Main Article

Significance of Tissue Eosinophilla and Zinreich CT Scan Scoring in Nasal Polyposis

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ABSTRACT

Introduction

Chronic Rhinosinusitis with nasal polyp is a chronic inflammatory condition of sinuses and nasal cavity characterized by the presence of benign and hyperplastic overgrowths called nasal polyps. Nasal tissue eosinophilia can predict the disease severity and prognosis of the disease . In this study an attempt has been made te find an association between nasal tissue eosinophilia and Zinreich CT scan scoring.

Materials and Methods

This observational study was conducted at a tertiary care centre involving 40 patients with nasal polyposis underwent Functional endoscopic sinus surgery. All patients underwent pre operative CT scan and modifed Lund MacKay (Zinreich) score were calculated. Excised polyp tissues were sent for Histopathologic examination and eosinophil count was calculated per high power field (400 X). Eosinophil count was categorized into two groups (d" 10 E/HPF) and (> 10 E/HPF). We found that 15 patients had <=10 E/HPF and 25 patients had >10 E/HPF with mean CT scoring of 24.13 ± 8.991 and 37.88 ± 9.799 respectively.

Results

In our study out of 40 patients 7 had undergone FESS previously and 33 patients were undergoing FESS first time. It was found that 10 patients who had not undergone FESS previously had 0-5 eosinophils per high power field. 6 out of total 40 patients who had undergone FESS previously had more than 10 eosinophils per high power field .

Conclusion

There was moderate degree of correlation between nasal eosinophilia and CT scoring with p value< 0.0001. The no of eosinophils per HPF in histopathological specimen is an important diagnostic modality to predict the recurrence of nasal polyps after FESS.

Keywords

Nasal polyp; Eosinophilia; CT

Chronic Rhinosinuitis with nasal polyp is characterized by a Th2- skewed eosinophilic inflammation while Chronic Rhinosinustis without nasal polyp presents a predominant Th1 milieu in Western counties.[1]

Mucosal eosinophilic status provides certain prognostic information about disease severity or outcome.

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CRSwNP patients with mucosal eosinophilia show significantly less improvement in quality of life after FESS.

In Western countries, mucosal eosinophilia is defined as >5 or >10 eosinophils per high-power field (HPF)[2,3] while in Japan mucosal eosinophilia is defined as ≥ 70, >100, or >120 eosinophils per HPF.[4,5,6] Thus, diagnosis of eosinophilic infiltration is different among countries and facilities, and there is no consensus.[7] CT scan is one of the diagnostic modality to know the extent of disease and acts as a roadmap during the FESS. Lund Mac Kay is a standard system for evaluating CRS on CT scans scoring six sinuses on either side. The Zinreich

soring system is a method used in conjunction with the Lund Mackay system to assess the severity of inflammation in Chronic Rhinosinusitis with nasal polyps on Computed tomography scans. It focusses on the degree of sinus opacification , particularly in the ethmoid sinuses and provides a more detailed assessment than the basic LM score.

The modified Lund Mc Kay (Zinreich) staging systems showed more efficient ability to gradate in evaluating rhinosinusitis inflammation compared with the L–M system and also showed acceptable accuracy.[8]

An attempt was made to find association between the eosinophil count per high per field in specimen of nasal polyp for all the patients who underwent FESS with the modified Lund Mac Kay(Zinreich scoring)

In a study in which a tissue eosinophil count of >10/ HPF was histopathologically defined as ECRS, Snidvang et al. [9] compared non-ECRS patients with ECRS patients and demonstrated that endoscopic and CT scores were more severe in the ECRS patients. Based on the study out comes, they concluded that tissue eosinophilia could be a good marker of CRS, regardless of its subtypes.

In this study we also tried to show the significance of eosinophil count in nasal polyp tissue in patients who had recurrent nasal polyps after undergoing FESS previously.

Aims and Objectives :

1. To assess the significance of association with nasal tissue eosinophil count and Modified Lund -Mckay (Zinreich)scoring in CT scan.
2. To determine degree of nasal polyp eosinophilia in patients who had undergone FESS previously.

Materials and Methods

This is an Observational study which included all patients who were diagnosed CRS w NP who had failed medical management and had elected to undergo FESS were enrolled in the study. Medical management included four weeks of topical nasal corticosteroid spray.

Preoperative demographic and medical history was obtained which included age, sex, history of prior sinus surgery for nasal polyps. Diagnostic Nasal Endoscopic examination was done in OPD and the diagnosis was confirmed. CT scans in the coronal plane were obtained preoperatively and evaluated by using the Modified Lund-Mackay CT (Zinreich) scoring system (0-54 point scale).

The Modified Lund-Mackay score was used for the radiologic quantification of CRS severity. The sinuses were grouped into the frontal sinus, anterior ethmoidal cells, posterior ethmoidal cells, maxillary sinus, sphenoid sinus, and ostiomeatal complex. In the modified staging score ranging from 0-5 was given based on percentage of sinus opacification caused by mucosal thickening.

- 0%
- <25%:1 point
- 26-50%:2 points
- 51-75%:3 points
- 76-99%: 4 points
- 100%: 5 points

The osteomeatal complex is scored differently:

- 0 (normal)
- 1 (partially obstructed)
- 2 (completely obstructed)

Patients after undergoing FESS the tissue sample was taken from the nasal polyp and sent for Histopathological examination.

The sections obtained from the paraffin blocks of surgical materials, which were fixed with formaldehyde, were stained using hematoxylin and eosin. In these sections, mucosal eosinophil count was performed using high-power field (HPF, 400×)

Two patterns were recognized depending on the eosinophil count: (1).>10 eosinophils per field) and (2) <=10eosinophils per field.

The significance of Modified Lund-MacKay CT score with nasal tissue eosinophilia was investigated. The degree of nasal tissue eosinophilia in patients with recurrent nasal polyps who had previously undergone FESS was noted.

Results

Out of 40 patients who participated in the study ,the mean age of the patient was 40.83 with standard deviation 15.21

Table I : Age Distribution

	TOTAL (N = 40)
Age	
Number	40
Mean (Sd)	40.83 (15.211)
Median	39.00
Q1, Q3	30.00, 52.50
Min, Max	17.0, 84.0

Among 40 patients 13 (32.5%) were female and 27 (67.5%) were male patients

Table II : Gender Distribution

	TOTAL (N = 40)
Gender, n (%)	
Female	13 (32.5)
Male	27 (67.5)

For the 40 patients who were included in the study the mean CT scoring was 32.73 with standard deviation 11.55. Out of 40 patients 33 patients were undergoing FESS first time and 7 patients had undergone FESS previously. 7 patients who had undergone FESS previously had mean CT scoring of 38 which was higher than those 33 patients who had not undergone FESS previously and the mean CT scoring was 31.61

Table III : Lund MC Kay Scoring of Patients

	PREVIOUS FESS		TOTAL (N = 40)
	NEGATIVE (N = 33)	POSITIVE (N = 7)	
CT Scoring			
Number	33	7	40
Mean(Sd)	31.61 (12.075)	38.00 (7.141)	32.73 (11.556)
Median	38.00	38.00	38.00
Q1, Q3	20.00, 42.00	38.00, 42.00	20.25, 42.00
Min, Max	15.0, 54.0	23.0, 45.0	15.0, 54.0

Out of all the patients who were included in the study, maximum no of patients had E/hpf in the range of 0-5 followed by 10-15 then 15-20 then 5-10 and 25-30.The eosinophil count was again categorized for patients who had undergone previous FESS and those who had not undergone FESS previously. It was found that maximum no patients who had not undergone FESS previously had 0-5 eosinophils per high power field. Majority of patients who had undergone FESS previously had 10-15 eosinophils per high power field.

Table IV : Eosinophil Count of Patients

	PREVIOUS FESS		TOTAL (N = 40)
	NEGATIVE (N = 33)	POSITIVE (N = 7)	
E/HPF, n (%)			
0 - 5	10 (30.3)	01 (14.3)	11 (27.5)
5 - 10	04 (12.1)	0	04 (10.0)
10 - 15	05 (15.2)	04 (57.1)	09 (22.5)
15 - 20	06 (18.2)	0	06 (15.0)
25 - 30	01 (3.0)	02 (28.6)	03 (7.5)
30 - 40	01 (3.0)	0	01 (2.5)
40 - 45	01 (3.0)	0	01 (2.5)
45 - 50	03 (9.1)	0	03 (7.5)
75 - 80	01 (3.0)	0	01 (2.5)
1200 - 1500	01 (3.0)	0	01 (2.5)

In our study when we categorized the patients into two groups then we found that 15 patients had <=10 E/HPF and 25 patients had >10 E/HPFwith mean CT scoring of 24.13 ± 8.991 and 37.88 ± 9.799 respectively. Independent sample t test was performed and there was moderate degree of correlation between nasal eosinophilia and CT scoring with p value< 0.0001

Table V : Comparison of Eosinophil Count and CT Scoring

EOSINOPHIL COUNT LEVELS	CT SCORE	P VALUE
<=10 E/HPF	**24.13 ± 8.991**	**<0.0001**
>10 E/HPF	**37.88 ± 9.799**	

Discussion

Among 40 patients there were male patients than female patients which was consistent with the study done by Bajolia et al[10] where there was male preponderance among all patients.

In our study we found that 15 patients had <=10 E/HPF and 25 patients had >10 E/HPF with mean CT scoring of 24.13 ± 8.991 and 37.88 ± 9.799 respectively which is in consistent with study done by Szucs et al [11]in which it was concluded that Eosinophilic mucosal inflammation represents the most severe inflammatory changes of the mucosa. Twenty to forty percent of the patients with chronic rhinosinusitis had no eosinophilic inflammation of the mucosa. The CT-staging system of Lund-Mackay correlated with the extent of mucosal inflammation. maximum no of patients had E/hpf in the range of 0-5.

Our study was also consistent with the study done by Gupta et al [12] which demonstrated a positive correlation between tissue eosinophil counts and Lund-Mackay scores, indicating that higher tissue eosinophil count levels are linked to more severe disease.

In our study it was found that maximum no patients who had not undergone FESS previously had 0-5 eosinophils per high power field. Majority of patients who

had undergone FESS previously had 10-15 eosinophils per high power field. This was in contrast to study done by Wu PWet al[13] in which the average tissue eosinophil count in each HPF was 27.0 ± 29.7 for the total cases, 49.3 ± 39.5 in patients who required revision surgery group, and 23.1 ± 25.8 in patients who did not require revision surgery. The eosinophil infiltration in the sinus mucosa of patients requiring revision surgery was significantly more severe.

However our study was consistent with study by Brescia et al [14]which two patterns of polyposis were recognized depending on the eosinophil count : (1) polyposis rich in eosinophilic component ([10 eosinophils per field); and (2) polyposis poor in eosinophilic component (\10 eosinophils per field) recurrence rate was significan tly higher for patients with eosinophilic-type CRSwNP than for the non-eosinophilic type.

The presence of mucosal eosinophilia (10 eosinophils/ HPF) at the time of FESS consistently predicted less improvement in both disease specific and general QOL compared with patients without eosinophilia.[15]

Conclusion

It was concluded that out of 40 patients 15 patients had <=10 E/HPF and 25 patients had >10 E/HPF with mean CT scoring of 24.13 ± 8.991 and 37.88 ± 9.799 respectively. There was moderate degree of correlation between nasal eosinophilia and CT scoring with p value< 0.0001.

In our study out of 40 patients 7 had undergone FESS previously and 33 patients were undergoing FESS first time. It was found that 10 patients who had not undergone FESS previously had 0-5 eosinophils per high power field.

6 out of total 40 patients who had undergone FESS previously had more than 10 eosinophils per high power field indicating that tissue eosinophilia is significantly high in recurrent nasal polyps and is an important diagnostic modality to predict the need for further surgeries during counselling of patients.

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