Bacterial colonization is associated with abnormal bronchial structure in severe COPD patients

POSTER PRESENTATION

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RATIONALE

Airway colonization by potentially pathogenic microorganism (PPM) in patients with severe Chronic Obstructive Pulmonary Disease (COPD) is associated with worse outcomes.

OBJECTIVE

To assess bronchial structural alterations in severe COPD patients with and without airway bacterial colonization.

MATERIAL AND METHODS

Clinically stable severe COPD patients were examined prospectively. All patients underwent bronchoscopy with protected specimen brush (PSB) and bronchial biopsies. Bacterial airway colonization was defined by the presence of ≥10^3 UFC/ml PPM in PSB cultures. Bronchial anatomical structure was investigated by transmission electron microscopy (TEM) and scanning electron microscopy (SEM) for gross anatomy hierarchy. Immunohistochemistry was used to characterize macrophages phenotype (M1 vs M2) and extracellular matrix (ECM) proteins.

RESULTS

We enrolled 17 COPD patients, 82% male, with a mean age (SD) of 67 (±8) years, and a mean FEV1 of 39% (±10) of predicted. In 7/17 patients (41%), PSB samples were positive for PPM (Haemophilus influenzae [n=5], Streptococcus pneumoniae [n=1] and Pseudomonas aeruginosa [n=1]). There were no differences in age, gender, lung function and/or prior COPD treatment between colonized vs. non-colonized patients. Yet, those with evidence of airway bacterial colonization showed: (1) damaged epithelial layer detected by both TEM and SEM; (2) absence of M2 macrophages; and, (3) a different expression profile of ECM proteins (decreased levels of elastin, laminin collagen II and fibronectin).

CONCLUSIONS

his preliminary data revealed that bacterial airway colonization in severe COPD is associated with damaged bronchial epithelial and altered ECM protein expression. What comes first require further interventional research.