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The Role of Pulmonary Function Tests in Preoperative Pulmonary Risk Assessment in Patients with Known and Suspected Pulmonary Disease

Bilinen ve Şüpheli Akciğer Hastalığı Olan Hastalarda Preoperatif Pulmoner Risk Değerlendirmesinde Solunum Fonksiyon Testlerinin Rolü

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ABSTRACT

Background: This study aims to evaluate the diagnostic accuracy of preoperative oxygen saturation (SpO_2) measurements and advanced pulmonary function tests (PFTs) in predicting postoperative pulmonary complications (PPCs) in patients with known or newly diagnosed pulmonary disease who are undergoing elective surgery. The objective is to determine the predictive value of these tests for PPC risk assessment, thereby improving surgical risk stratification and facilitating the development of targeted preventive strategies for high-risk patients.

Materials and Methods: This study analyzed data from patients with known pulmonary disease (n = 92) and newly diagnosed pulmonary disease (n = 108) who underwent elective surgery at University of Health Sciences Türkiye, Şişli Hamidiye Etfal Training and Research Hospital between 2022 and 2023. Patients were assessed preoperatively using the CANET scoring system to evaluate the risk of PPCs. Preoperative SpO_2 and PFT measurements, including Forced Expiratory Volume in One Second (FEV_1) and Forced Vital Capacity (FVC), were compared between groups by logistic regression analysis to predict PPCs ($p < 0.05$).

Results: Logistic regression analysis demonstrated that low SpO_2 values (odds ratio [OR] = 0.66, 95% confidence interval [CI] [0.50–0.88], p = 0.004) were significant risk factors for the development of PPCs in Group 1 (known pulmonary disease), while low FEV_1 values (OR = 0.98, 95% CI [0.96–1.00], p = 0.030) were significant risk factors in Group 2 (newly diagnosed pulmonary disease).

Conclusion: This study highlights the importance of evaluating preoperative SpO_2 and PFTs jointly in risk assessment using the CANET scoring system, especially in patients with pulmonary disease. Particularly in patients with newly diagnosed pulmonary disease, consideration of PFT results is critical for predicting and preventing PPCs. Integrating PFTs into surgical risk assessment protocols can improve patient outcomes.

Keywords: Spirometry, complications, postoperative, pulmonary, risk factors

ÖZ

Amaç: Bu çalışmanın amacı, elektif cerrahi geçirecek olan bilinen veya yeni tanı konmuş akciğer hastalığı olan hastalarda postoperatif pulmoner komplikasyonları (PPK) tahmin etmedeki preoperatif oksijen satürasyonu (SpO_2) ölçümlerinin ve solunum fonksiyon testlerinin (SFT) tanısal doğruluğunu değerlendirmektir. Böylece, bu testlerin PPK risk değerlendirmesi için öngörü değerini belirlemek, böylece cerrahi risk sınıflandırmasını iyileştirmek ve yüksek riskli hastalar için hedeflenen önleyici stratejilerin geliştirilmesini kolaylaştırmaktır.

Gereç ve Yöntemler: Bu çalışmada, 2022–2023 yılları arasında Sağlık Bilimleri Üniversitesi, Şişli Hamidiye Etfal Eğitim ve Araştırma Hastanesi'nde elektif cerrahi geçirecek olan bilinen (n = 92) ve yeni tanı almış (n = 108) akciğer hastalığı olan hastaların verileri analiz edildi. Hastalar, PPK riskini değerlendirmek için preoperatif CANET skorlama sistemi kullanılarak değerlendirildi. PPK' leri tahmin etmek için zorlu ekspiratuar volüm (FEV_1) ve zorlu vital kapasite (FVC) dahil olmak üzere ameliyat öncesi SpO_2 ve PFT ölçümleri lojistik regresyon analizi kullanılarak gruplar arasında karşılaştırıldı ($p < 0,05$).

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öz

Bulgular: Yapılan lojistik regresyon analizi, düşük SpO_2 değerlerinin (olasılık oranı [OR] = 0,66, %95 güven aralığı [GA] [0,50–0,88], p = 0,004) Grup 1'de (bilinen akciğer hastalığı) PPK gelişimi için önemli bir risk faktörü olduğunu, düşük FEV_1 değerlerinin (OR = 0,98 (0,96–1,00), %95 CI, p = 0,030) Grup 2'de (yeni teşhis konulmuş akciğer hastalığı) önemli bir risk faktörü olduğunu gösterdi.

Sonuç: Bu çalışma, özellikle akciğer hastalığı olan hastalarda CANET puanlama sistemini kullanarak preoperatif risk değerlendirmesinde preoperatif SpO_2 ve SFT sonuçları ile birlikte değerlendirmenin önemini vurgulamaktadır. Özellikle yeni teşhis konmuş akciğer hastalığı olan hastalarda, SFT sonuçlarını dikkate almak PPK'leri tahmin etmede ve önlemede kritik bir rol oynar. SFT' leri cerrahi risk değerlendirme protokollerine entegre etmek hasta sonuçlarını iyileştirebilir.

Anahtar Kelimeler: Spirometri, komplikasyonlar, postoperatif, pulmoner, risk faktörleri

Introduction

Pulmonary diseases, such as chronic obstructive pulmonary disease (COPD), asthma, bronchiectasis, lung cancer, and pleural effusion, pose significant risks during surgical procedures. The frequent underdiagnosis of these conditions increases the risk of postoperative complications. Given that a substantial proportion of COPD patients (78%) remain undiagnosed, the development of advanced screening methods is crucial. Accurate preoperative diagnosis of pulmonary diseases is vital but challenging, even with guidelines such as GOLD. There is a need for more effective strategies to identify and manage these conditions before surgery to reduce surgical risks and postoperative pulmonary complications (PPCs) (1).

Reducing surgical risks involves thorough preoperative assessment, focusing on modifiable risk factors. Anesthetic evaluation is crucial for managing anesthesia-related complications. Consultation with a pulmonologist for pulmonary disorders is vital. This combined approach of risk assessment, anesthesia evaluation, and pulmonologist input significantly improves patient safety and reduces morbidity and mortality during surgery (2).

Evaluating pulmonary function is crucial for predicting potential complications and mortality in surgical patients. A decline in lung function during the perioperative period significantly elevates these risks. Although pulmonary function tests (PFTs), such as spirometry, are commonly employed for preoperative risk assessment, the scientific community debates their efficacy in predicting PPCs. PPCs frequently arise from substantial lung function impairment due to surgery-related factors. Therefore, identifying these factors is essential for accurate risk stratification and PPC prevention. Further investigation is needed to elucidate the predictive role of PFTs for PPCs(3).

PPCs pose a significant threat to surgical patients, often leading to conditions such as pneumonia, atelectasis, respiratory failure, infections, COPD exacerbations, pulmonary thromboembolism, and the need for mechanical ventilation. Identifying potential risk factors for PPCs is crucial for implementing preventive measures and improving patient outcomes. Previous research has explored these risk factors in specific surgical populations, including those undergoing upper-abdominal surgery, esophagectomy, total knee arthroplasty, and coronary artery bypass surgery. By recognizing and addressing these risk factors preoperatively, clinicians can substantially decrease the incidence of PPCs and enhance patient outcomes (4,5).

The CANET scoring system is a valuable tool for assessing the risk of PPCs such as pneumonia, atelectasis, and acute respiratory failure. It assigns points based on parameters such as age, preoperative oxygen saturation (SpO_2), history of respiratory infection, anemia, the type and duration of surgery. A higher score indicates a higher risk of PPCs. This study aims to evaluate the reliability and utility of the CANET scoring system (which includes SpO_2 measurements) and of preoperative PFT results for predicting PPCs in patients undergoing surgical consultation. Furthermore, it emphasizes the importance of preoperative pulmonary assessment in surgical patients newly diagnosed with respiratory diseases. The study utilized the CANET scoring system to determine preoperative pulmonary risk in patients with newly or previously diagnosed respiratory diseases (6).

Materials and Methods

Study Population

This study included 200 patients, aged 18 years or older, who requested preoperative pulmonary evaluation at the Department of Chest Diseases Clinics of University of Health Sciences Türkiye, Şişli Hamidiye Etfal Training and Research Hospital Hospital between January 1, 2022, and January 1, 2023, prior to undergoing elective surgery. The study population consisted of patients who underwent preoperative pulmonary assessment. Exclusion criteria included patients under 18 years of age, patients with psychiatric illness, and other patients deemed unsuitable for evaluation.

Data Collection

All necessary data were collected retrospectively from the hospital's electronic database. The primary data

collected included patients' demographic characteristics, comorbidities, preoperative SpO_2 values, PFT results, and CANET scores calculated to assess surgical risk. The PPC, defined as the primary endpoint, included the following clinically significant conditions occurring within one month after elective surgery: asthma exacerbation, COPD exacerbation, pneumonia, atelectasis, and respiratory failure. Furthermore, the patients' need for intensive care unit (ICU) admission was recorded as a secondary outcome variable. All patients were scored using the CANET scoring system to assess the risk of postoperative PPC. During data collection, consideration was given to preoperative SpO_2 values measured using a standard pulse oximeter while the patient was resting in room air, and to the results of the PFT performed using a standardized spirometry device in accordance with the American Thoracic Society/European Respiratory Society (ATS/ERS) guidelines. Primarily, the percent predicted values (% predicted) of Forced Expiratory Volume in One Second (FEV_1), Forced Vital Capacity (FVC), and FEV_1/FVC were recorded during PFTs.

Study Design and Grouping

This observational study uses a retrospective design to investigate the effectiveness of preoperative assessments in predicting PPCs. Patients were categorized into two main groups based on their pulmonary disease status: Group 1 (Known Pulmonary Disease), which consisted of patients with a pre-existing diagnosis of a chronic pulmonary condition such as COPD, asthma, bronchiectasis, or restrictive disorders; and Group 2 (Newly Diagnosed Pulmonary Disease), which included patients in whom a pulmonary disease was diagnosed or first suspected during the preoperative evaluation, based on chest X-ray and spirometry results.

Data Analysis

Data from patient files recorded in the hospital system were used to assess the development of PPC, and a standardized follow-up protocol was applied to all patients. All patients were scored using the CANET Scoring System to assess the risk of postoperative PPCs. During data collection, preoperative SpO_2 values (measured using a standard pulse oximeter while the patient rested in room air) and the results of PFTs (performed using a standardized spirometry device in accordance with ATS/ERS guidelines) were taken into consideration. Logistic regression analyses were performed to compare the effectiveness of SpO_2 and PFTs in predicting PPCs. Receiver operating characteristic (ROC) curves were used to evaluate the ability of SpO_2 and FEV_1 to predict PPCs, and cutoff values were determined to optimize sensitivity and specificity for clinical use. To ensure a clear and clinically meaningful assessment of the degree of pulmonary impairment, FEV_1 values (expressed as a percentage of predicted) were classified into three distinct categories. These categories are defined as Normal (≥80%), Mild Impairment (60–79%), and Moderate/Severe Impairment (<60%). During data analysis, the predictive ability of SpO_2, FVC, and FEV_1 for PPC was assessed using ROC curves. Subsequently, backward (Wald) multivariable logistic regression analysis was performed, including variables with a p-value <0.20 and clinical covariates (age, sex, and smoking history), to identify independent risk factors.

Statistical Analysis

Analyses were performed using SPSS Statistics for macOS, version 30.0 (IBM Corp., Armonk, NY, USA). Patient characteristics were presented as n (%) for categorical variables and mean ± standard deviation for continuous variables, and were compared among diagnostic groups using the chi-square test or independent-samples t-test, as appropriate. ROC curves were plotted to evaluate the discriminative ability of preoperative SpO_2, FVC, and FEV_1 to predict PPC for all patients and within each diagnostic group. Logistic regression analyses were then performed to determine the factors independently associated with PPC. Initially, each variable was evaluated using univariate logistic regression analysis. Variables with a p-value <0.20 in univariate analysis, as well as clinically relevant covariates (age, sex, and smoking history), were included in the multivariate model. Multivariate logistic regression was performed using the backward (Wald) method. The results were presented as odds ratios (OR) with 95% confidence intervals (CI). The threshold for statistical significance was set at $p < 0.05$.

Results

The mean ages were 62 ± 15 years (Group 1, n = 92) and 60 ± 15 years (Group 2, n = 108). No significant differences were found with respect to age, gender, age groups, or smoking status ($p > 0.05$). SpO_2 levels differed significantly between Group 1 (96.5 ± 1.8%) and Group 2 (97 ± 1.5%) ($p = 0.038$). Although Group 2 had slightly more PPCs, no significant differences were observed in ICU follow-up ($p = 0.682$) or in PPC development ($p > 0.05$) (Table 1). PFT results showed a significant difference in FVC, but not in the FEV_1/FVC ratio ($p > 0.05$). FEV_1 values differed significantly ($p < 0.05$). CANET scores showed no significant intergroup differences ($p = 0.401$; Table 2).

ROC analysis showed that SpO_2, FVC, and FEV_1 had low discriminative power for PPCs (area under the curve [AUC] 0.60–0.70). Overall AUCs were as follows: SpO_2, 60% (cut-off 96%); FVC, 60.2% (cut-off 82%); and FEV_1, 62.7% (cut-off 79%).

Group-specific analysis revealed a significant prediction of SpO_2 in Group 1 and a significant prediction of FEV_1 in Group 2. SpO_2, FVC, and FEV_1 significantly affected the development of PPCs across all patients ($p < 0.05$); higher values predicted lower PPC incidence. Group-specific analysis showed SpO_2 significance in Group 1 and FEV_1 significance in Group 2 ($p < 0.05$) Logistic regression analysis demonstrated that low SpO_2 values (OR = 0.66, 95% CI [0.50–0.88], p = 0.004) were significant risk factors for the development of PPCs in Group 1 (known pulmonary disease), whereas low FEV_1 values (OR = 0.98, 95% CI [0.96–1.00], p = 0.030) were significant risk factors in Group 2 (Table 3).

The distribution of risk factors for the development of PPCs in patients is presented in Table 4. When all patients were evaluated together, univariate analysis showed that female sex was associated with a significantly lower risk of PPC compared with males. Smoking status was identified as a strong risk factor: the risk of complications increased 4.5-fold among current smokers and approximately 3.7-fold among former smokers. Furthermore, low SpO_2, FVC, and FEV_1 were significantly associated with the development of complications.

Discussion

This study compared two patient groups. Group 1 included patients with a prior diagnosis of lung disease (e.g., asthma, COPD, bronchiectasis), whereas Group 2 included patients whose lung disease was newly diagnosed during preoperative pulmonary risk assessment. The study aimed to determine the risk of PPCs in both groups using spirometric measurements (PFTs: FEV_1, FVC, FEV_1/FVC) and the Canet scoring system criteria (SpO_2) as part of preoperative pulmonary risk assessment. Although the difference was not statistically significant, the proportion of PPC cases in the newly diagnosed pulmonary disease group (47.2%) was slightly higher than that in the previously diagnosed group (33.7%). This numerical difference may be clinically significant. These patients had neither been previously diagnosed with respiratory diseases nor received any follow-up or treatment for them. Preoperative emergency interventions, such as bronchodilator therapy and respiratory physiotherapy, were initiated to stabilize the patients. As previously reported, this study confirms the

Table 1. Baseline characteristics and clinical findings of patients stratified by study groups.

Characteristics	Group-I (n = 92)	Group-II (n = 108)	p-value
	n (%) or mean ± SD	n (%) or mean ± SD	
Age (year)	62 ± 15	60 ± 15	0.466
<50	17 (18.5)	28 (25.9)	0.449
51–80	68 (73.9)	72 (66.7)	
>80	7 (7.6)	8 (7.4)	
Sex			0.646
Male	43 (46.7)	54 (50)	
Female	49 (53.3)	54 (50)	
Smoking history			0.085
Smoker	19 (20.7)	30 (27.8)	
Non-smoker	30 (32.6)	44 (40.7)	
Ex-smoker	43 (46.7)	34 (31.5)	
Comorbidity disease	90 (97.8)	99 (91.7)	0.111
Cancer	20 (22.2)	19 (19.2)	
Hypertension	11 (12.2)	13 (13.1)	
Heart diseases	4 (4.4)	10 (10.1)	
Gastrointestinal system diseases	32 (35.6)	27 (27.3)	
Diabetes mellitus	2 (2.2)	2 (2)	
Other	21 (23.3)	28 (28.3)	
PPC	31 (33.7)	51 (47.2)	0.053
ICU follow-up	12 (13)	11 (10.2)	0.682
Preoperative oxygen saturation SPO_2 (%)	96.5 ± 1.8	97 ± 1.5	0.038

ICU, intensive care unit; PPC, postoperative pulmonary complications; SD, standard deviation; SPO_2, preoperative oxygen saturation.

Table 2. Comparison of preoperative pft results and canet risk score distribution between the study groups.

PFT	Group-I (n = 92)	Group-II (n = 108)	p-value
	n (%) or mean ± SD	n (%) or mean ± SD	
FVC	80.8 ± 23.1	71.7 ± 21.7	0.006
Normal (%)	58 (66.7)	56 (56.6)	0.158
Abnormal (%)	29 (33.3)	43 (43.4)	
FEV_1	78 ± 23.9	70.5 ± 23.3	0.032
Normal (%)	49 (56.3)	32 (32.3)	0.004
Mild (%)	21 (24.1)	37 (37.4)	
Moderate/Severe (%)	17 (19.5)	30 (30.3)	
FEV_1/FVC	78.7 ± 12.6	80.6 ± 11.8	0.288
Normal (%)	71 (81.6)	82 (82.8)	0.828
Abnormal (%)	16 (18.4)	17 (17.2)	
CANET risk score			0.401
Low (below 26 points)	19 (20.7)	28 (25.9)	
Medium (26-44 points)	35 (38)	45 (41.7)	
High (45 points and above)	38 (41.3)	35 (32.4)	

FEV_1, Forced Expiratory Volume; FVC, Forced Vital Capacity; PFT, pulmonary function test; SD, standard deviation.

Table 3. The effect of PFTs on the development of PPCs.

Group	Risk factor	AUC (95% CI)	Cut-off	p-value	Sensitivity (%)	Specificity (%)
All patients	SpO_2	0.600 (0.515–0.684)	≤96	0.022	39.0	80.5
	FVC	0.602 (0.520–0.684)	≤82	0.019	73.0	49.1
	FEV_1	0.627 (0.546–0.708)	≤79	0.003	71.6	53.6
Group-I	SpO_2	0.643 (0.517–0.769)	≤96	0.032	51.6	73.8
	FVC	0.622 (0.500–0.744)	≤79	0.068	67.9	61.0
	FEV_1	0.578 (0.452–0.705)	≤81	0.239	64.3	55.9
Group-II	SpO_2	0.599 (0.487–0.712)	≤96	0.089	31.4	87.7
	FVC	0.563 (0.450–0.677)	≤82	0.280	76.1	41.5
	FEV_1	0.649 (0.540–0.758)	≤72	0.011	65.2	64.2

Used test: Receiver operating characteristic curve analysis. AUC, area under the curve; CI, confidence interval; FEV_1, Forced Expiratory Volume; FVC, Forced Vital Capacity; PFT, pulmonary function test; SPO_2, preoperative oxygen saturation.

importance of identifying pulmonary complaints during the preoperative period (7).

Age and gender were similar between groups, but smoking habits differed. Group 1 had a higher overall number of smokers, whereas Group 2 had more current smokers. This aligns with research showing that preoperative smoking cessation improves long-term success, thereby emphasizing its importance in evaluations (8). Studies (9,10) have consistently shown an increased incidence of serious complications in current smokers, including PPCs, surgical site infections, prolonged ICU stays, wound complications, neurological complications, and septic shock within 30 days after surgery. Consistent with Bluman et al. (11) findings, smoking increases the risk of PPCs, underscoring the need for smoking cessation before and after surgery. Group 1, which had prior lung disease, had higher rates of cancer and gastrointestinal issues, likely reflecting referral patterns from thoracic and general surgery clinics.

In our study, the age variable was not significant on its own, it but was retained in the multivariate model due to its potential relationship with respiratory function. In the multivariate analysis, smoking status and indicators of low respiratory reserve remained independent risk factors. The risk of complications increased fourfold among current smokers and threefold among former smokers. Female sex continued to show a protective effect; low SpO_2 and low FVC were also determined to be independent risk factors.

In this study, univariate analysis in Group I revealed

Table 4. Distribution of risk factors affecting the development of PPCs.

Group	Variables	Univariate		Multivariate*	
		OR (95% CI)	p-value	OR (95% CI)	p-value
All patients	Age	0.99 (0.97–1.02)	0.635		
	Sex (Female vs. Male)	0.42 (0.24–0.75)	0.004		
	Smoke (Smoker vs. Non-smoker)	4.45 (2.02–9.80)	<0.001	4.02 (1.75–9.20)	0.001
	Smoke (Ex-smoker vs. Non-smoker)	3.72 (1.83–7.58)	<0.001	3.07 (1.44–6.53)	0.004
	SpO_2	0.76 (0.63–0.92)	0.004	0.78 (0.62–0.97)	0.029
	FVC	0.98 (0.97–1.00)	0.018	0.98 (0.97–1.00)	0.022
	FEV_1	0.98 (0.97–1.00)	0.018		
Group-I	Age	1.02 (0.99–1.06)	0.194		
	Sex (Female vs. Male)	0.61 (0.26–1.46)	0.269		
	Smoke (Smoker vs. Non-smoker)	1.52 (0.42–5.48)	0.525		
	Smoke (Ex-smoker vs. Non-smoker)	2.37 (0.84–6.70)	0.105		
	SpO_2	0.66 (0.50–0.88)	0.004	0.72 (0.53–0.96)	0.024
	FVC	0.98 (0.96–1.00)	0.082		
	FEV_1	0.99 (0.97–1.01)	0.386		
Group-II	Age	0.98 (0.95–1.01)	0.113		
	Sex (Female vs. Male)	0.32 (0.15–0.70)	0.004		
	Smoke (Smoker vs. Non-smoker)	9.07 (3.11–26.47)	<0.001	7.80 (2.55–23.92)	<0.001
	Smoke (Ex-smoker vs. Non-smoker)	6.28 (2.29–17.21)	<0.001	6.46 (2.19–19.12)	<0.001
	SpO_2	0.81 (0.62–1.06)	0.128		
	FVC	0.99 (0.97–1.01)	0.244		
	FEV_1	0.98 (0.96–1.00)	0.030	0.98 (0.96–1.00)	0.036

*Backward Wald. Used test: Univariate logistic regression analysis and multivariate logistic regression analysis, multivariate logistic regression was performed using the Backward (Wald) method.
CI, confidence interval; FEV_1, Forced Expiratory Volume; FVC, Forced Vital Capacity; OR, odds ratio; PPC, postoperative pulmonary complications; SPO_2, preoperative oxygen saturation.

that only low SpO_2 was statistically significant; no other variables were significant. After multivariate analysis, low SpO_2 was the only variable that remained independently associated with complications. In Group II, univariate analysis showed that smoking history, female sex, and low FEV_1 were significant. In the multivariate model, the risk of complications increased approximately eightfold in current smokers and approximately sixfold in former smokers. Female sex continued to demonstrate a protective effect, and low FEV_1 remained an independent risk factor in the model.

This study used the Canet scoring system for 30-day PPC risk assessment, categorizing patients into low, intermediate, or high risk. The Canet system, validated in Turkey and based on factors such as age and SpO_2, effectively stratified PPC risk in this population (12). Group 2 patients with undiagnosed lung disease were identified preoperatively by history, physical examination, chest X-ray, and PFTs. This led to timely intervention and improved outcomes. Thorough preoperative evaluation, even in low-risk patients, is crucial for early detection and prevention of PPCs. Preoperative SpO_2 was lower in Group 1 (known lung disease, 92%) than in Group 2 (newly diagnosed, 96%), indicating potential hypoxemia in Group 1. Lower SpO_2 may increase the risk of postoperative complications. While SpO_2 is useful, it is limited; PFTs and imaging are required for a comprehensive respiratory assessment. Group 2 had a higher PPC rate, although this difference was not statistically significant. This may be due to lack of preoperative diagnosis and treatment, while Group 1's ongoing treatment might have mitigated risk.

Studies link impaired lung function (low FVC and low FEV_1/FVC) to a higher risk of PPCs, highlighting the importance of preoperative assessment. PFTs, including FEV_1, FVC, and FEV_1/FVC, are crucial for identifying respiratory dysfunction and predicting PPCs, thereby allowing for preoperative interventions to optimize lung health (13,14). This study analyzed PPC risk in patients with severe COPD ($FEV_1 \leq 1.2$ L, FEV_1/FVC <75%) who underwent non-cardiothoracic surgery.

Thirty-seven percent experienced PPCs, with ninety-seven percent of those patients receiving anesthesia lasting more than two hours. Two-year mortality was 47%. PFTs were poor predictors of PPC; ASA score was a better predictor. Prolonged anesthesia (>2 hours) may increase the risk of bronchospasm and the length of ICU stay. General anesthesia and prolonged operative time are risk factors. Preoperative assessment is more predictive than PFTs (15).

This study examined whether spirometry and arterial blood gas data could predict serious PPCs after elective abdominal surgery in 480 at-risk patients. Low preoperative FEV_1 (<61% predicted) and low PaO2 (<9.33 kPa) significantly increased PC risk, with FEV_1 being the strongest predictor. Age, ischemic heart disease, and surgery for malignant tumors were also independent risk factors. The authors conclude that preoperative respiratory function evaluation is useful for identifying increased PC risk in selected patients undergoing abdominal surgery (16).

Low FEV_1 and FVC values found in our study patients significantly increase the risk of PPCs. Low preoperative SpO_2 levels also increase the risk of complications. Logistic regression confirms an association between FEV_1, FVC, and PPCs, showing that PPC risk decreases with each unit increase in FEV_1 and FVC. Diagnostic sensitivity and specificity for FEV_1 and FVC cutoff values are approximately 59% each, indicating a need for more precise diagnostic parameters. The study demonstrates that low lung function (FEV_1 and FVC) and low SpO_2 are major risk factors for PPCs, though current cut-off values may not be perfect predictors. This systematic review summarizes the existing scientific literature on the ability of PFTs to predict PPCs in non-thoracic surgery. It suggests that spirometry and other PFTs enhance preoperative risk assessment. Spirometry should be considered for individuals planning upper abdominal surgery, especially those with key indicators for COPD (17).

Study limitations

This study, while providing valuable insights, is constrained by its retrospective design and single-center nature. The retrospective approach raises concerns regarding potential selection bias and the presence of missing data, which could affect the accuracy of the findings.

Conclusion

In this study, the Canet risk scoring method and PFT measurements were used to predict PPCs. This scoring system has been validated and is used in Turkey, and has been shown to be effective in predicting PPCs and mortality risk. Although pulmonary disease is commonly diagnosed, it remains underdiagnosed preoperatively among patients undergoing major surgery. Both previously known and newly diagnosed pulmonary diseases can increase the risk of postoperative complications. Static PFTs can help identify at-risk patients and improve surgical outcomes. Therefore, we recommend routine performance of PFTs before surgery, especially in patients without known lung disease.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the University of Health Sciences Türkiye, Şişli Hamidiye Etfal Training and Research Hospital Ethics Committee (approval number: 2451, dated: 26.09.2023), and administrative permission was obtained from the institutions where the study would be conducted.

Informed Consent: Retrospective study.

Footnotes

Conflict of Interest: No conflict of interest was declared by the author(s).

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