INPLASY

Revisit the role of FEV1/FEV6 in the detection of airway obstruction and chronic obstructive pulmonary disease: Evidence from a systematic review and meta-analysis

Corresponding author:
Dongru Du

dudongru@stu.scu.edu.cn

Author Affiliation:
West China school of medicine, Sichuan University.

Du, DR; Shen, YC; Luo, FM.

ADMINISTRATIVE INFORMATION

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202470029

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 09 July 2024 and was last updated on 09 July 2024.

INTRODUCTION

Review question / Objective Airflow obstructions may serve as an essential characteristic for multiple respiratory diseases, including chronic obstructive pulmonary disease (COPD). Spirometry examination is regarded as the gold criteria for airflow obstruction identification. However, application of spirometry also encountered certain challenges, including inadequate availability of spirometry equipment, shortness of well-trained physicians and low tolerability of elderly patients with respiratory diseases. Previous evidence suggested that FEV1/FEV6 as a simpler and more accessible approach to detect airflow obstruction. However, the diagnostic accuracy of this approach has been reported in many studies with compelling results.

Condition being studied Whether FEV6/FEV1 may serve as an alternative to FEV1/FVC in detecting airway obstruction and COPD.

METHODS

Search strategy (((Forced expiratory volume in 6s) OR (FEV6)) OR (FEV1/FEV6)) OR (Forced expiratory volume in six second) AND (((((((((((((Pulmonary Disease, Chronic Obstructive) OR (Chronic Obstructive Lung Disease)) OR (Chronic Obstructive Pulmonary Diseases)) OR (COAD)) OR (COPD)) OR (Chronic Obstructive Airway Disease)) OR (Chronic Obstructive Pulmonary Disease)) OR (Airflow Obstruction, Chronic)) OR (Airflow Obstructions, Chronic)) OR (Chronic Airflow Obstructions)) OR (Chronic Airflow Obstruction))))) OR (airway obstruction)).

Participant or population Participants with or without airflow obstruction diagnosed by conventional FEV1/FVC and FEV1/FEV6.

Intervention FEV1/FEV6 detection.

Comparator Conventional spirometry (FEV1/FVC).

Study designs to be included Retrospective, cross-sectional and prospective diagnostic tests investigating the diagnostic efficacy of FEV1/FEV6 compared to FEV1/FVC.

Eligibility criteria
Inclusion criteria:
(a) Diagnostic tests reporting the true positive (TP), true negative (TN), false positive (FP) and false negative (FN) of FEV1/FEV6 in detecting airflow obstruction compared to conventional spirometry.
(b) Studies with a sample size of over 100
(c) Studies using conventional spirometry as the gold diagnostic criteria for airflow obstruction.

Exclusion criteria:
(a) Duplicated data from the same database or institution
(b) Studies not published in English
(c) Case reports, systematic reviews, etc.

Information sources Two investigators will search PubMed, Embase and Web of science independently from inception of the database to May 2024. Eligible references from related publications will be also screened and extracted.

Main outcome(s) TP, TN, FP and FN of FEV1/FEV6 compared to conventional spirometry.

Quality assessment / Risk of bias analysis Quality assessment of eligible publications will be carried on via Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2). Results of bias analysis will be analyzed by Revman 5.3.

Strategy of data synthesis Baseline information of each article, including authors, publication year, geographical location, number and characteristics of participants (sex, age, smoking history), diagnostic criteria of airflow obstruction, value of TP, FP, TN and FN.
After extraction of data, we will conduct a pool analysis regarding sensitivity and specificity of FEV1/FEV6, which may reveal its overall diagnostic efficacy. I square static will be applied for heterogeneity assessment. According to the heterogeneity of the results, we will choose fix-effect (I250) to present our results. If heterogeneity is significant, we will investigate the source of heterogeneity via sensitive analysis, subgroup analysis and meta-regression.

Subgroup analysis We will conduct subgroup analysis for different cut-off value of FEV1/FEV6 to identify the best cut-off value to detect airflow obstruction.

Sensitivity analysis Sensitivity analysis will be applied via "leave one out" process to explore every single article's effect on overall results.

Country(ies) involved China.

Keywords Airflow obstruction, FEV1/FEV6, FEV1/FVC, chronic obstructive pulmonary disease.

Contributions of each author
Author 1 - Dongru Du.
Email: dudongru@stu.scu.edu.cn
Author 2 - Yongchun Shen.
Email: shen_yongchun@126.com
Author 3 - Fengming Luo.
Email: fengmingluo@outlook.com