Study title: Sleep quality in COPD patients. A clinical and polysomnographic study.

Project number: PR(AG) 365/2015

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Hypothesis

The CASIS questionnaire is an appropriate tool to measure the sleep quality abnormalities to be detected by polysomnography

Objetives

1. To know the validity of the CASIS questionnaire as a predictor of objective sleep alterations measured by polysomnography in patients with COPD.

2. To know the relationship between the evaluation of nocturnal symptoms by the CASIS and the Pittsburgh questionnaires in patients with COPD.

3. To know the relationship existing between the CASIS punctuation and several variables of COPD patients (phenotype, physical activity, lung function and exacerbations).

A.) Subjects

The study will be carried out in the Respiratory Service of the Vall d'Hebron University Hospital in Barcelona. Consecutive patients aged 40-80 years, smokers or exsmokers of at least 10 pack-years, diagnosed with moderate-to-severe COPD (post bronchodilator FEV1% < 70% and FEV1 ≥ 30 but < 80% of predicted in a spirometry performed within 6 months prior to inclusion into the study). The study protocol will be approved by the institutional review board and informed written consent will be obtained from all participants.

Exclusion criteria:

a.) Non-stable COPD. Stability is defined as being exacerbation free and without treatment changes for at least 4 weeks prior to baseline evaluation. The presence of a COPD exacerbation previous to the sleep studies (polysomnography, actigraphy, OSLER test) will lead to an early discontinuation of the patient´s participation in the study.

b.) Heart failure, asthma, cancer or other major medical illness with known effects on sleep quality.

c.) Unable to understanding the questionnaires administered in the study.

d.) Known Obstructive Sleep Apnea, other sleep disorder (narcolepsy, periodic limb movements) or shift work.

e.) Chronic respiratory failure (PaO_2 <60 mmHg).

f.) Treatment with sedatives or antidepressants.

B.) Measures

Patient´s characteristics and physical examination at baseline: it will include documentation related to age, sex, height, weight, alcohol consumption, tobacco use, current medications,

date of the last COPD exacerbation and forced spirometry. No interference with current medications and patient´s usual medical care will be undertaken during the study.

Symptoms and neurobehavioural examinations:

- Epworth sleepiness scale

- Sleep habits. Daily Sleep diary

- Pittsburgh Sleep Quality Index

- COPD and Asthma Sleep Impact Scale (CASIS)

- Night and early morning COPD symptoms scale (NiSCI, EMSCI)

- COPD Assessment Test (CAT)

- Hospital Anxiety and Depression Scale (HAD)

- mMRC dyspnea scale

- Charlson´s comorbidity index

- Specific evaluation of comorbidities that can influence sleep quality: prostatism, pain, etc.

C.) Polysomnography

Overnight sleep study will be conducted at the Multidisciplinary Sleep Unit using a computerized polysomnography device (Compumedics E Series, Australia). Polysomnography will include recordings of six electroencephalographic channels, bilateral electro-oculograms, chin and tibial electromyogram, electrocardiogram, airflow by nasal pressure transducer and oronasal thermocouples, as well as oxygen saturation by finger pulse oximeter. An expert scorer blinded to the study will review all sleep studies manually. According to standard definitions (American Sleep Disorders Association criteria) the following variables will be obtained:

1.) Total sleep time

2.) Sleep efficiency

3.) Sleep architecture

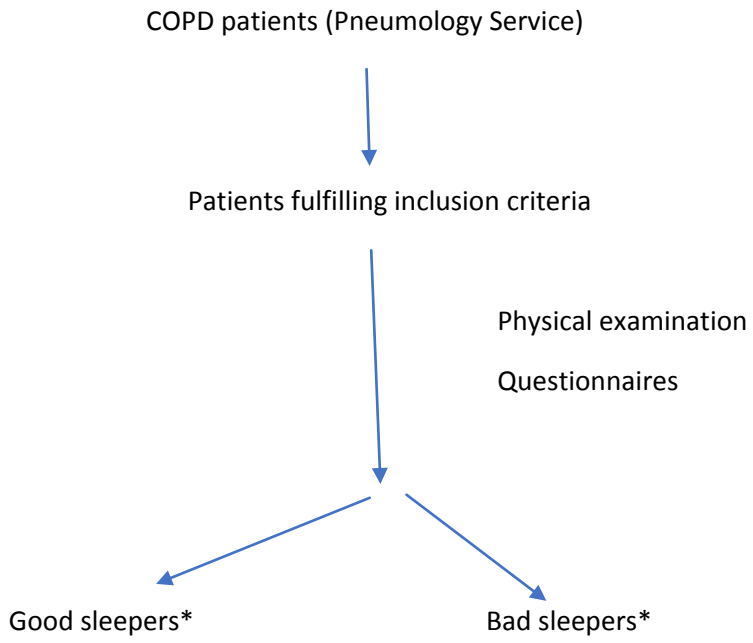
4.) Arousal Index

5.) Respiratory variables. Apnoea-hypopnoea index. Four oxygen saturation measures will be assessed: the cumulative percentage of time spent with oxygen saturations below 90% (CT90), and the basal, lowest and mean nocturnal SaO2. In addition, the oxygen desaturation index (ODI) per hour will be calculated by dividing the total number of oxygen desaturation events by the total hours of sleep. Four different oxygen desaturation thresholds (reductions in SaO2 equal or greater than 2%, 3%, 4%, and 5%) as indicators of hypoxemia severity (ODI-2%, ODI-3%, ODI-4%, and ODI-5%) will be determined.

D.) Study design

1. This will be an observational study with the objective of knowing the validity of the CASIS questionnaire as a predictor of objective sleep alterations measured by polysomnography in patients with COPD.

Flow chart of study assessments:



* Good and bad sleepers will be defined according to CASIS scores according to previous data in our population

**Plus actigraphy the week before and the Oxford sleep resistance test (OSLER) the morning after the sleep study.

Confidentiality: Confidentiality will be of the utmost importance throughout the study. Computerized files will have a numerical code for each patient. Only the study investigators will have access to this information by using a password. Eventually and whithout any violation of confidentiality, the Vall d´Hebron Hospital Ethics Committee of Clinical Investigation and Regulatory Authorities could have access to patient´s data in order to supervise the study procedures

Visits: 1- Recruitment and spirometry (1 week before poysomnography)

2- Actigraphy

3-Polysomnography and OSLER test

Number of patients needed

The main variable of the study is sleep efficiency. We consider a 15% difference between good and bad sleepers as clinically relevant. According to previous published data on sleep efficiency in COPD patients, a sample size of 29 patients in each group (total 58 patients) is estimated to provide at least 90% power to detect the chosen difference.

Based on this sample size calculation, the following procedures will be performed:

1- Polysomnography: 58

2- Actigraphy: 58

3- Osler´s test: 58

4- Spirometry: 200 (estimated) (to evaluate potential study candidates in the first visit)