Influence of Pseudomonas aeruginosa on the prognosis of Chronic Obstructive Pulmonary Disease (COPD)

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A retrospective cohort study of patients with COPD in the period between 2008-2018.

Background:

Chronic obstructive pulmonary disease (COPD) is a major cause of morbidity and mortality throughout the world and represents an important public health challenge (1,2). The course of COPD is complicated by recurrent acute exacerbations (AECOPD), which impair health status, accelerate the decline of lung function and worsen the prognosis (3).

Pseudomonas aeruginosa (P. aeruginosa) is detected in the airways in up to 20% of the patients with acute exacerbation of COPD (5-11). The bacterium is more likely to be isolated from patients with more advanced disease and is associated with prolonged hospitalization, increased exacerbation rate and poor long-term prognosis compared to other microorganisms (12,13).

It is, however, difficult to draw definitive conclusions regarding the extent to which P. aeruginosa contributes to adverse clinical outcomes since severely reduced lung function is by itself a strong predictor of mortality in patients with COPD (14,15). Infection with P. aeruginosa might therefore be secondary to damaged lung tissue and decreased lung function, and thereby have no independent impact on the prognosis.

So far, no larger retrospective cohort study has been investigating the association between P. aeruginosa and prognosis in an unselected population of patients with COPD.

Aim of the study:

To investigate if P. aeruginosa is an independent predictor of disease progression, exacerbation and mortality in COPD in a nationwide and unselected database study.

Material and methods:

Retrospective cohort-study of patients enrolled in the Danish COPD database (Dansk Register for KOL; Dr-KOL) during January 2008 – January 2018.

Inclusion criteria:

- Verified COPD
- Age ≥ 40 years

Exposure: Culture verified P. aeruginosa from lower respiratory tract specimens.

Data is collected from following databases:

Danish COPD database (Dr-KOL), Danish Microbiology Database (MiBa), The Danish National Health Data Authority (Sundhedsdatastyrelsen) and the Danish National Prescription Registry (Den Danske Receptdatabase).

Primary end-point**:**

- Time to exacerbation and/or death within 5 years from the P. aeruginosa-positive airway-culture.

Secondary main end-points**:**

- Frequency of exacerbation and/or death (all-cause) within 5 years.
- Frequency of hospital admission within 5 years.
- Frequency of hospital admission with non-invasive ventilation (NIV) or respiratory therapy during hospitalization within 5 years.
- Change in FEV1 (liter), CAT and BMI from baseline to 5 years.

Statistical analysis:

Cox proportional hazards regression will be used to analyse primary composite end-point in patients exposed to P. aeruginosa.

Funding and approval:

The study is fully financed and approved by Danish Data Agency Protection (HGH-2017-036) and the Danish Research Ethics Committee (H-15010949).

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