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Association of mucus burden with baseline fractional exhaled nitric oxide, gender, and age at asthma onset in patients with uncontrolled moderate-to-severe asthma treated with dupilumab in the VESTIGE study

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Background: Mucus plugging contributes to airflow obstruction in asthma and is driven by type 2 inflammation mediated by IL-4 and IL-13. Dupilumab, a monoclonal antibody targeting the IL-4/IL-13 receptor, reduces mucus burden.

Aim: This post hoc analysis of VESTIGE (NCT04400318) evaluated changes in mucus score in patients stratified by baseline fractional exhaled nitric oxide (FeNO), gender, and age at asthma onset.

Methods: VESTIGE was a 24-week, randomized, double-blind, placebo-controlled, phase 4 trial conducted in 109 adults aged 21–70 years with uncontrolled moderate-to-severe asthma and elevated type 2 biomarkers (blood eosinophil count ≥ 300 cells/ μ L; FeNO ≥ 25 ppb). Patients received dupilumab 300 mg (n=72) or placebo (n=37) subcutaneously q2w. Mucus plug score (range 0–18) was assessed via multidetector CT. Outcomes were analyzed by baseline FeNO (<50 ppb [n=52] or ≥ 50 ppb [n=42]), gender (male [n=37] or female [n=57]), and age at asthma onset (<50 years [n=76] or ≥ 50 years [n=18]).

Results: At Week 24, dupilumab vs placebo significantly reduced mucus score regardless of baseline FeNO level (<50 ppb: LS mean difference [95% CI] -5.09 [-7.10 , -3.09]; $P < 0.0001$, and ≥ 50 ppb: -3.22 [-6.21 , -0.24]; $P < 0.05$). Consistent with these findings, mucus score was significantly reduced in both male and female patients (-3.63 [-6.22 , -1.03]; $P < 0.01$, and -5.67 [-7.82 , -3.51]; $P < 0.0001$, respectively). Similar results were observed for patients with asthma onset at age <50 years (-4.64 [-6.38 , -2.90]; $P < 0.0001$) and ≥ 50 years (-4.89 [-9.41 , -0.36]; $P < 0.05$).

Conclusions: Dupilumab reduced mucus burden regardless of baseline FeNO level, gender, or age at asthma onset, supporting its benefit in patients with uncontrolled type 2 asthma.