Trajectory and mortality of preserved ratio impaired spirometry: the Rotterdam Study

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ABSTRACT Preserved ratio impaired spirometry (PRISm) is a heterogeneous condition but its course and disease progression remain to be elucidated. We aimed to examine its prevalence, trajectories and prognosis in the general population.

In the Rotterdam Study (population-based prospective cohort) we examined prevalence, trajectories and prognosis of subjects with normal spirometry (controls; forced expiratory volume in 1 s (FEV_1)/forced vital capacity (FVC) ⩾0.7, FEV_1 ⩾80%), PRISm (FEV_1/FVC ⩾0.7, FEV_1 <80%) and chronic obstructive pulmonary disease (COPD) (FEV_1/FVC <0.7) at two study visits. Hazard ratios with 95% confidence intervals for mortality (until December 30, 2018) were adjusted for age, sex, body mass index, current smoking and pack-years.

Of 5487 subjects (age 69.1±8.9 years; 7.1% PRISm), 1603 were re-examined after 4.5 years. Of the re-examined PRISm subjects, 15.7% transitioned to normal spirometry and 49.4% to COPD. Median lung function decline was highest in subjects with incident PRISm (FEV_1 −92.8 mL·year^{-1}, interquartile range (IQR) −131.9– −65.8 mL·year^{-1}; FVC −93.3 mL·year^{-1}, IQR −159.8– −49.1 mL·year^{-1}), but similar in persistent PRISm (FEV_1 −30.2 mL·year^{-1}, IQR −67.9– −7.5 mL·year^{-1}; FVC −20.1 mL·year^{-1}, IQR −47.7–21.7 mL·year^{-1}) and persistent controls (FEV_1 −39.6 mL·year^{-1}, IQR −64.3–−12.7 mL·year^{-1}; FVC −20.0 mL·year^{-1}, IQR −55.4–18.8 mL·year^{-1}). Of 5459 subjects with informed consent for follow-up, 692 (12.7%) died during 9.3 years (maximum) follow-up: 10.3% of controls, 18.7% of PRISm subjects and 20.8% of COPD subjects. Relative to controls, subjects with PRISm and COPD Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2–4 had increased all-cause mortality (PRISm: HR 1.6, 95% CI 1.2–2.0; COPD GOLD 2–4: HR 1.7, 95% CI 1.4–2.1) and cardiovascular mortality (PRISm: HR 2.8, 95% CI 1.5–5.1; COPD 2–4: HR 2.1, 95% CI 1.2–3.6). Mortality within <1 year was highest in PRISm, with patients often having cardiovascular comorbidities (heart failure or coronary heart disease; 70.0%).

PRISm is associated with increased mortality and this population encompasses at least three distinct subsets: one that develops COPD during follow-up, a second with high cardiovascular burden and early mortality, and a third with persistent PRISm and normal age-related lung function decline.