## References

1. Caylà JA, Caminero JA. La necesidad histórica de un programa nacional de control de la tuberculosis para España. Arch Bronconeumol. 2018;54:603–4.
2. Houben RM, Dodd PJ. The global burden of latent tuberculosis infection: a reestimation using mathematical modelling. PLoS Med. 2016;13, e1002152.
3. World Health Organization. Global tuberculosis report 2018. Geneva (Switzerland); 2018. Available from: http://apps.who.int/iris/bitstream/handle/10665/274453/9789241565646-eng.pdf?ua=1 [accessed 08.01.19].
4. Servicio de Epidemiologia. Consejería de Sanidad Junta de Castilla y León. Informe epidemiológico sobre la tuberculosis en Castilla y León. Años 2012, 2013, 2014, 2015 y 2016; 2018. Available from: https://www.saludcastillayleon.es/profesionales/es/inf-epidemiologicos/informes-epidemiologicos-castilla-leon/informes-tuberculosis [accessed 21.11.18].
5. Alberte-Castiñeiras A, Campos-Bueno A, López-Urrutia L, Alvarez-Alonso E, Megías G, Ojeda-Fernández E. Drug-resistance in *Mycobacterium tuberculosis* in Castilla y León, Spain, 2001–2005: third collaborative study. Enferm Infecc Microbiol Clin. 2010;28:706–9.
6. Caminero JA, Cayla JA, García-García JM, García-Pérez FJ, Palacios JJ, Ruiz-Manzano J. Diagnosis and treatment of drug-resistant tuberculosis. Arch Bronconeumol. 2017;53:501–9.



Miguel López-Gobernado,[a,*] Alberto Pérez-Rubio,[b] Eva Lopez-García,[c] Jose María Eiros[d]

[a] *Servicio de Estudios, Documentación y Estadística, Consejería de Sanidad de la Junta de Castilla y León, Valladolid, Spain*
[b] *Dirección Médica, Hospital Clínico Universitario de Valladolid, Valladolid, Spain*
[c] *Gerencia de Atención Primaria Valladolid-Oeste, Valladolid, Spain*
[d] *Departamento de Microbiología, Facultad de Medicina, Universidad de Valladolid, Valladolid, Spain*

* Corresponding author.
*E-mail address:* mlopezgob@saludcastillayleon.es (M. López-Gobernado).


1579-2129/


## Sleep-Disordered Breathing: Looking Beyond the Apnea/Hypopnea Index☆

### *Trastornos respiratorios del sueño: más allá del índice apneas e hipopneas*

*To the Editor,*

The relationship between sleep-disordered breathing and cardiovascular disease has now been clearly identified.[1] Part of the cardiovascular impact is attributable to chronic intermittent hypoxia[2] generating oxygen free radicals which trigger the inflammatory cascade by promoting a state of systemic inflammation that leads to widespread endothelial damage, thus predisposing toward atherosclerosis.

The severity of these disorders is evaluated using the apnea–hypopnea index (AHI), defined by the number of apnea and hypopnea events per hour of sleep using polysomnography as a diagnostic method, and per hour of recording, if respiratory polygraphy is used. Apneas are defined by a reduction in airflow of at least 90% with a duration of at least 10 s. Hypopnea occurs when airflow is reduced by at least 30% for at least 10 s, in association with arterial oxygen desaturation of 3% or more.[3] This raises the first question: is the pathophysiological impact of both parameters the same? Do they represent the same thing? Is it acceptable to combine them in the same index?

In a cohort of 963 patients with stable heart failure, 58% had moderate to severe apnea, and mortality during a follow-up of 7.3 years was 50%. The percentage of time during sleep with an oxygen saturation below 90% (T90) was significantly associated with mortality, which increased by 16% for every hour that the patient showed a saturation of less than 90%. This relationship was not observed with the AHI.[4] Obviously, the presence of apnea and hypopnea define the presence of the disease, but is this ratio useful for stratifying their severity? Is it an appropriate representation of the pathophysiological mechanisms that potentially contribute to the increased risk of cardiovascular disease in these patients? Probably not, since a higher degree of hypoxemia will surely have greater negative effects; but the AHI ignores this, and does not reflect either the depth or the duration of desaturations and therefore would classify patients with different T90 values, desaturations or comorbidities but with the same AHI in the same severity group.

It was recently reported that the severity of obstructive sleep apnea, quantified by the hypoxic burden associated with the respiratory event, was independently associated with cardiovascular mortality. In contrast, there was no association between this and AHI when it was evaluated as an independent predictor.[5]

Excessive daytime sleepiness, on the other hand, is a symptom that indicates the clinical severity of obstructive sleep apnea. However, patients may have worse oxygenation indices and longer apneas than those without this symptom, despite having a similar AHI.[6]

This evidence suggests that when stratifying disease severity, we must set aside our one-dimensional vision that only considers AHI, and instead take into account other parameters that reflect the overall status of the patient, and include those that reflect the hypoxemic burden of the disease, which is ultimately responsible for cardiovascular morbidity and mortality. It would be interesting to combine efforts to develop a similar tool to the BODE index in COPD that would provide an overall assessment of patients with sleep disordered breathing.


## References

1. Linz D, Woehrle H, Bitter T, Fox H, Cowie MR, Böhm M, et al. The importance of sleep-disordered breathing in cardiovascular disease. Clin Res Cardiol. 2015;104:705–18.
2. Lam JC, Mak JC, Ip MS. Obesity, obstructive sleep apnea and metabolic syndrome. Respirology. 2012;17:223–36.
3. Berry RB, Brooks R, Gamaldo C, Harding SM, Lloyd RM, Quan SF, et al. AASM scoring manual updates for 2017 (version 2.4). J Clin Sleep Med. 2017;13:665–6.
4. Oldenburg O, Wellmann B, Buchholz A, Bitter T, Fox H, Thiem U, et al. Nocturnal hypoxaemia is associated with increased mortality in stable heart failure patients. Eur Heart J. 2016;37:1695–703.
5. Azarbarzin A, Sands SA, Stone KL, Taranto-Montemurro L, Messineo L, Terrill P, et al. The hypoxic burden of sleep apnoea predicts cardiovascular disease-related mortality: the Osteoporotic Fractures in Men Study and the Sleep Heart Health Study. Eur Heart J. 2018, http://dx.doi.org/10.1093/eurheartj/ehy624.
6. Bostanci A, Turhan M, Bozkurt S. Factors influencing sleep time with oxygen saturation below 90% in sleep-disordered breathing. Laryngoscope. 2015;125:1008–12.


☆ Please cite this article as: Camporro FA, Kevorkof GV, Alvarez D. Trastornos respiratorios del sueño: más allá del índice apneas e hipopneas. Arch Bronconeumol. Arch Bronconeumol. 2019;55:396–397.

Fernando Astur Camporro,[a,*] Gregorio V. Kevorkof,[a]
Daniel Alvarez[b]

[a] *Servicio de Neumología, Clínica Universitaria Reina Fabiola, Córdoba, Argentina*
[b] *Servicio de Neurología, Clínica Universitaria Reina Fabiola, Córdoba, Argentina*

* Corresponding author.
*E-mail address:* fercam02@hotmail.com (F.A. Camporro).

1579-2129/


## Pneumonia in Asthma Patients: Are We Giving It Enough Attention?☆

### *Neumonía en asmáticos: ¿le estamos prestando suficiente atención?*

*To the Editor,*

We recently conducted a systematic retrospective chart review of patients hospitalized with asthma or COPD during a 1-year period in the respiratory medicine department of our hospital (which attends a population of 276 429 inhabitants), gathering information about their associated comorbidities. The sample consisted of 300 patients, 210 (70%) admitted with a diagnosis of COPD (30%) and 90 with a diagnosis of asthma. Women predominated among the asthma patients (83% vs 15%; *P*: .0001), their body mass index was higher (30±6 vs 28±6; *P*: .003), they were younger (66±16 years vs 73±9; *P*: .0001), and there were fewer smokers (15% vs 32%; *P*: .002). We found that comorbidities were very common in both groups (4±2 comorbidities/patient), the most prevalent in both groups being similar: hypertension, obesity, dyslipidemia, and diabetes (Table 1). It is of particular interest to see that the reason for admission among a significantly greater percentage of asthmatics was pneumonia: 22% vs 9% in the COPD group (*P*>.002). Unfortunately, we do not have patient data on the use of corticosteroids or on their immunization status.

**Table 1**
Demographic Characteristics and Comorbidities of Asthma and COPD Patients.

| Variables | COPD*N*=210 | Asthma*N*=90 | *P*-value |
|---|---|---|---|
| Sex (% women) | 15 | 83 | .0001 |
| BMI | 28 (SD: 6) | 30 (SD: 6) | .003 |
| Active smokers (% patients) | 32 | 15 | .002 |
| Age (years) | 73 (SD: 9) | 66 (SD: 16) | .0001 |
| Length of stay (days) | 5.8 (SD: 3) | 5.3 (SD: 2.9) | .213 |
| Number of comorbidities | 4 (SD: 2) | 4 (SD: 2) | .218 |
| AHT (% patients) | 54 | 56 | .401 |
| Diabetes mellitus (% patients) | 30 | 24 | .179 |
| Depression (% patients) | 10 | 16 | .078 |
| Ischemic heart disease (% patients) | 23 | 7.7 | .001 |
| Arrhythmia (% patients) | 20 | 6.6 | .002 |
| Congestive heart failure (% patients) | 10 | 7.7 | .311 |
| Cerebrovascular disease (% patients) | 5.7 | 2.3 | .155 |
| Arthritis/osteoporosis (% patients) | 15 | 31 | .002 |
| Solid tumor (% patients) | 20 | 8.8 | .018 |
| Dementia (% patients) | 5.2 | 4.4 | .514 |
| Peripheral artery disease (% patients) | 14.7 | 3.3 | .002 |
| Cataracts (% patients) | 32.8 | 20 | .016 |
| Liver disease (% patients) | 9 | 4.4 | .237 |
| Kidney failure (% patients) | 12.8 | 6.6 | .082 |
| Dyslipidemia (% patients) | 39 | 40 | .519 |
| Vertebral fractures (% patients) | 5.2 | 2.2 | .197 |
| Gastroesophageal reflux disease (% patients) | 11.4 | 5.5 | .082 |
| Sleep apnea syndrome (% patients) | 23 | 12 | .018 |
| Bronchiectasis (% patients) | 12 | 7.7 | .141 |
| Pneumonia in current hospitalization (% patients) | 9 | 22 | .002 |
| Rhinosinusitis/polyposis (% patients) | 3.9 | 25 | .0001 |
| Dermatitis/eczema (% patients) | 3.3 | 15 | .0001 |

AHT: arterial hypertension; BMI, body mass index; COPD: chronic obstructive pulmonary disease; SD: standard deviation.

The literature often emphasizes the adverse effects of both systemic and inhaled steroids. Evidence is available on the risk of pneumonia in patients with COPD who continue treatment with inhaled corticosteroids, but fewer publications address the issue in asthma patients.[1] However, a recent study analyzing the adverse effects of systemic corticosteroids in a broad population of asthmatic adults in the United Kingdom[2] found that the most frequent adverse effects are, in fact, infections. Asthmatics must often take both inhaled and oral corticosteroids, and perhaps we need to keep in mind, much more than we do in practice, that this population is at high risk of developing pneumonia.[3] While pneumococcal vaccination is specifically recommended in patients with COPD (emphysema or chronic bronchitis),[3] the Spanish asthma management guidelines (GEM) call for studies to definitively establish their indication in asthma patients.[4] Some authors believe that these guidelines are outdated with respect to pneumococcal vaccination.[5]

This issue, in our opinion, should be taken into account when reviewing an asthma patient in the office, and we should consider taking preventive measures against pneumonia, especially in obese women with hypertension and dyslipidemia. These patients have an increased risk of not only pneumonia but also hospitalization for pneumonia, and pneumonia is currently a frequent cause of admission in asthmatics, more so even than in patients with COPD.

## References

1. Mckeever T, Harrison WT, Hubbard R, Shaw D. Inhaled corticosteroids and the risk of pneumonia in people with asthma: a case-control study. Chest. 2013;144:1788–94.
2. Bloechliger M, Reinau D, Spoendlin J, Chang SC, Kuhlbusch K, Heaney LG, et al. Adverse events profile of oral corticosteroids among asthma patients in the UK: cohort study with a nested case-control analysis. Respir Res. 2018;19:75.
3. González-Romo F, Picazo JJ, Garcia-Rojas A, Labrador Horrillo M, Barrios V, Magro MC, et al. Consenso sobre la vacunación anti-neumocócica en el adulto por riesgo de edad y patología de base. Actualización 2017. Rev Esp Quimioter. 2017;30:142–68.
4. Guía Española para el Manejo del Asma (GEMA 4.3) [monografía en Internet; consultado 6 Oct 2018]. Disponible en: http://www.gemasma.com.

☆ Please cite this article as: Cabanes L, Valentín V, Martinez Moragón E. Neumonía en asmáticos: ¿le estamos prestando suficiente atención?. Arch Bronconeumol. 2019;55:397–398.