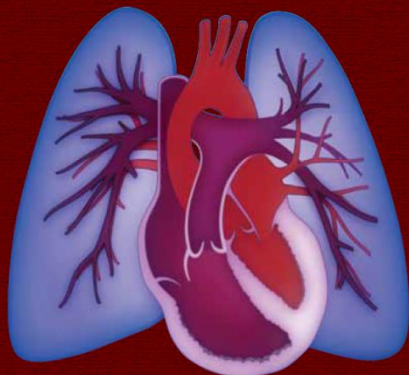




ΕΛΛΗΝΙΚΗ ΕΤΑΙΡΕΙΑ ΜΕΛΕΤΗΣ ΤΗΣ ΠΝΕΥΜΟΝΙΚΗΣ ΥΠΕΡΤΑΣΗΣ

2^ο ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΠΝΕΥΜΟΝΙΚΗΣ ΥΠΕΡΤΑΣΗΣ



Αθήνα, 15-17 Ιουνίου 2018

Αμφιθέατρο Cotsen Hall
(Γεννάδειος Βιβλιοθήκη)

"Χορηγούνται 17 Μόρια Συνεχιζόμενης
Ιατρικής Εκπαίδευσης από τον Π.Ι.Σ."



Σύνδρομο άπνοιας στον ύπνο και πνευμονική υπέρταση

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Δομή ομιλίας

Εισαγωγή στο ΣΑΥ

Πνευμονική Υπέρταση και ΣΑΥ

I. Επιδημιολογία

ΠΥ σε ασθενείς με ΣΑΥ

ΣΑΥ σε ασθενείς με ΠΥ

II. Παθοφυσιολογία

III. Κλινική εικόνα

IV. Θεραπεία

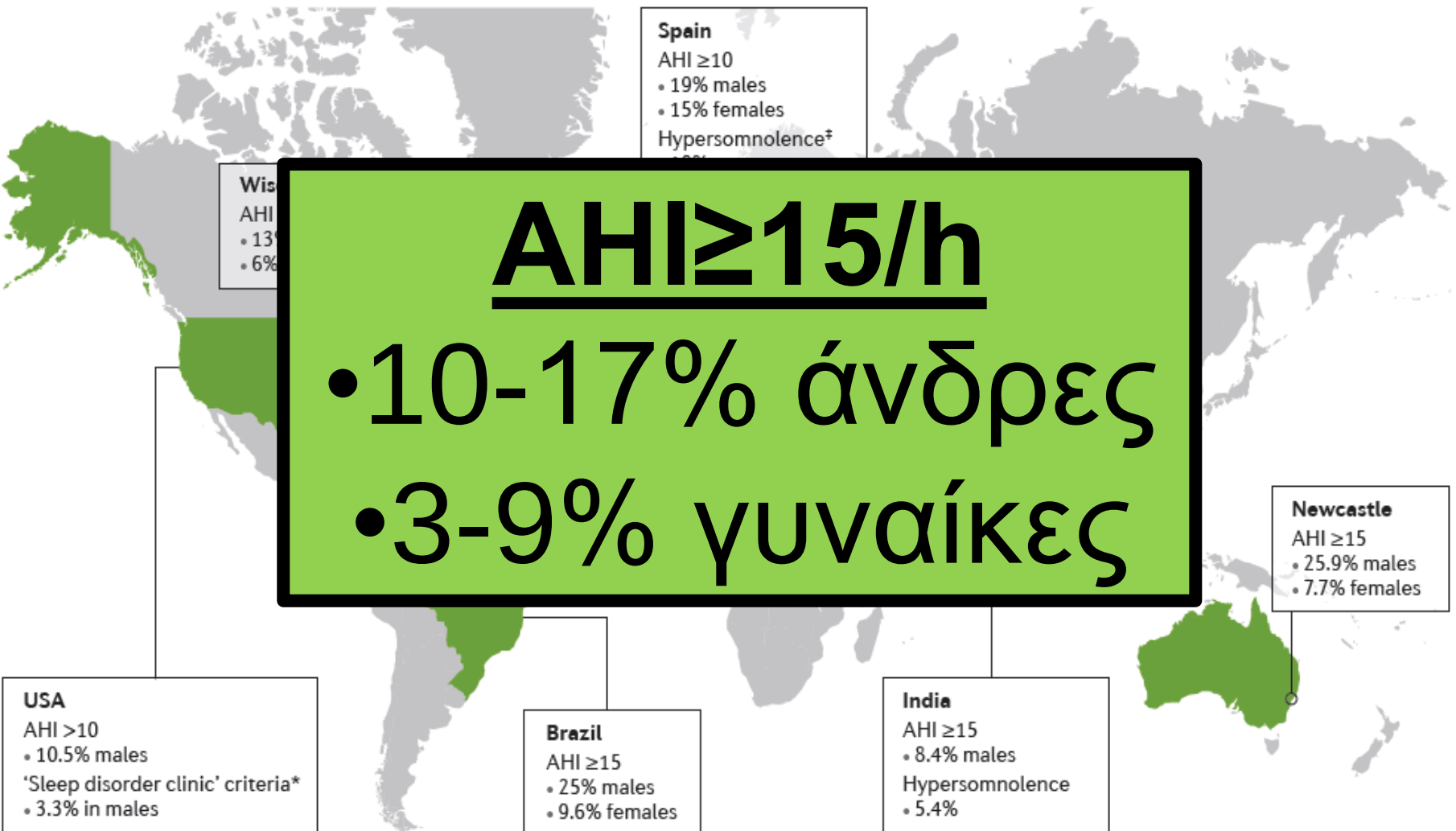
Συμπεράσματα

Σύνδρομο Απνοιών στον Ύπνο (ΣΑΥ)

Χαρακτηρίζεται από επαναλαμβανόμενα επεισόδια διακοπής της ροής του αέρα κατά τη διάρκεια του ύπνου λόγω μερικής ή πλήρους απόφραξης του ανώτερου αεραγωγού με αποτέλεσμα διαλείπουσα υποξυγοναιμία, συχνές αφυπνίσεις και κατακερματισμό του ύπνου



Επιδημιολογία



Συνοπτικά χαρακτηριστικά του ΣΑΥ

Diagnosis:

- Polysomnography (PSG)-gold standard

Treatment:

- Mild OSA with symptoms or comorbid diseases or moderate-severe OSAS: **CPAP**

Social aspects:

- Traffic accidents, reduced work productivity (Absenteeism, Presenteeism)

Comorbidities

- CVD (Afib, HTN, CHF, Stroke, **Pulmonary hypertension**)
- DM, Dyslipidemia, Metabolic syndrome
- Neurologic (Cognitive disorders)
- CKD-Renal function decline

Patrick Lévy, Nature Reviews, 2015

Ruth E, J Clin Sleep Med 2006

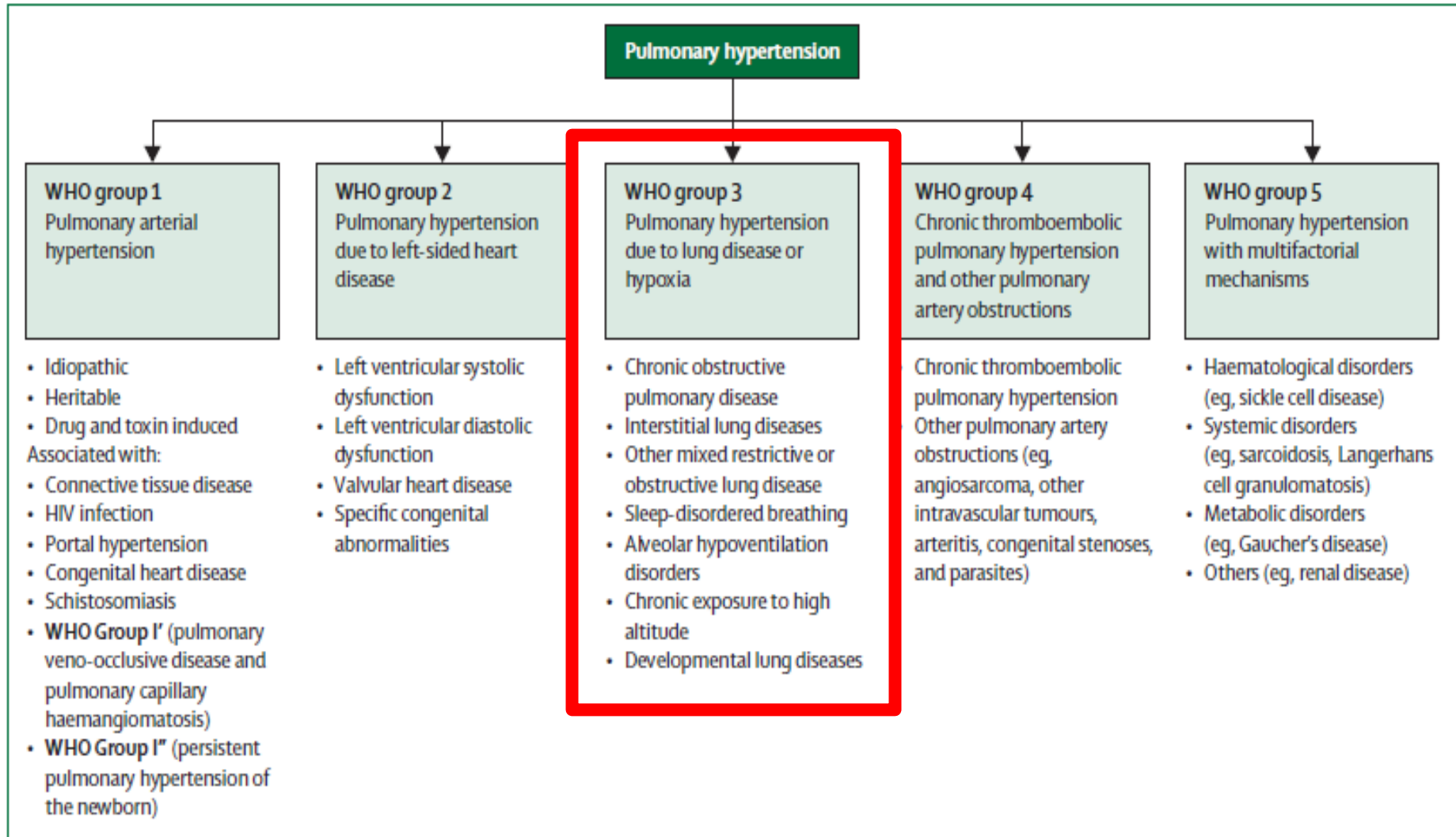
Nena E, JOEM 2010

Πνευμονική Υπέρταση

ΟΡΙΣΜΟΣ:

- Pulmonary hypertension is defined as a mean pulmonary artery pressure (mPAP) at rest ≥ 25 mm Hg by right heart catheterisation (RHC)
- **Based on** pulmonary artery wedge pressure (PAWP)
 - precapillary (PAWP ≤ 15 mm Hg)
 - postcapillary (PAWP > 15 mm Hg)
- **Based on** pathophysiological, clinical, and therapeutic aspects PH:
 - pulmonary arterial hypertension
 - due to left-sided heart disease
 - due to lung disease or hypoxia
 - CTEPH
 - unclear or multifactorial mechanisms

Ταξινόμηση Πνευμονικής Υπέρτασης



Πνευμονική Υπέρταση σε ασθενείς με ΣΑΥ

Επιδημιολογικά δεδομένα

- The prevalence of pulmonary hypertension in patients with moderate to severe OSA is approximately **20-30%**
- Estimates may be **inaccurate**; many patients also have **COPD and/or left-sided heart disease**, contributing to PH
- With coexistent obesity hypoventilation syndrome
 **58%**
- PH when present in OSA patients without coexisting lung disease, **is typically mild**

Pulmonary Hemodynamics in the Obstructive Sleep Apnea Syndrome*

Results in 220 Consecutive Patients

*Ari Chaouat, MD; Emmanuel Weitzenblum, MD; Jean Krieger, MD;
Monique Oswald, MD; and Romain Kessler, MD*

(CHEST 1996; 109:380-86)

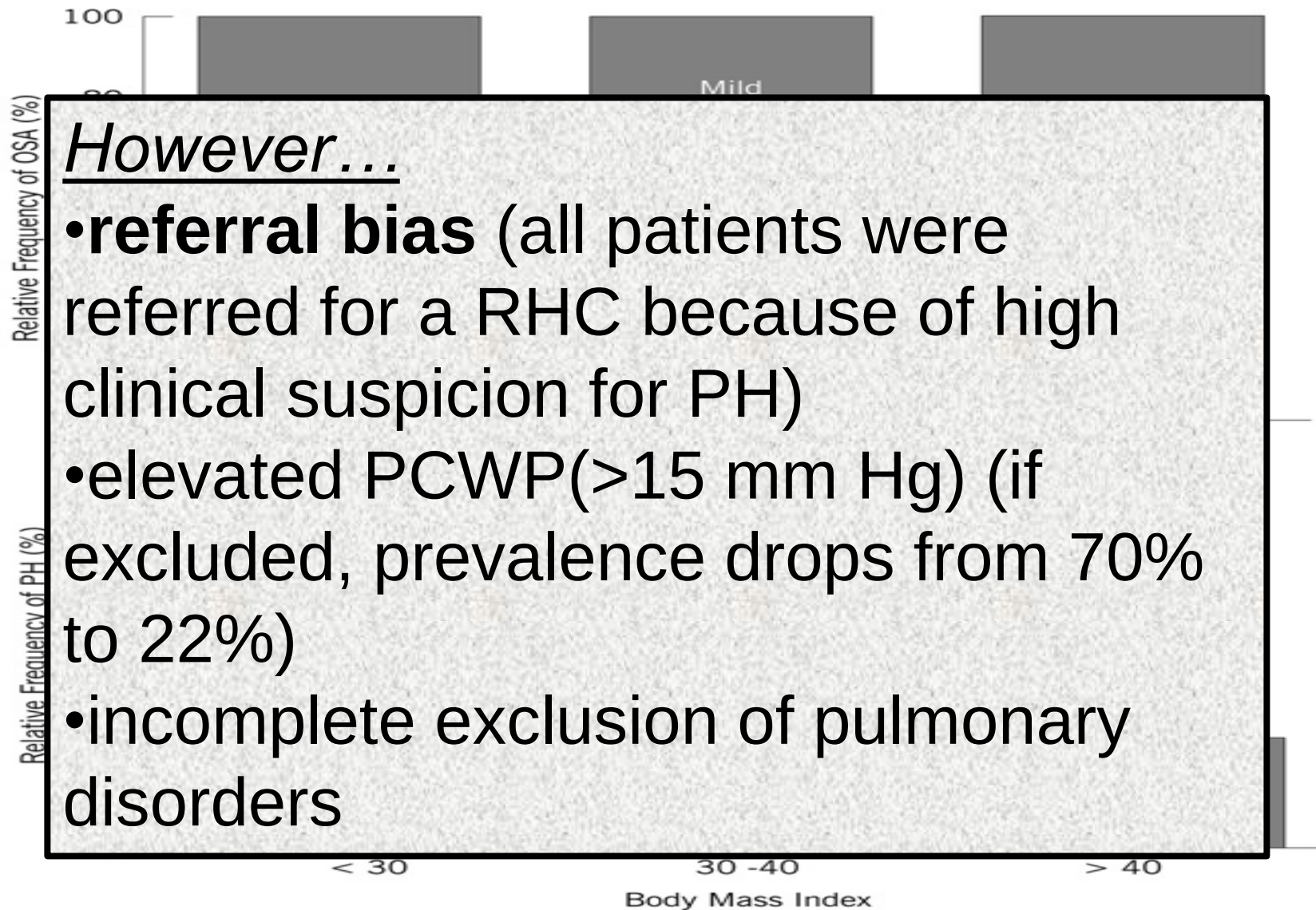
- 220 OSA patients underwent RHC
- PH was diagnosed **in 17%**, but the **mPAP** in the PH group was only mildly elevated at **26±6mmHg**
- PH strongly correlated with a **higher daytime PaCO₂**, **lower daytime PaO₂** and **lower mean SpO₂ during sleep**
- **BMI was higher** in the OSA-PH group vs OSA without PH

Frequency and Impact of Pulmonary Hypertension in Patients With Obstructive Sleep Apnea Syndrome

Omar A. Minai, MD^{a,b,d,*}, Basma Ricaurte, MD^{a,b}, Roop Kaw, MD^c,
Jeff Hammel, MS^{a,b}, Mary Mansour, MD^c, Kevin McCarthy, RPSGT^{a,b}, Joseph A. Golish, MD^{a,b,d},
and James K. Stoller, MD^{a,b}

Am J Cardiol 2009;104:1300–1306

- 83 subjects with OSA underwent RHC within 6 months of PSG
- The occurrence of PH was 70%
- mPAP=40.3±11 mm Hg
- Correlates of PH: female, age<49 years, BMI≥26Kg/m² and RVSP ≥30 mm Hg on echocardiogram



However...

- **referral bias** (all patients were referred for a RHC because of high clinical suspicion for PH)
- elevated PCWP(>15 mm Hg) (if excluded, prevalence drops from 70% to 22%)
- incomplete exclusion of pulmonary disorders

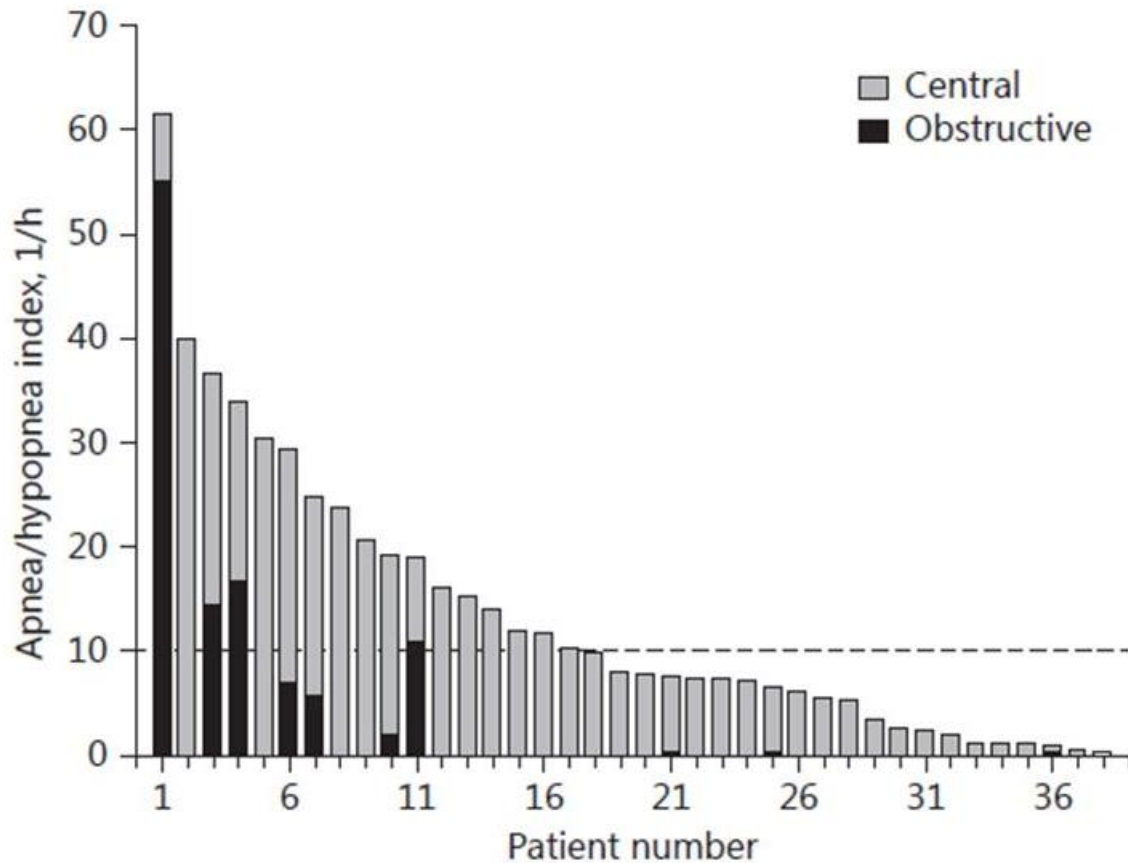
Παράγοντες κινδύνου για πνευμονική υπέρταση σε ασθενείς με ΣΑΥ

- **Daytime hypoxemia**
- **Severe OSA (AHI $\geq$ 30/h)**
- **Comorbid lung disease-COPD (overlap syndrome)**
- **Comorbid obesity hypoventilation syndrome-OHS**

ΣΑΥ σε ασθενείς με πνευμονική υπέρταση Επιδημιολογικά δεδομένα

- SDB is common in patients with PH
- CSA/CSR prevails in younger patients with severe PH and right-sided heart failure
- OSA predominates in older patients with PH, especially **men with higher BMI**; which are confounders predisposing to OSA

AHI in 38 patients with precapillary pulmonary hypertension



AHI ≥ 10 /h
in 45% of PH
patients



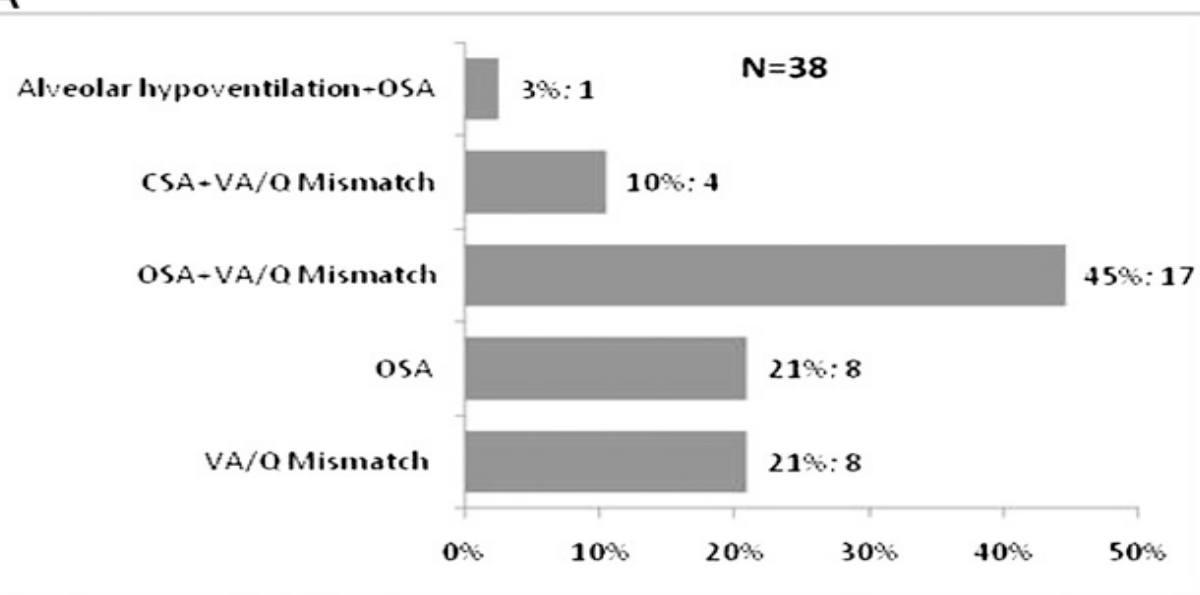
High Occurrence of Hypoxemic Sleep Respiratory Disorders in Precapillary Pulmonary Hypertension and Mechanisms

Fadia Nicolas Jilwan, MD; Pierre Escourrou, MD, PhD; Gilles Garcia, MD, PhD; Xavier Jaïs, MD; Marc Humbert, MD, PhD; and Gabriel Roisman, MD, PhD

CHEST 2013; 143(1):47–55

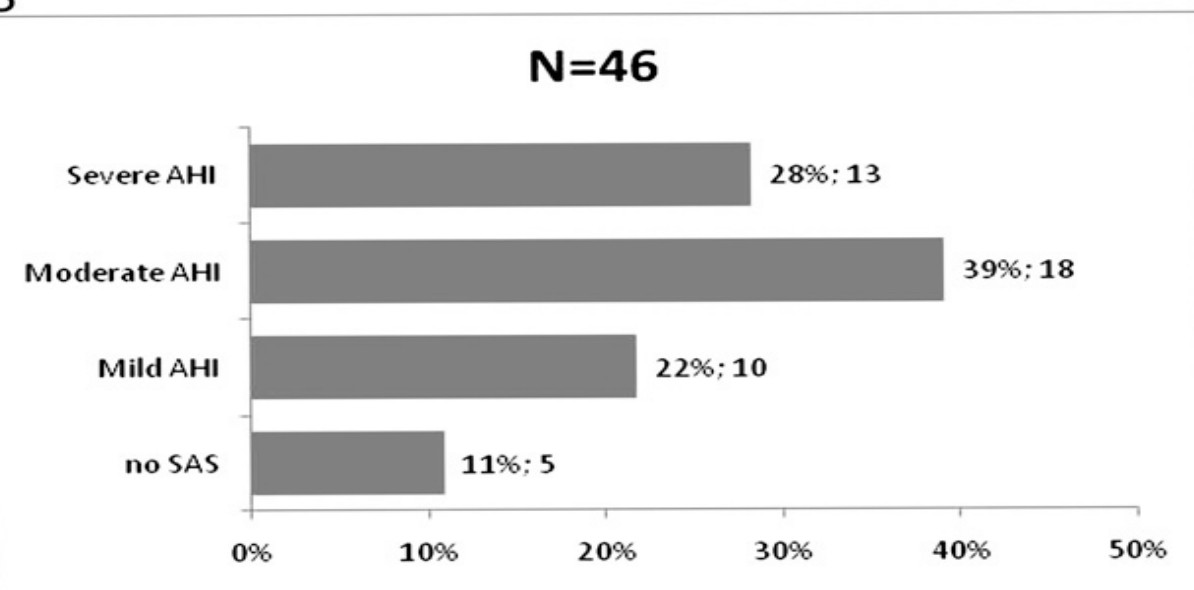
- Προοπτική μελέτη παρατήρησης
- 46 clinically stable patients with IPAH (n =29) or CTEPH (n =17)
- PSG with transcutaneous capnography
- BMI<35 kg/m², FEV₁>60% predicted

A



**41 PH patients
(89%) had sleep
apnea**

B



Sleep Disordered Breathing in Group 1 Pulmonary Arterial Hypertension

Milan Minic¹; John T. Granton, M.D.²; Clodagh M. Ryan, M.D.²

- Αναδρομική μελέτη επιπολασμού (Retrospective, cross-sectional study)
- 52 consecutive subjects with known WHO group 1 PAH
- Assessed for possible SDB
- Polysomnography within 6 months of RHC

Table 1—Baseline characteristics

	Total Group (n = 52)	OSA (n = 29)	CSA (n = 8)	NSA (n = 15)
Age (years)	53 ± 15	55 ± 15*	59 ± 13	44 ± 15
Gender				
Male	22 (42.3%)	11 (50.0%)	4 (18.2%)	7 (31.8%)
Female	30 (57.7%)	18 (60.0%)	4 (13.3%)	8 (26.7%)
Body mass index (kg/m ²)	29.6 ± 9.2	30.9 ± 7.6	26.7 ± 6.4	28.4 ± 12.8
Group 1 PH				
IPAH	24 (46.2%)	11 (45.8%)	4 (16.7%)	9 (37.5%)
CTD	11 (21.2%)	8 (72.7%)	1 (9.1%)	2 (18.2%)
HIV	3 (5.8%)	2 (66.7%)	1 (33.3%)	0 (0.0%)
CHD	13 (25.0%)	8 (61.5%)	1 (7.7%)	4 (30.8%)
Group 1' PH				
PVOD	1 (1.9%)	0 (0.0%)	1 (100.0%)	0 (0.0%)

OSA is highly prevalent among PAH patients

Ανεξάρτητοι προγνωστικοί παράγοντες για ΣΑΥ στην πνευμονική υπέρταση

Variables	Beta	p-value
ESS > 10	-0.401	0.003
Age	-0.329	0.011
BMI > 30	-0.266	0.042

Αμφίδρομη σχέση πνευμονικής υπέρτασης - ΣΑΥ

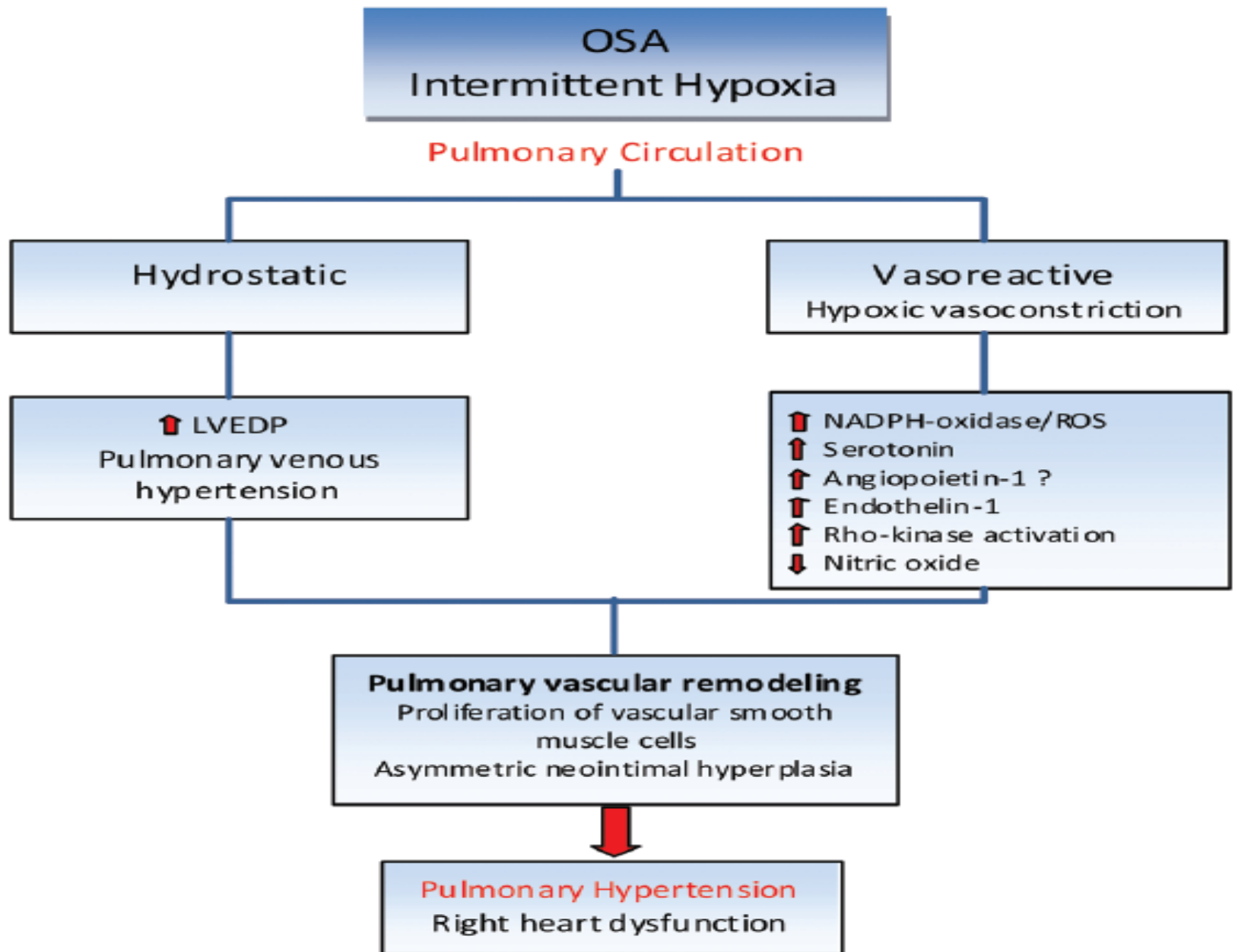
- During ***normal sleep***, there is a fall in heart rate and systemic arterial blood pressure with lowest values in deep NREM
- In REM pulmonary arterial pressure becomes unstable and increases compared to NREM sleep
- **Nocturnal hypoxemia may induce PH** through hypoxic and/ or hypercapnic pulmonary vasoconstriction and sympathetic activation
- **Precapillary PH** associated with right ventricular failure **may promote instability of ventilatory control** leading to **sleep apnea**

Παθοφυσιολογία πνευμονικής υπέρτασης στο ΣΑΥ

- Intermittent hypoxia
 - *Hypoxic and Hypercapnic Pulmonary Vasoconstriction*
- Negative pleural pressure
 - increased venous return leading to increased right ventricular (RV) preload
 - Elevates LV afterload by increasing LV transmural pressure
- Endothelial dysfunction
 - sympathetic overstimulation in OSA patients induce vascular shear stress and promote endothelial dysfunction
- Genetic susceptibility

Διαλείπουσα υποξία

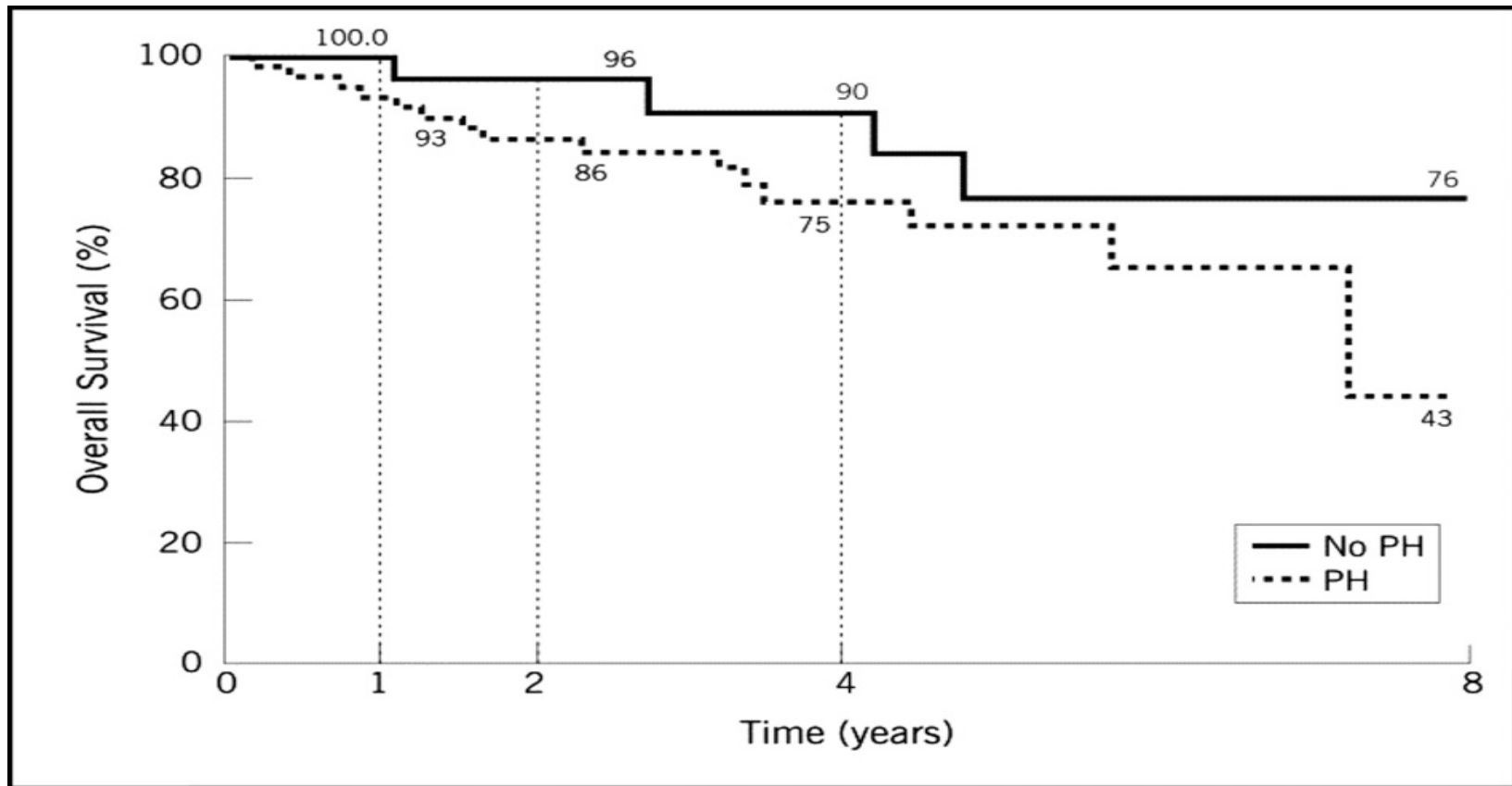
- **Hypoxic pulmonary vasoconstriction (HPVC)**
 - ✓ normal regulatory mechanism designed to limit blood flow to hypoxic alveoli and preserve ventilation-perfusion matching
 - ✓ Both alveolar hypoxia and peripheral arterial hypoxemia may contribute to HPVC
 - ✓ Its effect on pulmonary vascular pressure depends on the duration of the hypoxia



Κλινική εικόνα

- Signs and symptoms of PH are **nonspecific**
- Delay in diagnosis very common
- Early – dyspnea with activity.
- Late symptoms:
 - syncope
 - chest pain / chest pressure
 - leg edema (signs of right heart failure)
 - abnormal findings on chest X ray or ECG
- **Right heart failure** is a late complication of untreated OSA and accompanied by other confounders (COPD,OHS,CHF etc.)

The presence of pulmonary hypertension may have prognostic importance in patients with OSA



- 83 patients with OSA with and without PH
- The survival rate at 1, 4, and 8 y was 100%, 90%, and 76% in the non-PH group and 93%, 75%, and 43% in the PH group

Screening for PH and OSA

1. In the evaluation of patients with PAH, an assessment of SDB is recommended. Quality of evidence: low; net benefit: small/weak; strength of recommendation: C.
2. In the evaluation of a patient with PAH for SDB, polysomnography is recommended if OSA is suspected as the etiology, if a screening test result for OSA is positive, or if a high clinical suspicion for OSA is

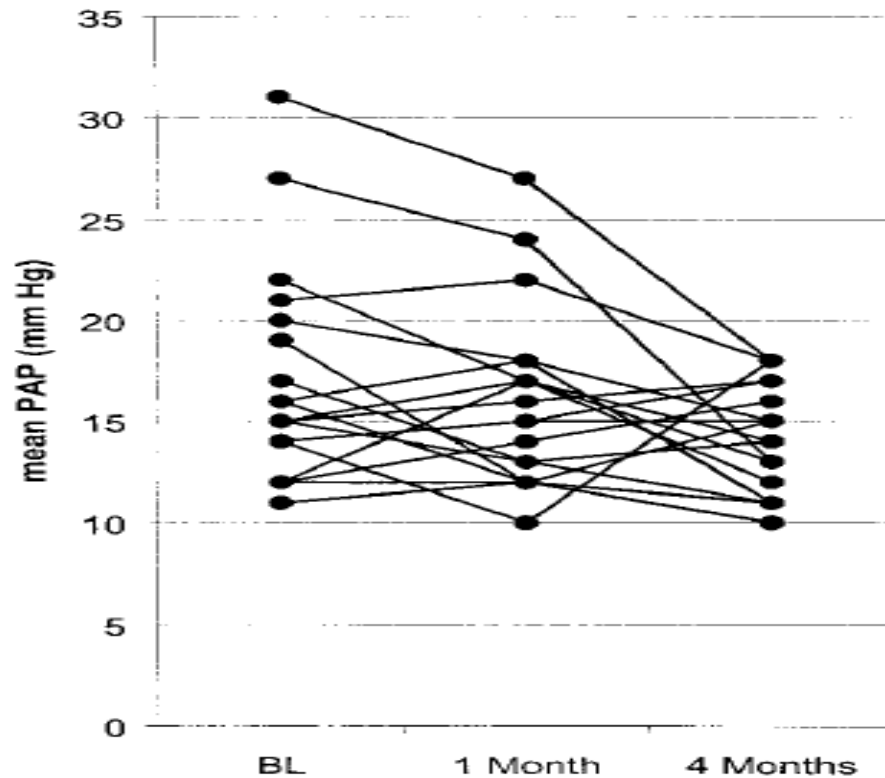
- OSA in PH: Objective sleep evaluation with PSG or other sleep studies but not pulse oximetry
- PH in OSA: no evidence to suggest the benefit of screening OSA population for pulmonary hypertension

tion that pulmonary pressures will decrease, although they may not normalize, particularly when PAH is more severe. Quality of evidence: low; net benefit: small/weak; strength of recommendation: C.

Continuous Positive Airway Pressure Treatment Improves Pulmonary Hemodynamics in Patients with Obstructive Sleep Apnea

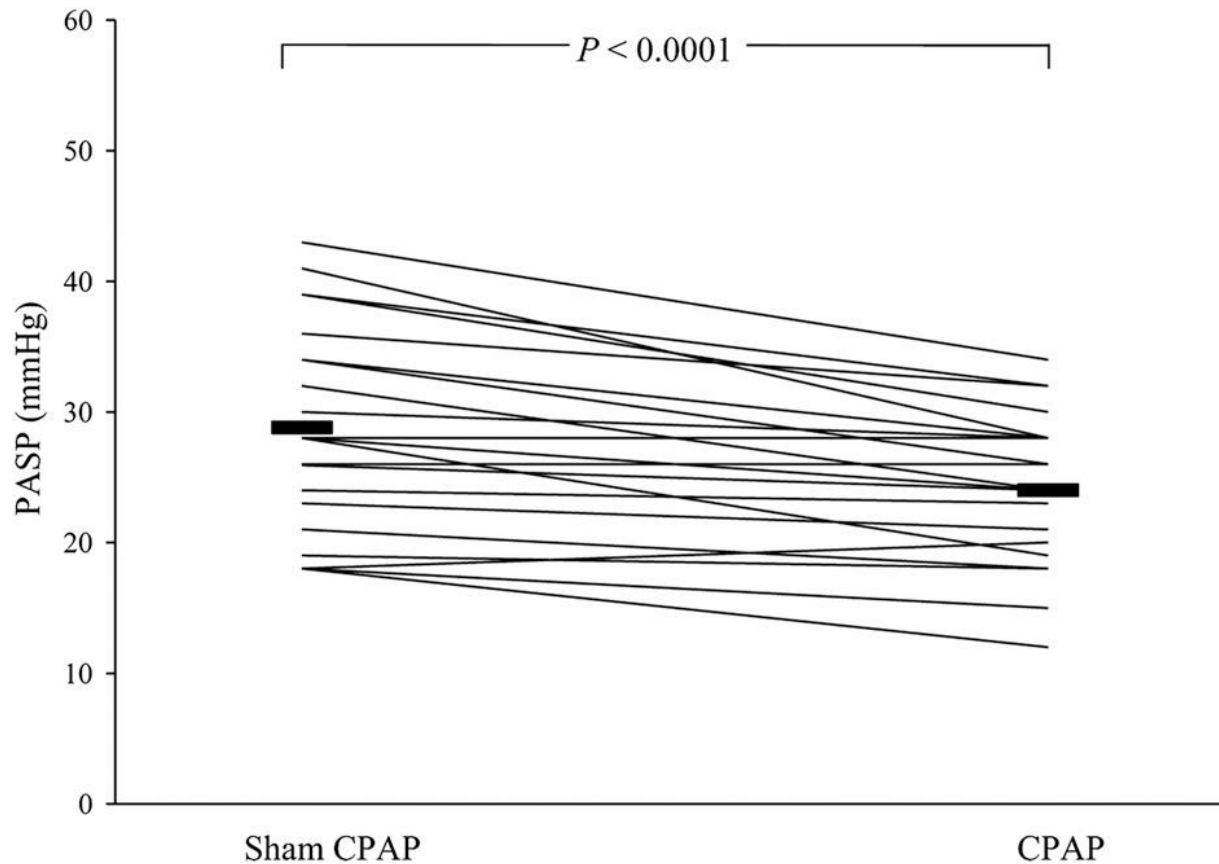
DIMITAR SAJKOV, TINGTING WANG, NICHOLAS A. SAUNDERS, ALEXANDRA J. BUNE, and R. DOUGLAS McEVOY

Am J Respir Crit Care Med, 2002



- Doppler echocardiography in 20 patients with OSA
- After 4 months of CPAP, mPAP decreased from 16.8 ± 1.2 mm Hg to 13.9 ± 0.6 mm Hg ($p < 0.05$)

Επίδραση της θεραπείας του ΣΑΥ στην πνευμονική υπέρταση



PASP: 28.9 ± 8.6 mm Hg to 24.0 ± 5.8 mmHg after 12 wk of CPAP ($p < 0.0001$)

Effect of continuous positive airway pressure treatment on pulmonary artery pressure in patients with isolated obstructive sleep apnea: a meta-analysis

Tasnim F. Imran¹ · Marya Ghazipura² · Spencer Liu³ · Tanzib Hossain³ · Hormoz Ashtyani³ · Bernard Kim³ · J. Michael Gaziano¹ · Luc Djoussé¹

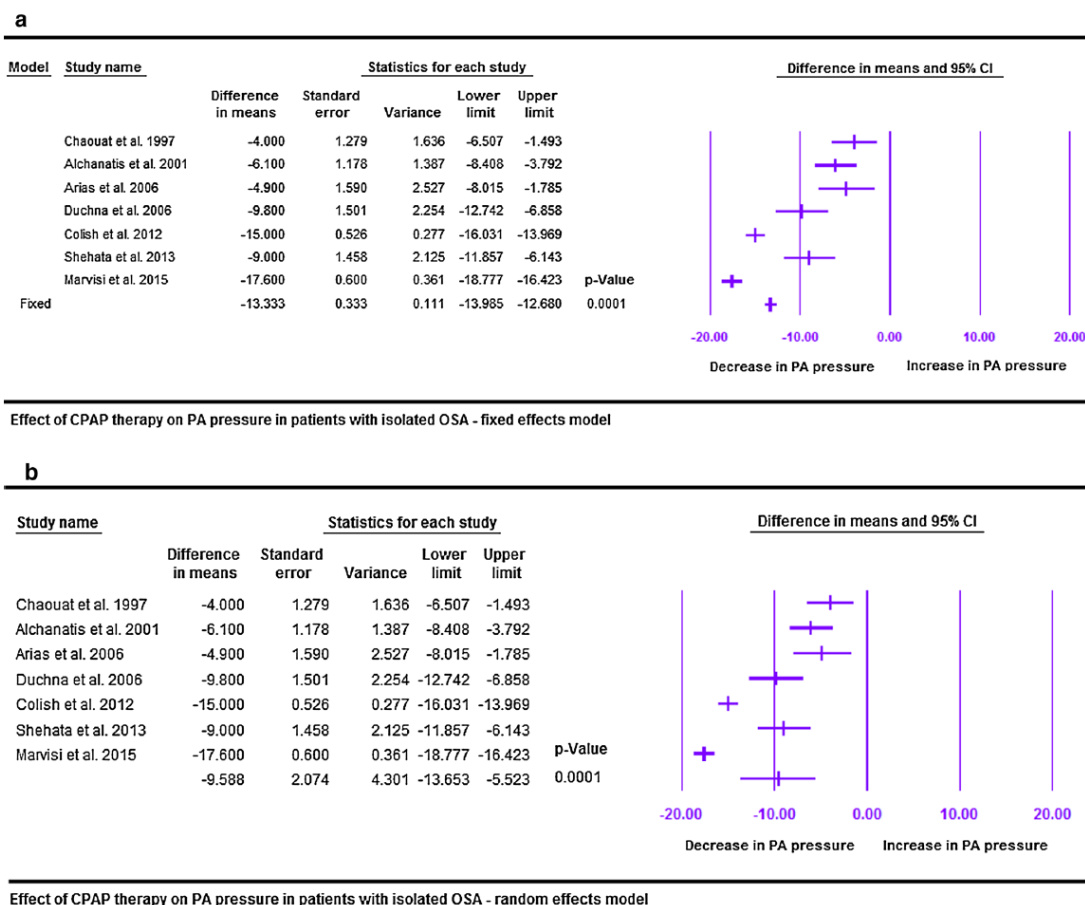


Fig. 3 Meta-analysis of pulmonary artery pressure pre- and post-CPAP therapy, fixed effects model (a), and random effects model (b)

Συμπερασματικά

- Αμφίδρομη σχέση μεταξύ ΣΑΥ και πνευμονικής υπέρτασης
- Η πνευμονική υπέρταση δεν είναι συχνή στο ΣΑΥ
- Η θεραπεία με CPAP είναι αποτελεσματική στη θεραπεία πνευμονικής υπέρτασης που σχετίζεται με το ΣΑΥ
- Προσυμπτωματικός έλεγχος για διαταραχές της αναπνοής στον ύπνο (CSB, OSA) σε όλους τους νεοδιαγνωσθέντες ασθενείς με precapillary PH
- Απαιτείται συνεργασία μεταξύ πνευμονολόγων, καρδιολόγων (ειδικών ιατρείων ΠΥ) και ειδικών του ύπνου

Ευχαριστώ πολύ

