/FiO2'nin solunum sayısına bölünmesiyle elde edilen ve HFNO tedavisinin başarısını öngören bir araçtır.

Nasıl Hesaplanır?

$$\text{ROX İndeksi} = \frac{\frac{SpO_2}{FiO_2}}{\text{Solunum Sayısı (dakikada)}}$$

HFNO Başladıktan 2 Saat Sonra

< 2.85

ROX indeksi < 2.85 ise tedavi başarısızlığı ve entübasyon riski yüksektir.

HFNO Başladıktan 6 Saat Sonra

< 3.47

ROX indeksi < 3.47 ise tedavi başarısızlığı ve entübasyon riski yüksektir.

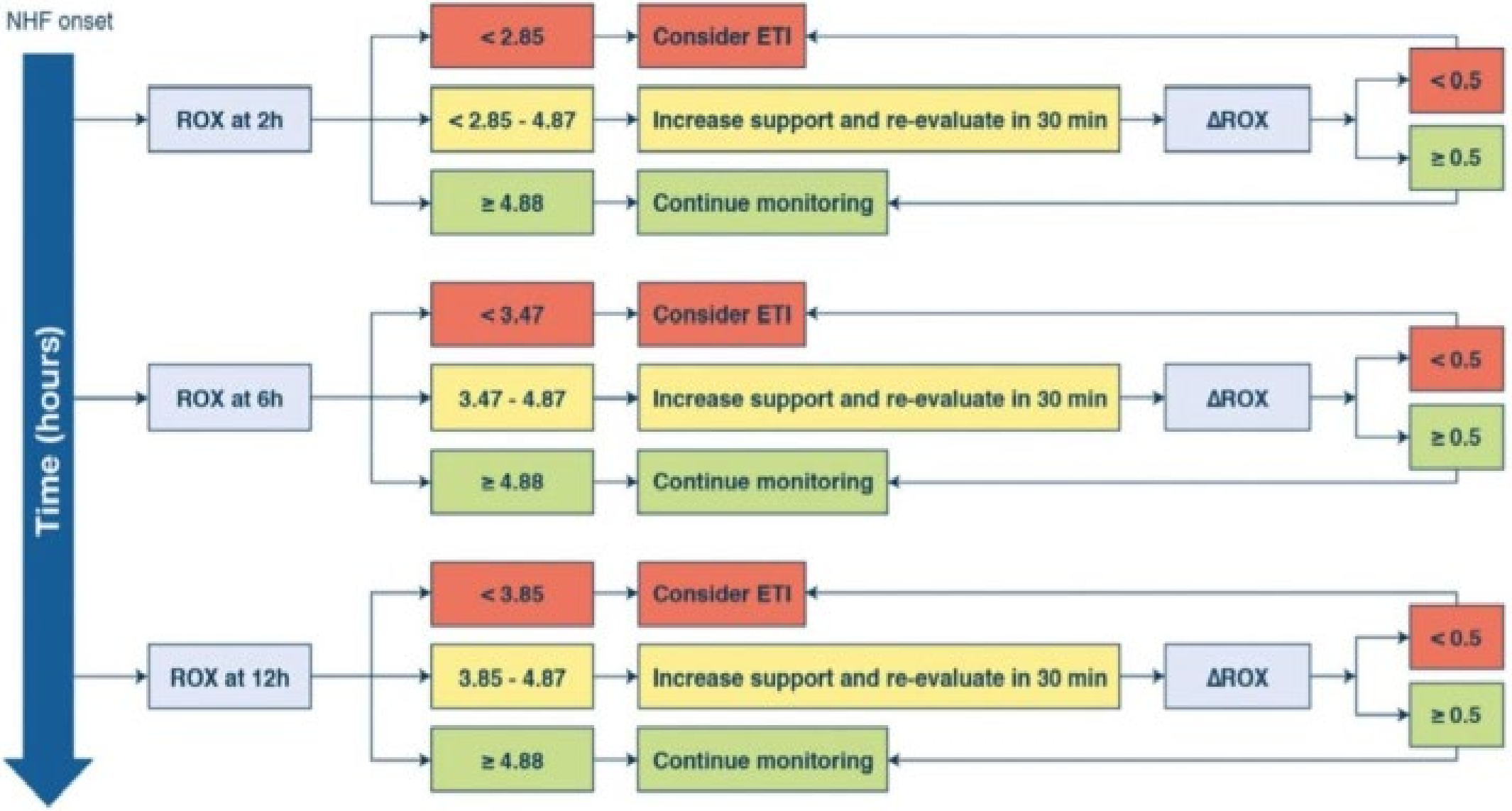
HFNO Başladıktan 12 Saat Sonra

< 3.85

ROX indeksi < 3.85 ise tedavi başarısızlığı ve entübasyon riski yüksektir.

Önemli Not

Bu indeks yalnızca **Yüksek Akışlı Nazal Oksijen** (HFNO) tedavisi için doğrulanmıştır. Entübasyonu geciktirmemek için yakın takip zorunludur.


NHF onset
Time (hours)
ROX at 2h
< 2.85
Consider ETI
< 2.85 - 4.87
Increase support and re-evaluate in 30 min
ΔROX
< 0.5
≥ 0.5
≥ 4.88
Continue monitoring
ROX at 6h
< 3.47
Consider ETI
3.47 - 4.87
Increase support and re-evaluate in 30 min
ΔROX
< 0.5
≥ 0.5
≥ 4.88
Continue monitoring
ROX at 12h
< 3.85
Consider ETI
3.85 - 4.87
Increase support and re-evaluate in 30 min
ΔROX
< 0.5
≥ 0.5
≥ 4.88
Continue monitoring

Zhou et al. BMC Pulmonary Medicine (2022) 22:121
https://doi.org/10.1186/s12890-022-01914-2

BMC Pulmonary Medicine

RESEARCH Open Access

The ROX index as a predictor of high-flow nasal cannula outcome in pneumonia patients with acute hypoxemic respiratory failure: a systematic review and meta-analysis

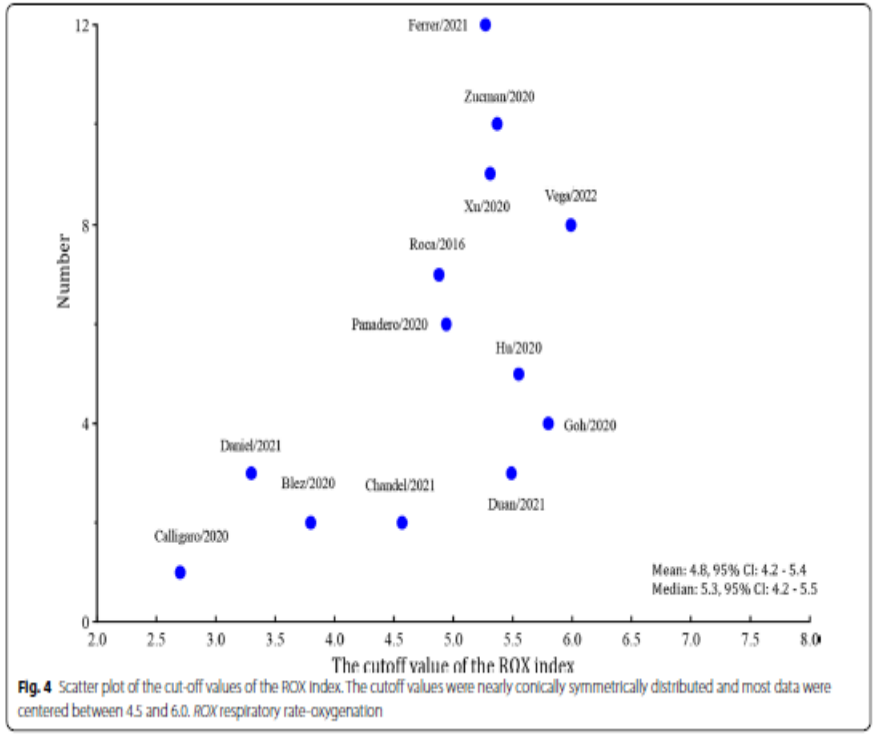


Fig. 4 Scatter plot of the cut-off values of the ROX index. The cutoff values were nearly conically symmetrically distributed and most data were centered between 4.5 and 6.0. *ROX* respiratory rate-oxygenation

6 prospektif, 7 retrospektif; n= 1751
10 çalışma COVID-19
ROX hem erken hem de 12 saate kadar benzer doğrulukta
ROX <4.2 → entübasyon düşün
4.2–5.4 → Dikkat
• >5.4 → iyi
•
AUHSROC = 0.81 (95% CI 0.77–0.84)
• Pooled sensitivite = %71
• Pooled spesifisite = %78
• Tanısal odds ratio (DOR) = 8.3

Liu et al. Respiratory Research (2024) 25:143
https://doi.org/10.1186/s12931-024-02771-9

Respiratory Research

RESEARCH Open Access

Association between the ROX index and mortality in patients with acute hypoxemic respiratory failure: a retrospective cohort study

ROX: ilk 24 saatin ortalaması alınmış- Fizyolojik?

n= 813

28 günlük mortalite

3-6-12 ay mortalite, ICU ve hastane mortalitesi

Sonuç: nonlineer- güçlü ilişki
***ROX>8.28 ilişki kayboluyor.**

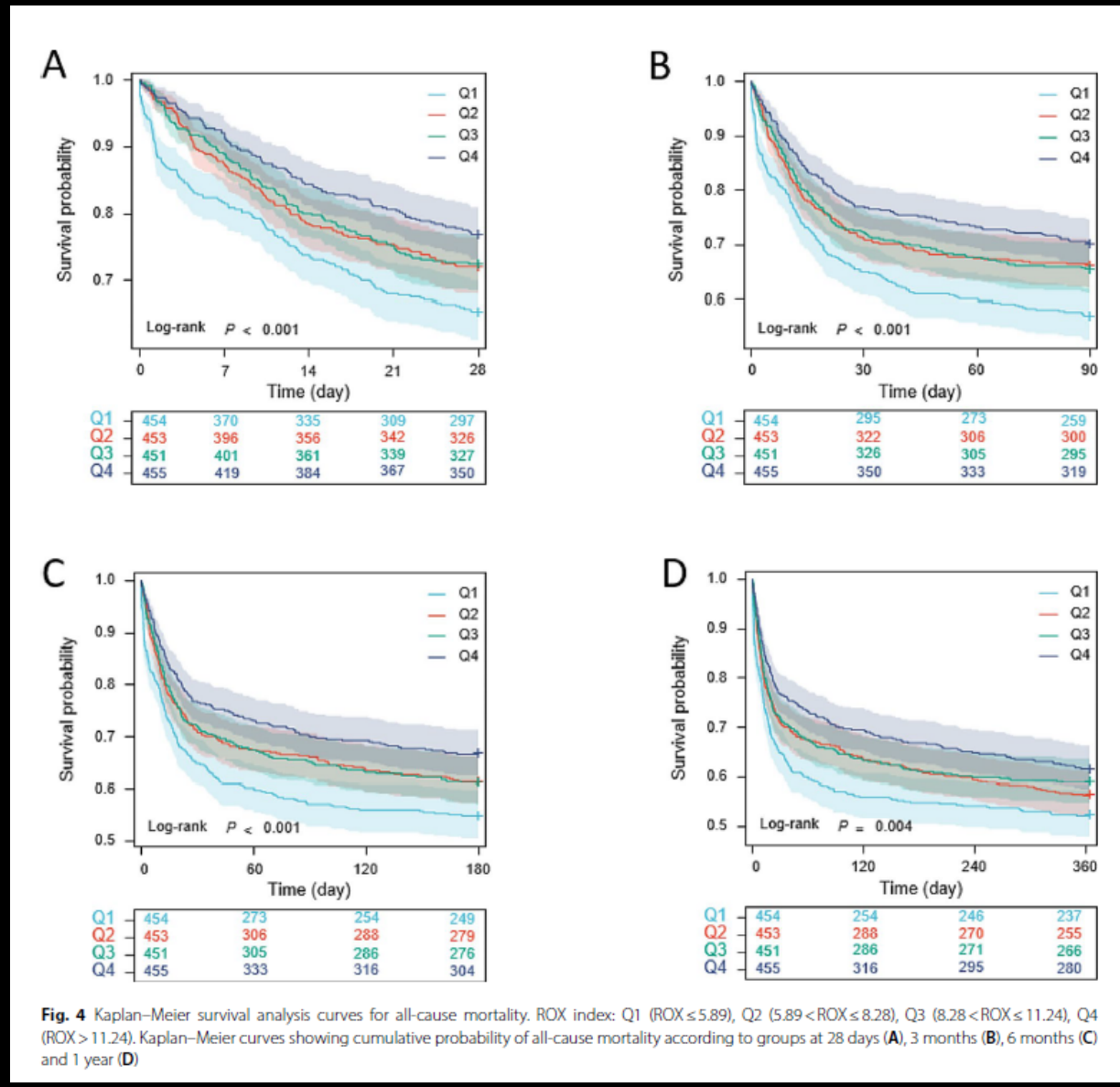


Fig. 4 Kaplan–Meier survival analysis curves for all-cause mortality. ROX index: Q1 (ROX ≤ 5.89), Q2 (5.89 < ROX ≤ 8.28), Q3 (8.28 < ROX ≤ 11.24), Q4 (ROX > 11.24). Kaplan–Meier curves showing cumulative probability of all-cause mortality according to groups at 28 days (**A**), 3 months (**B**), 6 months (**C**) and 1 year (**D**)

A Novel Index to Predict the Failure of High-Flow Nasal Cannula in Patients with Acute Hypoxemic Respiratory Failure: A Pilot Study

American Journal of Respiratory and Critical Care Medicine Volume 206 Number 7 | October 1 2022

$$\mathrm{VOX} = \frac{\mathrm{SpO_2/FiO_2}}{\mathrm{VT}}$$

Tek merkez, n=62

ROX ilk saatlerde yetersiz..

TV, HFNO başarısız olan hastalarda başlangıçtan itibaren belirgin yüksek. Özellikle >10 ml/kg PBW!

A Novel Index to Predict the Failure of High-Flow Nasal Cannula in Patients with Acute Hypoxemic Respiratory Failure: A Pilot Study

American Journal of Respiratory and Critical Care Medicine Volume 206 Number 7 | October 1 2022

Table 1. Diagnostic Accuracy of Different Respiratory Variables at Different Time Points of Need for IMV in Patients Treated With HFNC

	Time (h)	AUROC	95% CI	*P* Value
Sp_{O_2}/Fi_{O_2}	0	0.76	0.64–0.89	<0.001
	2	0.82	0.71–0.93	<0.001
	6	0.84	0.73–0.95	<0.001
Respiratory rate	0	0.50**	0.35–0.64	0.944
	2	0.42**	0.28–0.56	0.271
	6	0.51**	0.36–0.66	0.893
ROX index	0	0.66**	0.52–0.80	0.034
	2	0.70*	0.56–0.85	0.006
	6	0.79**	0.68–0.91	0.001
VT (ml/kg of PBW)	0	0.83	0.71–0.94	<0.001
	2	0.87	0.77–0.97	<0.001
	6	0.87	0.76–0.98	<0.001
VOX index	0	0.84	0.75–0.94	<0.001
	2	0.88	0.79–0.97	<0.001
	6	0.93	0.86–0.99	<0.001

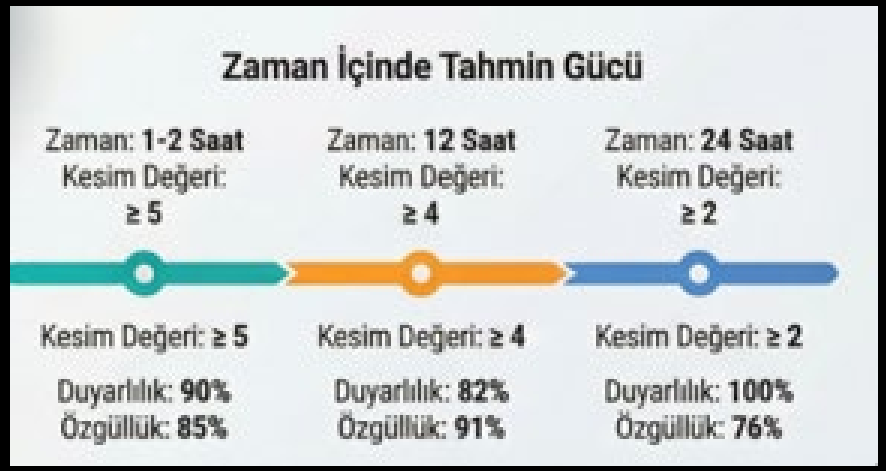
HACOR skoru

Variable	Value	Score
Heart rate (HR)	≤ 120	0
	> 120	1
Acidosis (pH)	≥ 7.35	0
	7.30 – 7.34	2
	7.25 – 7.29	3
	< 7.25	4
Consciousness (GCS)	15	0
	13 – 14	2
	11 – 12	5
	≤ 10	10
Oxygenation (PaO_2/FiO_2)	> 200	0
	176 - 200	2
	151 – 175	3
	126 - 150	4
	101 – 125	5
	≤ 100	6
Respiratory rate (RR)	≤ 30	0
	31 - 35	1
	36 – 40	2
	41 – 45	3
	> 45	4

>5

1 Saatte >5 Puan Yüksek Başarısızlık Riski Anlamına Gelir.

Bu eşik değer, farklı hasta gruplannda NiV başarısızlığını öngörmede etkilidir.



Duan et al. Critical Care (2022) 26:196
https://doi.org/10.1186/s13054-022-04060-7

Critical Care

RESEARCH Open Access

An updated HACOR score for predicting the failure of noninvasive ventilation: a multicenter prospective observational study

Variable	Value	Score
Heart rate (HR)	≤ 120	0
	> 120	1
Acidosis (pH)	≥ 7.35	0
	7.30 – 7.34	2
	7.25 – 7.29	3
	< 7.25	4
Consciousness (GCS)	15	0
	13 – 14	2
	11 – 12	5
	≤ 10	10
Oxygenation (PaO_2/FiO_2)	> 200	0
	176 - 200	2
	151 – 175	3
	126 - 150	4
	101 – 125	5
	≤ 100	6
Respiratory rate (RR)	≤ 30	0
	31 - 35	1
	36 – 40	2
	41 – 45	3
	> 45	4

18 merkez, prospektif çalışma (n=2179)

6 NIV öncesi değişken eklenmiştir:

SOFA skoru
Pnömoni varlığı
Kardiyojenik pulmoner ödem
Pulmoner ARDS
İmmünsüpresyon
Septik şok

Duan et al. Critical Care (2022) 26:196
https://doi.org/10.1186/s13054-022-04060-7

Critical Care

RESEARCH Open Access

An updated HACOR score for predicting the failure of noninvasive ventilation: a multicenter prospective observational study

Güncellenmiş HACOR skorunun NIV başladıktan 1–2 saat sonra hesaplanması, en güçlü sonuçları vermiştir.

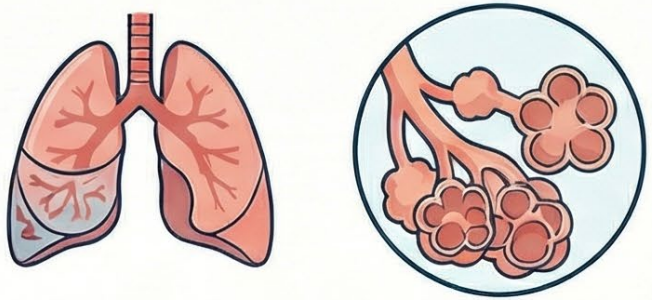
AUC ≈ 0.85

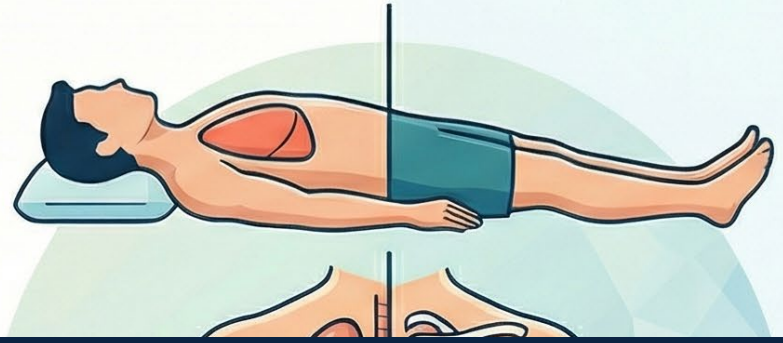
- ≤7 puan → Düşük risk (NIV başarısızlığı %12)
- 7.5–10.5 → Orta risk (%38)
- 11–14 → Yüksek risk (%67)
- 14 → Çok yüksek risk (%84)

Pron Pozisyonunun Fizyolojik Gerekçeleri

Hastalarda yüzüstü pozisyon uygulamasının akciğer fonksiyonları üzerindeki temel fizyolojik faydaları ve etki mekanizmaları.

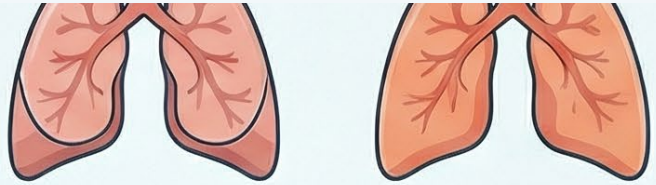
Mekanik ve Yapısal İyileşme





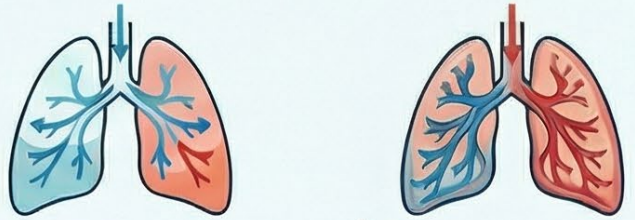
Homojen Stres Dağılımı

Transpulmoner basınç eşitlenerek ventilatör kaynaklı akciğer hasarı (VILI) riski düşürülür.



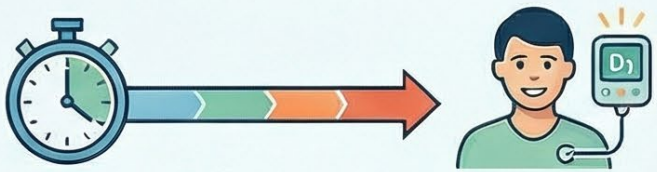
Yer çekimi desteğiyle drenaj kolaylaşır, küçük hava yolları açılır ve enfeksiyon riski azalır.

Fonksiyonel Faydalar ve Klinik Yanıt



V/Q Uyumunun İyileşmesi

Perfüzyonun havalanan bölgelere yönelmesiyle ventilasyon-perfüzyon eşleşmesi belirgin şekilde düzelir.



1-4 Saat İçinde Klinik Yanıt

Fizyolojik yanıt veren hastalarda oksijenasyon iyileşmesi genellikle bu sürede gözlemlenir.

Kılavuz Önerisi: ATS/ESICM/SCCM Klinik Uygulama Kılavuzu (2017) — Orta–ağır ARDS'de (PaO_2/FiO_2 < 150 mmHg) günde ≥ 12 saat pron pozisyon için güçlü öneri.

SONUÇ

- **«HFNOmı, NIV mi?» tercihte belirsizlikler devam etmekte.**
- **De novo hipoksemik solunum yetmezliğinde, sepsise bağlı AHSY'de HFNO hala ilk öneri, konforlu**
- **Tedavi başarısı sadece oksijenasyonla değil, inspiratuar efor, WOB ve pulmoner heterojeniteye göre incelenmelidir.**
- **Yüksek inspiratuar efor → Helmet + Pressure Support koruyucu olabilir;yine de çalışmalara ihtiyaç var**
- **İmmünsuprese grupta belirsizlikler devam ediyor**
- Oksijenasyon zayıfsa → Helmet NIV, HFNO'den daha etkili olabilir;hastaya göre karar vermek gerekir.
- **Başarısızlığı ERKEN tanımalı.**

TEŞEKKÜRLER