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Original Article

Impacts of sinonasal polyposis on pulmonary function pre and post function endoscopic surgery

Otorhinolaryngology

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ABSTRACT

Background: the upper and lower airway form one contagious functional unit and exposed to same similar inflammatory stimuli that support hypothesis disease in one part could reflect or manifest on another.

Objective: to assess the effects of sinonasal polyposis on ventilatory function test pre and post functional endoscopic sinus surgery (FESS).

Methodology: This interventional randomized controlled clinical trial was carried out on 30 patients presented with chronic rhinosinusitis with nasal polyposis. All patients were subjected to nasal obstruction scale evaluation (NOSE) assessment, nasal endoscopic examination, Lund MacKay CT score and PFT pre and three months post FESS.

Results: there was a significant decrease of 2 items of NOSE scale (nasal obstruction and trouble sleeping), endoscopic examination score, and Lund MacKay CT score, with significant increase of PFT (FEV_1 %, FVC %, FEV_1\FVC ratio and FEF25-75%) three months post-operatively compared to preoperative values (p-value < 0.001). In the preoperative period 73.3% had an obstructive pattern in PFT while in the post-operative period only 36.6% had an obstructive pattern in PFT (p =0.004). By using multivariate logistic regression analysis, the most significant predictive factors of abnormal PFT in patients with sinonasal polyposis were right CT Lund MacKay scale (B= 0.74, p =0.014), left CT Lund MacKay scale (B= 0.56, p = 0.01), and total Lund MacKay CT score (0.4, p= 0.01).

Conclusions: the sinonasal polyposis have negative effects in PFTs that improved after FESS. The predictive factor for reduced PFTs in patients with sinonasal polyposis is Lund MacKay CT score.

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Keywords: Nasal polyposis, pulmonary function tests, nose scale, Lund MacKay CT score

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INTRODUCTION

Chronic rhinosinusitis is a persistent inflammation of the mucosal lining of the nose and paranasal sinuses, and it can be categorized into chronic rhinosinusitis with nasal polyps (CRSwNP) and chronic rhinosinusitis without nasal polyps (CRSsNP)**.** CRSwNP is a common chronic disease that causes nasal obstruction, headache, and hyposmia [1].

There's association among both upper and lower respiratory tract diseases. The presence of allergic rhinitis is considered essential risk factor for development of asthma, and the link between both of them is clarified by the 'unified airway disease' [2].There's similar physiological and immunological features of both upper and lower airway diseases, also both have related histological and anatomical structures. Pathological changes of the lower airway maybe stimulated by existence of upper airway inflammation [3].

Recently, patients with CRSwNP without clinically detected lower airway disease were found to have latent lower obstructive changes[4], in nonexistence of airway hyper responsiveness. Nevertheless, the pulmonary function tests (PFT) of patients with CRSwNP is not yet totally understood, and the association between

histopathological structures in tissue and lower pulmonary disease manifestations remains mostly unclear [5].The current study was carried out to assess the impact of sinonasal polyposis on pulmonary functions tests (PFT) pre and post functional endoscopic sinus surgery (FESS).

SUBJECTS AND METHODS

This interventional randomized controlled clinical trial] was carried out prospectively at otorhinolaryngology department, Al-Zahraa university hospital, Cairo, Egypt during the period from March 2019 till March 2021. The study was conducted on 30 patients with CRSwNP refractory to medical treatment without known lung disease. The study protocol was approved by institutional review board (IRP 20193011) of faculty of medicine for girls, Cairo, Al-Azhar University, Egypt. Written informed consent was obtained from each participant before included into the study.

Inclusion criteria: patients older than 18 years old, patients with CRSwNP, refractory to standard medical treatment.

Exclusion criteria: patients known to have any chronic pulmonary diseases with or without nasal polyp and patient with antrochoanal polyp with bilateral nasal obstruction were excluded from the study.

Methods

All patients were subjected to adequate history taking and symptom evaluation using nasal obstruction scale evaluation (NOSE) questionnaire, with special concern for the symptoms in last 12 weeks[6].

Endoscopic nasal examination was performed by 4.0-mm rigid 0°endoscopes after applying topical anesthesia and topical decongestant. The nasal cavity was carefully examined for presence of nasal polyps and its evaluation according to the Meltzer Clinical Scoring System [7].

Computed tomography CT nose and paranasal sinuses for assessing the anatomy and severity of nasal polyps using Lund and Mackey radiological staging system. This score ranges from 0 (complete lucency of all sinuses) to 24 (complete opacification of all sinuses) [8].

Spirometry was carried out using (FUKUDA DENSHI Spirosift SP-5000- Japan). The subsequent measurements were documented: forced vital capacity (FVC %), forced expiratory volume in the first second (FEV_1%), FEV_1\FVC ratio and forced expiratory flow rate 25-75 %of vital capacity (FEF 25-75%).were calculate spirometric-indices using the best out of three technically acceptable performances according to the references of the European Respiratory Society [9].

Operative procedures

All patients underwent surgical interference by FESS)/ Messerklinger technique were operated on by the same team of surgeons under general anesthesia aided by endotracheal intubation with application of nasopharyngeal pack, supine position with head elevated and tilted to the right side towards the surgeon (reversed Trendelenburg position). Cotton applicators soaked in 10 ml of Xylocaine 4% and in 1 ml of 1:100,000 Adrenaline to pack the nasal cavity. Packs were placed using direct visualization with an endoscope into the middle meatus and around the middle turbinate in all mucosal surfaces. Applicators were remained for 10 minutes then removed, the polyp tissue may be removed with polyp forceps, through cutting instruments or microdebrider, Endoscopic Uncinectomy, Maxillary Antrostomy, Anterior Ethmoidectomy, Opening the frontal recess: depend on the degree of the disease according to radiological demonstration and operative findings, Exploration of the posterior ethmoids: if the posterior cells were involved, Sphenoidotomy: if sphenoid sinus was involved, Nasal Packing: Nose is packed with Nasal Tampon (merocel).

All patients followed up through 3 months by adequate medical therapy included antibiotics (when needed), topical steroids and nasal douch with hypertonic saline for at least 4 weeks. The next visit took place every week in first month's follow up. The patient was examined by nasal endoscopy and subjectively evaluated by NOSE scale. The next visit took place every two weeks in second months later and once in third months at which time NOSE scale, nasal endoscopy examinations, PFT, and CT scans were repeated.

Statistical analysis

The data were collected, coded, anonymized, and fed to computer on excel sheet and then analyzed by statistical package for social science (SPSS) program on windows XP version 20.0 (SPSS Inc.; Chicago, USA).The Shapiro-Wilk test was used for testing normality of the studied variables, and it was not normally distributed. Therefore, quantitative data was presented as median with interquartile range (IQR) and compared using Mann Whitney test (MW) for mean rank. While qualitative data was presented as number and percentages and compared using chi-square test (X^2). Multivariate logistic regression analysis was used to identify the predictive factors of abnormal PFT among patients sinonasal polyposis. The strength of relevance was determined according to the value of the Beta coefficient (B), and significance according to the Wald Chi-square test. The significant level was set according to probability value as p-value <0.05 (95% confidence interval).

RESULTS

The studied patients were 22 males (73.3%) and 8 female (26.7%) their age ranged from 20-63 years with median (IQR) of age was 39 (31.5 - 50.3).

The study group parameters were put in comparison pre-operatively and three months post-operatively. The nasal obstruction and trouble breathing scale were statistically significantly improved post-operatively compared to preoperatively (p=0.001), while unable to get enough air during exertion was not significantly differed after 3 months of FESS (table 1).

Most of the studied patients have nasal endoscopic score 2 (26.7%) or 3 (66.7%) before FESS with a median (IRR) of [3 (2 – 3)], while post-operative all of them had score 0 with a median (IQR) of [0 (0 – 0)] with statistical significant difference (p=0.001). Furthermore, the Lund-Mackay sinus CT grading was statistically significantly decreased post-operatively compared to preoperatively [20.5 (18.8- 23) vs. 2 (2 – 4)] (p=0.001) (table 2).

The median (IQR) of FEV_1\FVC ratio, FEV_1%, FVC%, and FEF 25-75% were statistically significantly increased 3 months after FESS compared to pre-operative data ($p < 0.05$) (table 3). Before FESS 73.3% of patients have obstructive pattern and 26.7% have normal pattern in PFT, while post-operatively 63.3% have normal pattern and 36.7% have obstructive pattern in PFT with statistical significant difference (p =0.004) (table 4).

By using multivariate logistic regression analysis for factors predicting abnormal PFTs in patients presented with sinonasal polyposis we found that the most significant factors were right sinus Lund-

Mackay CT score (B = 0.74, p = 0.014), left sinus Lund-Mackay CT score (B = 0.56, p = 0.01), and total Left sinus Lund-Mackay CT score (B = 0.4, p = 0.01)(table 5)

Table (1): Comparison of NOSE scale pre and post functional endoscopic sinus surgery

NOSE scale		Pre-FESS (n = 30)	Post-FESS (n = 30)	MW	P-value
Nasal obstruction	Median (IQR)	3 (2 – 3)	0 (0 – 1)	4	0.001*
	Mean rank	45.4	15.6		
Trouble sleeping	Median (IQR)	1 (1 – 1)	0 (0 – 0)	138	0.001*
	Mean rank	40.9	20.1		
Unable to get enough air during exertion	Median (IQR)	0 (0 – 1)	0 (0 – 0)	354	0.054
	Mean rank	33.7	27.3		

FESS: Functional Endoscopic sinus surgery, IQR: Interquartile range, MW: Mann-Whitney U test, NOSE scale: nasal obstruction symptom evaluation scale, *: significant p-value.

Table (2): Comparison of endoscopic examination and Lund-Mackay sinus CT grading system between pre-operative and post-operative groups.

Item		Pre-FESS (n = 30)	Post-FESS (n = 30)	Stat. test	P-value
Endoscopic examination grading					
Median (IQR)		3 (2 – 3)	0 (0 – 0)	MW = 0.0	0.001*
Mean rank		45.5	15.5		
Score					
Score 0		0 (0%)	30 (100%)	X^2 = 60	0.001*
Score 2		8 (26.7%)	0 (0%)		
Score 3		20 (66.7%)	0 (0%)		
Score 4		2 (6.7%)	0 (0%)		
Lund-Mackay sinus CT grading system					
Right sinus	Median (IQR)	10 (9 - 11.25)	4 (3 – 4)	MW = 6	0.001*
	Mean rank	45.3	15.7		
Left sinus	Median (IQR)	11 (8.75 – 12)	2 (2 – 4)	MW = 13	0.001*
	Mean rank	45.1	15.9		
Total score	Median (IQR)	20.5 (18.8- 23)	6 (4.75 – 8)	MW = 4	0.001*
	Mean rank	45.4	15.6		

FESS: Functional Endoscopic sinus surgery, CT: computed tomography, IQR: Interquartile range, MW: Mann-Whitney U test, X^2: Chi-square test, *: significant p-value

Table (3): Comparison of spirometric-indices pre and post functional endoscopic sinus surgery

Spirometric-indices		Pre-FESS (n = 30)	Post-FESS (n = 30)	MW	P-value
FEV_1 / FVC ratio	Median (IQR)	78.5 (72.8- 87.3)	87 (82.8 - 89.3)	231	0.001*
	Mean rank	32	56.1		
FEV_1 %	Median (IQR)	61 (45 -76.5)	78 (64.8 – 84)	207.5	0.008*
	Mean rank	23.7	47.1		
FVC %	Median (IQR)	61.5 (40.8 -71.8)	77.5 (62.3- 82)	218	0.008*
	Mean rank	24.7	49		
FEF 25-75%	Median (IQR)	60 (49 - 65.3)	68 (65- 70)	141.5	0.001*
	Mean rank	22.5	52.5		

FEV_1\FVC ratio., FEV1%: forced expiratory volume in the first second, FVC%: forced vital capacity FEF25-75%: forced expiratory flow rate 25-75 %of vital capacity , IQR: Interquartile range, MW: Mann-Whitney U test. *: significant p-value

Table (4): Comparison of pulmonary function test pattern pre and post functional endoscopic sinus surgery

PFT pattern	Pre-FESS (n = 30)	Post-FESS (n = 30)	Chi-square	P-value
Normal	8 (26.7%)	19 (63.3%)	$X^2 = 8.1$	0.004*
Obstructive	22 (73.3%)	11 (36.7%)		

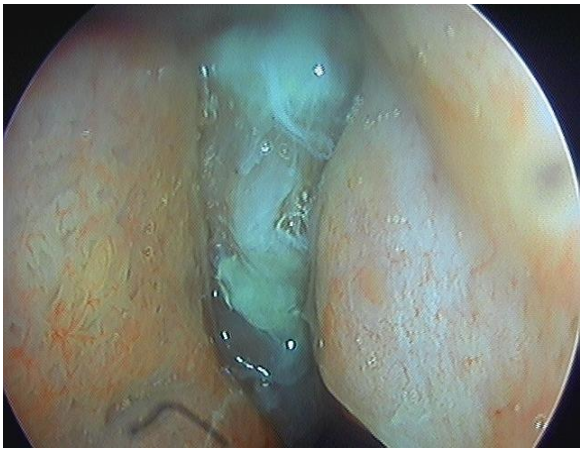
*: significant p-value.

Table (5): Multivariate Logistic regression analysis for factors predicting abnormal PFTs

	B	SE	p-value	OR	95% CL	
Age	0.22	0.038	0.557	1.02	0.95	1.1
Sex	- 1.5	0.89	0.094	0.22	0.038	1.29
Nasal obstruction	0.3	0.52	0.562	0.1.35	0.48	3.78
Trouble sleeping	- 0.13	0.52	0.803	0.87	0.31	2.46
Unable to get enough air during exertion	- 0.076	0.53	0.885	0.92	0.32	2.6
Endoscopic score	- 1.0	0.84	0.239	0.36	0.07	1.94
Right sinus Lund-Mackay CT score	0.74	0.3	0.014*	2.1	1.16	3.8
Left sinus Lund-Mackay CT score	0.56	0.22	0.01*	1.76	1.14	2.72
Total Lund-Mackay CT score	0.4	0.15	0.01*	1.5	1.1	2.04

B: Regression coefficient, SE: Standard error, CL: Confidence level.

a)



b)

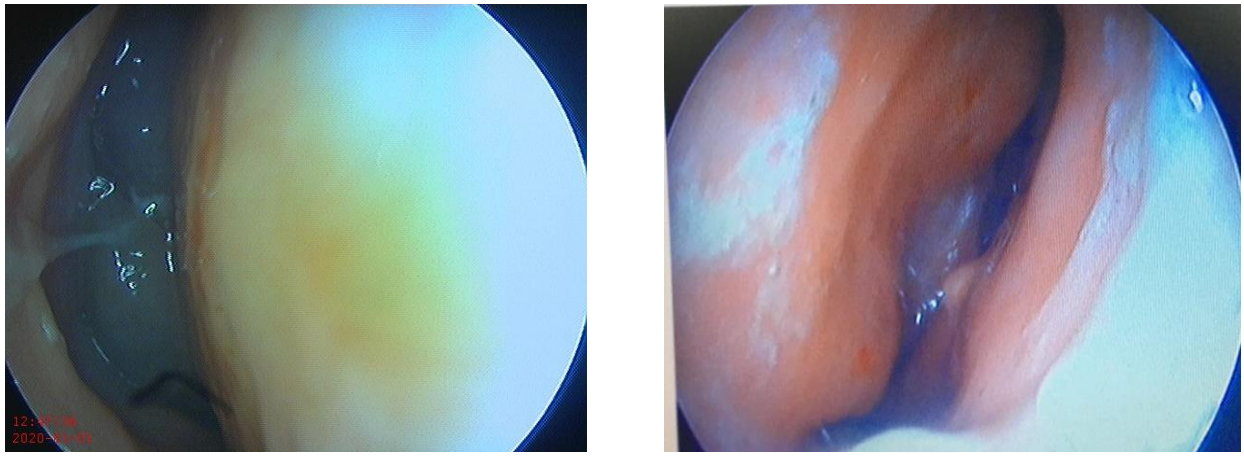


Figure (1): Pre and post FESS endoscopic sinus examination

Preoperative there's multiple polyps extend beyond the middle meatus of left nasal cavity (Grade 3).
3 months post-operative FESS shows no visible nasal polyps in the nasal cavity with widened maxillary sinus ostium (Grade 0).

a) b)

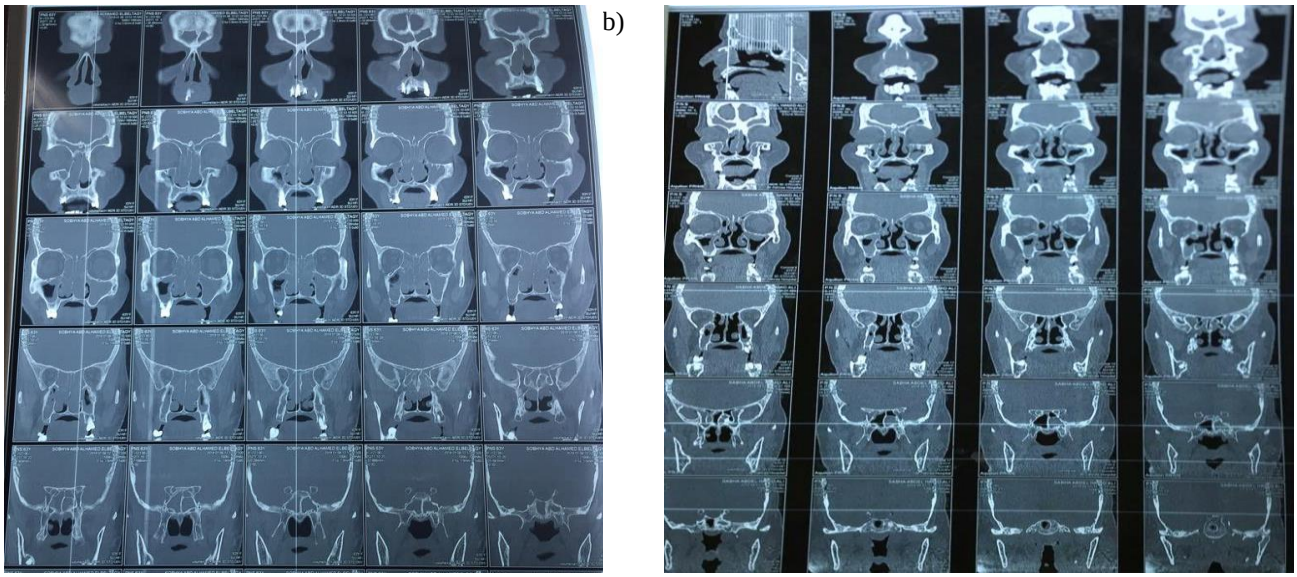


Figure (2): Pre and post FESS CT nose and paranasal sinuses

a) Preoperative there was complete opacity of bilateral frontal, anterior and posterior ethmoid, sphenoid and left maxillary sinus, partially opacified right maxillary sinus, bilateral obliteration of Osteomeatal complex (Lund Mckay score 23).

b) Post-operative there was complete opacity of right frontal sinus, partially opacified left frontal, left sphenoid, both maxillary sinus, pneumatized right sphenoidal, anterior and posterior ethmoidas, bilateral obliteration of Osteomeatal complex (Lund Mckay score 10)

DISCUSSION

CRSwNP has a negative impact on patients' quality of life, not only due to the discomfort of specific symptoms (chronic rhinorrhea, nasal obstruction, facial pressure and hyposmia), but also due to central dysfunction manifested as fatigue and loss of sleep, which may further cause cognitive impairment or depression [10]. Asthma and allergic rhinitis are presenting with numerous phenotypes and are considered the most frequent chronic inflammation of both upper and lower airways, that's why we focused our attention on it [11].

The current study revealed that about three-quarter (73.3%) of the studied patients have obstructive pattern in PFT at first presentation that dropped to 36.7% after FESS (p 0.004). That means there was a significant improvement of PFT (FVC %, FEV1% and FEV1/FVC ratio, FEF25-75%) 3 months post-operative. These findings means that nasal polyposis have negative impacts on lower airways functions that improved by surgical removal of the polyp. Elimination of the trigger area in the nose and paranasal sinuses which result in release of inflammatory mediators, prostaglandins and leukotrienes that might affect the lower respiratory tract is one of possible mechanisms of improvement of pulmonary function test that occurred among patients with chronic rhinosinusitis with nasal polyps after FESS [17]. Zhang et al. [12] investigated cases where FEF25-75 and FEV_1 were diminished and found that reduced pulmonary function had a correlation with CRSwNP as

shown by CT, in the absence of disease affecting the lower respiratory tract. Ciprandi et al. [13] concluded that 53.7% of CRS cases had associated decreases pulmonary function. Williamson et al.[14]found subclinical diminishment of FEV_1 and FEF25-75 in CRSwNP. Tanaka et al. [15] reported that 13% of patients with CRSwNP and 20% of patients with CRSwNP and peripheral blood eosinophilia showed obstructive pulmonary dysfunction (FEV_1/FVC \70%) even with the nonexistence of an asthma diagnosis. Several theories explain the relationship between upper and lower airway. One is that naso-pharyngo-bronchial reflexes possibly involved in airway hyperresponsiveness [16].Local stimulus by inflammatory mediators might initiate bronchospasm. Additional suggested mechanism is that local upper respiratory tract inflammatory process may reflect to the lower airway through chemotactic factors and leukocytes that increase cell adhesion receptors [16].

Youssef et al.[17] draw attention to the role of nasal blockage in occurrence of lung disease with loss of function of the nose for warming, cleaning and humidifying the inspired air and with loss of its defensive mechanisms which explain our results in improving pulmonary function after FESS. Similarly, Ragab et al. [18] found involvement of lower airways in 60% of adult patients with chronic rhino-sinusitis with failure of medical treatment: some are manifested (e.g., asthma), while others are not manifested (e.g., bronchial hyper responsiveness). They also revealed that nasal polyps was one of the risk factors for the involvement of the lower respiratory tract. Kariya et al.[4] reported that the latent obstruction in low diameter airways associated with chronic rhinosinusitis even where they caused no symptoms and had not led to a diagnosis of obstructive airway disease. Karuthedath et al. [19]assessed the effect of FESS on the pulmonary function tests of chronic rhinosinusitis patients. Overall, patients benefited from FESS, with improved PFTs. Our results were agreeing with Youssef et al., [17]as they found post-operatively a significant improvement in the FEV_1/FVC value, reflecting the impact of FESS on relieving the non-symptomatic lower airway obstruction. However, they supposed that significant decrease in upper and lower airway reactions to intense triggers due to usage of intranasal corticosteroid post-operative. Yıldırım et al. [20] used FESS on cases with CRSwNP, but without clinically diagnosed asthma. One finding was the statistically significant increase in FVC at 1 month post FESS, indicative of a connection between upper and lower portions of the airway. But alongside this, FESS seems not to have altered FEV_1, FEV_1/ FVC or FEF-25-75. However, the spirometry was not repeated at either 6 months or 1 year post-operatively and the possibility exists that these values might have altered at those points. Chen et al.[21] also reported that, for patients with CRSwNP and asthma, FESS may improve subjective smell sensation and endoscopic appearance.

Shturman-Ellstein et al. [22] observed the impact of nasal breathing as opposed to mouth breathing among patients presented with asthma through hyperventilation, which resulted in worsened lung function with mouth breathing versus nasal breathing. In contrary to our study, Ragab et al. [18] found no association between CT scan scores and pulmonary function. This result is like the results of Borges Dinis[23], who found no statistical relation among the objective degree of paranasal sinus disease in the preoperative and post-operative phases and the objective asthma including pulmonary function. This may be due to the regular corticosteroid inhalation prescribed for all asthmatic patients, which cannot be stopped for moral reasons.

By comparing the preoperative and post-operative NOSE scale we found a statistically significant improvement of nasal obstruction and trouble sleeping post-operatively (p 0.001). Additionally, there was improvement of post-operative endoscopic findings and Lund-Mckay CT score. Another essential finding of the current study is that the severity of radiological finding of sinusitis was a predictive factor on abnormal airway functions. Also, Our results agreed with Lee et al. [16] results that revealed patients with radiological doubtful of chronic rhinosinusitis had decrease FEV_1/FVC, which revealed a subclinical airway obstruction.

CONCLUSIONS

In conclusion, there was asymptomatic lower airway dysfunction in cases of CRSwNP which improved after FESS and pulmonary function test can be used for assessment of the disease severity and in long term follow up.

Although our study is restricted by a somewhat small number of patients, we consider that this prospective study helps to simplify the exact value of FESS and to highlight that the underuse of pulmonary function testing for patients with upper airway obstruction may lead to missed lower airway diseases. Initial diagnosis and good control are essential to decrease health care costs and morbidity in addition to lessen the advance of chronic illnesses.

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REFERENCES

1. **Fokkens WJ, Lund VJ, Mullol J, Bachert C, Alobid I, Baroody F, et al.** European position paper on rhinosinusitis and nasal polyps. A summary for otorhinolaryngologists. Rhinology. 50:1-12, 2012.
2. **Brozek JL, Bousquet J, Baena-Cagnani CE, Bonini S, Canonica GW, Casale TB, et al.** Allergic

rhinitis and its impact on asthma (ARIA) guidelines. J Allergy Clin Immunol. 126:466-76, 2010.

3. **Bousquet J, Schu¨nemann HJ, Samolinski B, Demoly P, Baena-Cagnani CE, Bachert C, et al.** Allergic Rhinitis and its Impact on Asthma (ARIA): achievements in 10 years and future needs. J Allergy Clin Immunol. 130(5):1049-62, 2012.
4. **Kariya S, Okano M, Oto T, Higaki T, Makihara S, Haruna T, et al.** Pulmonary function in patients with chronic rhinosinusitis and allergic rhinitis. J Laryngol Otol. 128:255-62, 2014.
5. **Yang MS, Lee HS, Kim MH, Song W, Kim T, Kwon J, et al.** Rhinitis patients with sputum eosinophilia show decreased lung function in the absence of airway hyperresponsiveness. Allergy Asthma Immunol Res. 5(4):232-8, 2013.
6. **Mukulika S, Banerjee S, Hembrom R and Sen I.** Use of nasal obstruction symptom evaluation scale in objective evaluation of symptomological improvement in post septoplasty patients. Bengal Journal of Otolaryngology and Head Neck Surgery. 25(1): 213-252, 2017.
7. **Meltzer EO, Hamilos DL, Hadley JA, Lanza DC, Marple BF, Nicklas RA, et al.** Rhinosinusitis developing guidance for clinical trials, Otolaryngol Head Neck Surg.135(5): 31–80, 2006.
8. **Hopkins C, Browne JB, Slack R, Lund V and Brown P.** The Lund-Mackay staging system for chronic rhinosinusitis: How is it used and what does it predict? Otolaryngology-Head and Neck Surgery. 137(4): 555-561, 2007.
9. **Miller MR, Crapo R, Hankinson J, Brusasco V, Burgos F, Casaburi R, et al.** General considerations for lung function testing. Eur Respir J. 26(1):153-61, 2005.
10. **Maniu A, Perde-Schrepler MI and Tatomir C.** Latest advances in chronic rhinosinusitis with nasal polyps' endotyping and biomarkers, and their significance for daily practice, Rom J Morphol Embryol. 61(2):309–320, 2020.
11. **Licari A, Castagnoli R, Denicolo CF, Rossini L, Marseglia A and Marseglia GL.** The nose and the lung: united airway disease? Front. Pediatric. 3; 5:44, 2017.
12. **Zhang L, Zhang L, Zhang CH, Fang X, Huang Z, Shi Q, et al.** The Lung function impairment in non-atopic patients with chronic rhinosinusitis and its correlation analysis. Clin Exp Otorhinolaryngol. 9 (4): 339-45, 2016.
13. **Ciprandi G, Cirillo I, Vizzaccaro A, Monardob M and Toscac MA.** Early bronchial airflow impairment in patients with persistent allergic rhinitis and bronchial hyperreactivity. Respir Med. 99(12):1606-12, 2005.
14. **Williamson PA, Vaidyanathan S, Clearie K, Barnes M, and Lipworth BJ.** Airway dysfunction in nasal polyposis: a spectrum of asthmatic disease? Clin Exp Allergy. 41(10):1379-85, 2011.
15. **Tanaka S, Hirota T, Kamijo A, Ishii H, Hatsushika K, Fujieda S, et al.** Lung Functions of Japanese Patients with Chronic Rhinosinusitis Who Underwent Endoscopic Sinus Surgery. Allergology International. 63:27-35, 2014.
16. **Lee S, Yoon S, Song W, Lee S, Kang H, Kim S, et al.** Influence of chronic sinusitis and nasal polyp on the lower airway of subjects without lower airway diseases. Allergy Asthma Immunol Res. 6(4):310-315, 2014.
17. **Youssef AM, Osama G, Abdel-Naby Awad OG and Taha M.** Pulmonary function of patients with chronic rhinosinusitis and the impact of endoscopic sinus surgery. OTO Open. 1-7, 2017.
18. **Ragab SM, Lund VJ and Scadding G.** Evaluation of the medical and surgical treatment of chronicrhinosinusitis: a prospective, randomized, controlled trial. Laryngoscope. 114: 923-30, 2004.
19. **Karuthedath S, Singh I and Chadha S.** Impact of functional endoscopic sinus surgery on the pulmonary function of patients with chronic rhinosinusitis: a prospective study. Indian J Otolaryngol Head Neck Surg. 66:441-448, 2014.
20. **Yıldırım M, Belli S, Ozyilmaz C and Ogurlu O.** The Effect of functional endoscopic sinus surgery on lung function in patients with chronic sinusitis and nasal polyps without asthma. ENT Updates. 8(2): 93-99, 2018.
21. **Chen FH, Deng J, Hong HY, Xu R, Guo J, Hou W, et al.** Extensive versus functional endoscopic sinus surgery for chronic rhinosinusitis with nasal polyps and asthma: a 1-year study. Am J Rhinol Allergy. 30:143-148, 2016.
22. **Shturman-Ellstein R, Zeballos R, Buckley JM and Souhrada JF.** The beneficial effect of nasal breathing on exercise induced bronchoconstriction. Am Rev Respir Dis. 118:65-73, 1978.
23. **Borges DP and Gomes A.** Sinusitis and asthma: How do they interrelate in sinus surgery? Am J Rhinol.11:421-428, 1997.

الملخص العربي

تأثير لحميات الانف على وظائف التنفس قبل وبعد عمليه المنظار الوظيفي للأنف والجيوب الأنفية

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ملخص البحث:

الخلفية: يشكل مجرى الهواء العلوي والسفلي وحدة وظيفية معدية ويتعرضان لنفس المحفزات الالتهابية المماثلة التي تدعم فرضية المرض في جزء واحد يمكن أن ينعكس أو يظهر في جزء آخر.

الهدف: تقييم تأثير لحميات الأنف والجيوب الأنفية على اختبارات وظائف الرئة قبل و بعد عمليه المنظار الوظيفي للأنف والجيوب الأنفية.

الطرق: أجريت هذه الدراسة التداخلية على 30 مريضا يعانون من التهاب الجيوب الأنفية المزمن مع لحميات بالجيوب الأنفية. خضع جميع المرضى لتقييم مقياس انسداد الأنف، والفحص بالمنظار للأنف، ودرجة لوند مكاي بالأشعة المقطعية و اختبار وظائف التنفس قبل وبعد ثلاثة أشهر من جراحة الجيوب الأنفية بالمنظار .

النتائج: كان هناك انخفاض كبير في عنصرين من مقياس الأنف (انسداد الأنف ومشاكل النوم)، ودرجة الفحص بالمنظار، ودرجة لوند مكاي بالأشعة المقطعية، مع زيادة ملحوظة في وظائف التنفس (السعه الحيوية القصوى للرئة، أقصى معدل للزفير في الثانية الأولى، النسبة ما بين أقصى معدل للزفير في الثانية الأولى إلى السعه الحيوية للرئة و معدل الزفير القصوى في النسبة ما بين 25 الى 75 من السعه الحيوية للرئة) ثلاثة أشهر بعد الجراحة مقارنة بقيم ما قبل الجراحة (القيمة الاحتمالية =0.001).

في فترة ما قبل الجراحة ، يعاني 73.3 ٪ من ضيق الشعب الهوائية باستخدام جهاز قياس التنفس بينما في فترة ما بعد الجراحة 36.6 ٪ فقط لديهم ضيق الشعب الهوائية. باستخدام تحليل الانحدار اللوجستي متعدد المتغيرات كانت أهم العوامل التنبوئية لـوظائف التنفس غير الطبيعية في المرضى الذين يعانون من لحميات بالجيوب الأنفية هي مقياس ودرجة لوند مكاي بالأشعة المقطعية للجيوب الأنفية اليمنى، مقياس ودرجة لوند مكاي بالأشعة المقطعية للجيوب الأنفية اليسرى، وإجمالي درجة لوند مكاي بالأشعة المقطعية.

الاستنتاجات: لحميات الأنف والجيوب الأنفي له آثار سلبية على وظائف التنفس التي تحسنت بعد جراحه الجيوب الأنفية بالمنظار. العامل التنبؤي لخفض وظائف التنفس في المرضى الذين يعانون من لحميات الجيوب الأنفية هو درجة لوند مكاي بالأشعة المقطعية.

الكلمات المفتاحية: لحميات الأنف والجيوب الأنفية، اختبارات وظائف الرئة، مقياس الأنف، درجة لوند ماكاي بالأشعة المقطعية.

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