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SPIROMETRY IN MAJOR SURGERY: VALUE PLACED IN POSTOPERATIVE RESPIRATORY POOR HEALTH PROBLEMS

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ABSTRACT

Predicting POPC based on spirometry is challenging since several studies reveal various risk variables (advanced age, obesity, smoking, prolonged operation times, proximity of incision to diaphragm, and presence of lung pathology) are involved in its development. The study's findings support this idea. According to the study, having an abnormal preoperative spirometry result, abnormal physical exam findings, being older, smoking, having a higher ASA CL, having a BMI >25, and having diabetes mellitus are all risk factors for pulmonary problems. To identify patients at high risk of POPC, we propose that creating a new multifactorial risk score would be beneficial.

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1. INTRODUCTION

One of the most significant factors contributing to postoperative morbidity and death is pulmonary problems [1]. Increased morbidity, mortality, and duration of hospital stay for a patient following surgery are caused by postoperative pulmonary problems, including pneumonia, atelectasis, bronchitis, pleural effusion, aspiration, and bronchospasm. The reported incidence of postoperative pulmonary complications (POPC) has been found in studies to range between 5 to 70 percent, with upper abdominal and thoracic surgeries having the greatest rates [2,3].

For the past several years, there has been an emphasis on the necessity for a preoperative screening test to identify individuals who are at risk. Numerous studies conducted in the 1960s came to the following conclusions: Preoperative respiratory therapy benefits patients with abnormal preoperative spirometry, and spirometric tests are more sensitive than medical history and physical examination for detecting lung diseases. Patients with abnormal preoperative spirometry also have a higher risk for postoperative pulmonary complications [4,5,6]. According to studies, spirometric examination alone is not particularly helpful for diagnosing and preventing postoperative pulmonary issues [7,8].

2. MATERIALS & METHODS

The investigation was conducted at the Sri Lakshmi Narayana Medical College and Hospital, Surgical Gastroenterology Department in Puducherry. The study was in progress from September 2019 until October 2021. The gastrointestinal surgical department at SLIMS was used to choose the study's participants.

2.1.INCLUSION CRITERIA

Patients in elective abdominal surgery who may perform spirometry in the surgical gastro-enterology ward.

2.2. EXCLUSION CRITERIA

Patients who are incapable of performing spirometry.

Patients who are unwilling to sign up for this study.

From the SGE (5 patients) department, 102 patients were chosen and posted for elective surgery. Patients were evaluated the day before surgery and followed up for seven days following the procedure. Before surgery, all patients were evaluated by multiple parameters. Before surgery, people who experienced respiratory symptoms (cough, sputum, dyspnea, or wheeze) and abnormal findings on a chest physical were referred to as "symptomatic patients" (orthopnoea, rise or reduction in tactile fremitus, dullness, crackles, or rhonchus). Patients were scanned and clinically assessed seven days after surgery to see their health. According to the classification used in this study, postoperative pulmonary complications included pneumonia, Atelectasis, Bronchitis, and Pleural effusion.

In a sitting position, the superpro conducted spirometric tests. The ATS spirometry guidelines, detailed below, were followed when doing the spirometry. Forced vital capacity (FVC), FVC 34, forced expiratory volume (FEV 1), FEV 1 percent, FEV 1/FVC, PEF, and PEF34 were noted. Patients with abnormal spirometry included those with one or more abnormal spirometry readings.

2.3. OPERATION OF FVC MANEUVER

Make sure the person is standing properly. Include a nose clip. Completely inhale; the breath should be quick but not pushed. Put the mouthpiece in your mouth and seal your lips around it. Once lips are sealed around the mouthpiece, exhale as much as possible. If required, repeat instructions while firmly coaching. At least three maneuvers should be repeated; eight maneuvers are often sufficient. Verify test repeatability and add additional maneuvers if necessary.

2.4. ACCEPTABILITY CRITERIA

The test can be successful if the acceptability and repeatability requirements are fulfilled. If not, techniques should be continued until the patient cannot continue or the criteria are satisfied. Eight 1s maximum tries are advised. The most permitted measurements should be given together with the notation that reproducibility requirements were not satisfied if the findings are acceptable but not repeatable. 4 Patients with respiratory symptoms before surgery were called "symptomatic patients" (cough, sputum, dyspnea, wheeze). Patients with abnormal physical examination findings were characterized as one or more abnormal findings during a preoperative chest physical examination (orthopnoea, increase or reduction in tactile fremitus, dullness, crackles, or rhonchus). The SPSSX statistical software was used

to analyze the study's data. When applicable, the chi-squared test and student's t-test were employed to compare the means and proportions of the various groups. A P-value below was considered to be significant.

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3. RESULTS

Fifty-one patients with upper abdominal surgery scheduled (20 female and 31 male) had their data evaluated. Table 1 lists the characteristics of the patients. Of the 33 patients (71.5%) with abnormal preoperative spirometry, 11 had obstructive lung disease, and 22 had restrictive lung disease. The actual and percentage of projected results of the patient's preoperative spirometric examinations. Pie and bar charts of the patient characteristics are studied.

Table 1. Characteristics of patients

Patient number		51	
Male : Female ratio		31:20:00	
age	< 50	34	
	t > 50	17	
BMI	< 25	38	
	t >25	13	
Smoking		18	35.29%
Pre operative signs and symptoms		17	34.31%
Preoperative spirometry			
Normal		18	28.43
Obstructive		11	-23.55
Restrictive		22	-48.04
Comorbid			
Diabetes		18	
Hypertension		8	

In the seven days following surgery, postoperative pulmonary problems were noted in 30 (29%) patients (see fig 5). POPC rates for thoracic, abdominal, and lung resections are 27 percent, 31.8 percent, and 35 percent, respectively (fig 4). Age over 50, BMI over 25, ASA over 2, smoking, diabetes, FEVl/FVC 80, and FEVl 1.25 lit increase POPC (Table-2).

Table 2. Clinical and laboratory characteristics of patients with and without postoperative pulmonary complication (POPC).

Characteristics	POPC (+) N= 15		POPC(-) N= 36		Number	P-value
Age <50	9	-26.40%	25	-73.50%	34	
>50	6	35.30%	11	64.70%	17	0.001
Male	11	33. 8%	o	-66.10%	31	Ns

Female		-22.50%	16	-77.50%	20	
Smoking						
Yes	6	-40%	12	-33.30%	18	Ns
No	9	-60%	l24	-66.60%	33	
BMI						
<25	8	-27.60%	27	-72.30%	38	Ns
>25	7	-34.60%	9	65.40%	13	
>30	1	-50%	1	-50%	2	
Spirometry						
FVC	2.15±0.77		2.20±0.78			Ns
FVC%	69.93±22.97		71.53±20.81			Ns
FEVl	1.72±0.60		1.88±0.62			Ns
FEV1%	65±15.99		73.28±21.79			0.08
FEVl/FVC	80.70±12.49		86.39± 9.86			1<0.05
PEF	4.00±1.62		4.34±1.72			Ns
PEF%	53.03±20.31		60.67±21.31			0.09
FEVl < 1.25	3	40%	4	-60%	7	
>1.25	12	27.60%	32	72.40%	4	Ns
Preoperative signs & symptoms						
Present	6	-31.40%	24	-68.50%	17	Ns
Absent	9	-28.30%	48	-71.60%	39	Ns
r<2	7	-21.20%	26	-78.70%	33	
r>2	8	-33.30%	46	-66.60%	69	Ns
	16	-27.50%	42	-72.40%	58	
Abdomen surgery	14	-31.80%	30	-68.20%	44	
Comorbid						
Diabetes	16	41.00%	23	-59.00%	39	
Hypertension	5	-31.20%	11	-68.70%	16	

Abnormal spirometry was noted with an increase in age>50, BMI >25, and ASA > 2. Out of 15 POPC, 9 had abnormal spirometry, and the rest, 6, had normal spirometry.

4. DISCUSSION

After abdominal surgeries, the respiratory system is significantly impacted by general anesthesia and surgical procedures. Lung volumes are reduced due to decreased diaphragm activity and ventilatory response [10-12]. These may result in bacterial colonization, alveolar collapse, atelectasis, early closure of airways, ventilation/perfusion mismatch, decreased mucus clearance, and more. These modifications might be caused by pulmonary problems that affect pulmonary function [13, 14]. The emergence of really ill people with impaired In this research, 15 (29%) of the patients who underwent abdominal surgery experienced POPC. Of the 15 POPC, 8 had pneumonia, 4 had bronchitis, 2 had atelectasis, and 1 had a pleural

effusion. In this study, patients with 1. Age >50 (35.3%) compared to 50 (26.4%) (total of 15 pts) had a greater prevalence of POPC. Nine points for people over 50 and 6 points for people under 50.

For identifying POPC, abnormal spirometry (60%) is more effective than normal spirometry (40%) (9 with abnormal six normal spirometry). Since the middle of the 1950s, when spirometry became clinically available, it has been seen to meet the requirements of the ideal screening test since it is affordable, easily accessible, simple to use, relevant to more people, repeatable, and has acceptable normal readings [15-18]. However, past research on the use of spirometry in predicting POPC has shown inconsistent findings. Patients in this research who had abnormal preoperative spirometry experienced POPC more frequently. When used to predict POPC, abnormal preoperative spirometry had greater sensitivity and specificity than abnormal physical examination results. These results suggest that spirometry might be a helpful screening tool for determining POPC risk.

Predicting POPC based just on spirometry is challenging since several studies reveal various risk variables (advanced age, obesity, smoking, prolonged operation times, proximity of incision to diaphragm, and presence of lung pathology) are involved in its development [19-25]. The study's findings support this idea. According to the study, having an abnormal preoperative spirometry result, abnormal physical exam findings, being older, smoking, having a higher ASA CL, having a BMI >25, and having diabetes mellitus are all risk factors for pulmonary problems. To identify patients at high risk of POPC, we propose that creating a new multifactorial risk score would be helpful.

We conclude that POPC is still prevalent (29 percent) and significantly contributes to postoperative morbidity. Many variables, including abnormal preoperative spirometry, are to blame for the development of POPC. Therefore, the prognosis of POPC following abdominal surgery is improved when spirometry is combined with additional characteristics, including age, BMI, ASA, smoking history, and concurrent disorders like diabetes mellitus.

4. CONCLUSIONS

This study will determine postoperative pulmonary complications (POPC) incidence and risk factors at Sri Lakshmi Narayana Institute of Medical Sciences. The prevalence of POPC is still quite high despite several improvements in contemporary medical and surgical treatment.

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ETHICAL APPROVAL

Nil

COMPETING INTEREST

The authors declare no conflict of interest.

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