



# Office-based spirometry to stratify the risk of postoperative complications

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Nowadays, lung cancer is the most common cause of cancer death in the world, and lung resection is recognized as the standard treatment for early-stage lung cancer (1). Since postoperative pulmonary complications are major driver of perioperative mortality, postoperative length of stay and rehospitalization (2-4), stratifying poor risk patients for pulmonary complications is critical issue (5-7).

With regard to the assessment of risk of postoperative complications following lung resection, spirometry and electrocardiography has been recommended by the American College of Chest Physicians, the British Thoracic Society and the European Society of Thoracic Surgeons (8-10). On spirometry, forced expiratory volume in one second (FEV1) and diffusing capacity of the lung for carbon monoxide (DLCO) are commonly measured to calculate predicted postoperative pulmonary function as well as to stratify risk for postoperative pulmonary complication.

Conventional laboratory spirometry (LS) is a standard tool to evaluate preoperative lung function in the world (8,11,12). In previous literature, office-based spirometry (OS) is documented as a useful tool for screening of chronic obstructive pulmonary disease (COPD) (13-15). While OS can provide only FEV1 and forced vital capacity (FVC), OS has advantage of saving time and possibly expense in the preoperative evaluation of lung function in patients undergoing lung resection comparing to LS (8,16). Furthermore, Puri *et al.* showed that OS-FEV1 was clinically comparable to formal LS values, and the sensitivity of OS for detecting the risk of complications was 100% and

specificity was 93% in low risk patients undergoing lung resection (17). In this context, Hudson *et al.* hypothesized that OS can be used for evaluating operability for lung resection instead of LS in low risk patients. Thus, they investigated the safety of preoperative risk stratification for lung resection in this population (18).

The authors prospectively enrolled 66 patients undergoing lung resection who were considered as low-risk for cardiopulmonary complications in terms of performance status, exercise tolerance function, surgical procedure and comorbidities in their study (18). Finally, 52 propensity score-matched pairs who received preoperative LS or OS were compared and they showed that patients received preoperative OS had experienced similar major morbidity to those who received preoperative LS. They concluded that we can adequately and safely evaluate risk of postoperative pulmonary complications using preoperative OS without formal LS, with significant cost savings (\$38,000 per year). Clinical usefulness of OS to assess FEV1 before lung resection has already been reported in a small cohort (17), however, this paper by Hudson *et al.* which mainly focused on major postoperative complications is more practical (18).

Many clinicians may be interested in whether OS can be used in moderate or higher risk patients as preoperative assessment instead of formal LS; however, this is still unknown because the authors enrolled only low risk patients anticipated few postoperative mortality and few complications in this study. For the low risk patients who passed their strict inclusion and exclusion criteria in their

study, even OS may not be required and blood gas analysis may be sufficient.

Moreover, as for the surgical procedure, patients underwent sublobar resection; wedge resection or segmentectomy were included in this study. Almost two third patients had undergone sublobar resection even after propensity score matching. Sublobar resection is often selected as a limited resection for high risk patients who cannot tolerate lobectomy to avoid risk for postoperative complications in our daily practice. It may cause very few complications, so that there was not any difference in postoperative events between OS-group and LS-group. On the other hand, pneumonectomy which may often cause some complications was excluded in this study. It might have been more useful for us if sublobar resection had been omitted as well.

As mentioned above, their paper has some parts of consideration, but what is clinically significant in this study is that they suggested that preoperative LS which has been routinely used in the most cases in our daily practice may be unnecessary at least in the highly selected low risk patients and using preoperative OS may result in reducing the medical expense. Some preoperative evaluations are often time- and cost-consuming and may not be mandatory in some setting. To omit the unnecessary examinations has benefit for both patients and physicians.

In summary, their finding could provide rationale for future prospective studies to compare predictive ability of postoperative pulmonary complications between OS and LS. Furthermore, OS needs to be assessed in patients with moderate or higher risk in large-scale cohort, possibly in prospective study. Widely use of preoperative OS may contribute to medical economy in near future.

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## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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