

RESEARCH ARTICLE

Correlation between chronic rhinosinusitis and laryngopharyngeal reflux

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ABSTRACT


Background: Chronic rhinosinusitis (CRS) is a major Ear, Nose and Throat disease and there are higher numbers of refractory cases poorly responding to medical and surgical treatment. Laryngopharyngeal reflux (LPR) is said to be the important cause for same. **Aims and Objectives:** This study aims to study the incidence of LPR in patients of refractory CRS. This study also aims to study the impact of proton pump inhibitors (PPI) (effective treatment of LPR) given as adjuvant therapy along with functional endoscopic sinus surgery (FESS) in patients with refractory CRS. **Materials and Methods:** A total of 40 patients of refractory CRS taken up for the study were evaluated for signs and symptoms of LPR. They were then divided into two groups of 20 each - study group and control group. All the patients in both groups were evaluated for signs and symptoms of CRS. All these patients underwent FESS. Post-surgery patients in the study group were given intranasal steroids (INS) along with PPI (tablet pantoprazole) whereas in control group were put on INS without PPI. The patients were followed monthly for 3 months for improvement in signs and symptoms of CRS and patient's relief and comfortability levels. **Results:** 45% of patients of refractory CRS had LPR with the posterior larynx being mainly involved. The major signs and symptoms of CRS were nasal obstruction, nasal discharge, and nasal polyps. There was more improvement in nasal obstruction, nasal discharge, and post-nasal discharge in patients of study group with PPI as compared to control group without PPI. There was better relief of symptoms in patients given PPI as compared to control group and this improvement was more marked at 3rd post-operative visit after 3 months. **Conclusion:** There is a strong association between refractory CRS and LPR. PPI are an effective drug for refractory CRS when given as adjuvant therapy along with FESS.

KEY WORDS: Chronic Rhinosinusitis; Diagnostic Nasal Endoscopy; Diagnostic Laryngoscopy; Functional Endoscopic Sinus Surgery; Laryngopharyngeal Reflux; Proton Pump Inhibitors

INTRODUCTION

Chronic rhinosinusitis (CRS) is a major problem affecting 5–15% of world population.^[1] It is defined as inflammation

of sinonasal mucosa lasting for more than 12 weeks.^[2] It leads to impaired quality of life, emotional and functional impairment and high socioeconomic burden.^[3] The present treatment for CRS is intranasal steroids (INS).^[4] Those patients who fail to respond to medical treatment are diagnosed as refractory CRS. Functional endoscopic sinus surgery (FESS) is said to be the treatment of choice for refractory CRS.^[5] However, some patients fail to respond to FESS, and the reflux disease is said to be an important cause for the same.^[6] Other causes mentioned are poor surgical technique, allergy and smoking.^[7]

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Laryngopharyngeal reflux (LPR) is defined as reflux of stomach and esophageal contents into larynx and pharynx.^[8,9] Proton pump inhibitors (PPI) are the mainstay of treatment of LPR.^[10] There are some studies available regarding relationships between CRS and reflux disease in children.^[11] However, there are very few studies regarding this relationship in adults. According to a study, in LPR the nasal and nasopharyngeal mucosa are exposed to gastric acid leading to inflammation of mucosa and impaired mucociliary clearance which leads to obstruction of sinus ostia and recurrent infections.^[12] This leads to nasal congestion, excessive nasal secretions and post-nasal discharge (PND).^[13]

Hence, this study was planned to study the incidence of LPR in patients of refractory CRS. This study also aims to study the impact of PPI (effective treatment of LPR) given as adjuvant therapy along with FESS in patients with refractory CRS.

MATERIALS AND METHODS

This randomized case-control study was conducted in the Department of Ear, Nose and Throat of our Medical College and Hospital from January 2017 to August 2017 and the patients were followed up for 3 months. The Approval of Institutional Ethics Committee was taken. Patients aged above 18 years with signs and symptoms of CRS who gave consent for the study were included in the study. These were confirmed by Diagnostic Nasal Endoscopy (DNE) and computed tomography scan paranasal sinuses (PNS) coronal plane if needed.

Only patients with refractory CRS who did not respond to medical management were included in this study. Patients with a history of allergic rhinitis, those with deviated nasal septum, those on anti-reflux drugs such as PPI or H2 receptor antagonists or with history of smoking were excluded from the study. Patients who were found unfit for surgery and general anesthesia (GA) were also excluded from the study. 40 patients were taken up for study.

All these 40 patients included in the study were evaluated for symptoms of LPR such as foreign body sensation in throat, change in voice, chronic cough, sore throat, and difficulty in swallowing. These patients also underwent throat examination and diagnostic laryngoscopy for signs of LPR such as laryngeal congestion and posterior pharyngeal wall congestion. The findings were noted.

A total of 40 patients included in this study were randomly divided into two equal groups of 20 each called study and control group. All these patients in both groups were evaluated at the initial visit for symptoms of CRS such as nasal obstruction, nasal discharge, headache, facial pain, loss of smell, and PND. All these patients underwent DNE

for evaluation of signs such as nasal polyps, mucopurulent discharge, and mucosal edema.

All these patients with refractory CRS in both groups underwent FESS under GA. Post-surgery the patients in both groups were put on INS fluticasone propionate 50 mcg 2 sprays in each nostril once daily in the morning. The patients in the study group were also put on oral PPI tablet pantoprazole 40 mg once daily 1 h before breakfast whereas PPI was not given to the control group. The patients in both groups were followed up after 1 month, 2 months, and 3 months post-surgery.

The evaluation points were

1. Age and sex distribution of patients with CRS.
2. Incidence of LPR among patients with CRS.
3. Major signs and symptoms of patients with CRS.
4. Improvement of signs and symptoms of patients with CRS post-surgery in the study group as compared to control group at each visit.
5. Patient comfort level was assessed in both groups according to LIKERT Scale as 1 - very comfortable, 2 - comfortable, 3 - no change, and 4 - uncomfortable at each visit.
6. Effectiveness of PPI in CRS was evaluated.

RESULTS

Most of the patients were of middle age group (>50%). There was no major difference in the incidence of CRS among males and females [Table 1].

Around 18 patients of the total patients with CRS (45%) had symptoms of LPR. The major symptom seen was foreign body sensation in throat seen in 15 patients and change in voice in 7 patients. On examination of the throat and diagnostic laryngoscopy, 12 of these 18 patients had congestion or edema of larynx or posterior pharyngeal wall. The most common finding was seen in posterior part of larynx - arytenoids and inter arytenoid region and posterior part of vocal cords [Table 2].

The most common symptom of patients of CRS in both groups was nasal obstruction (88%) followed by nasal discharge in 68% of patients. Among the findings on examination and DNE, mucosal edema, and mucopurulent discharge mainly in middle meatus were seen in 78% of patients. Nasal polyps were found in 7 patients (35%) in the study group and 8 patients (40%) in control group [Table 3].

Regarding the improvement of signs and symptoms post-treatment in both groups, there was almost equal reduction of symptoms in both groups at 1st visit after 1 month. However, more improvement was seen in the symptoms of nasal obstruction, nasal discharge, PND and signs of mucopurulent

discharge and mucosal edema in a study group where PPI were given as compared to control group without PPI at the end of 2nd month post-treatment (2nd post-treatment visit). This difference was more marked at the end of 3rd post-treatment visit [Tables 4 and 5].

Regarding the comfort level and relief among patients in both groups, more patients had relief or felt comfortable at the end

Table 1: Age and sex distribution among patients with CRS

Age group (years)	Males	Females	Total
18-40	6	7	13
41-60	11	10	21
>60	2	4	6
Total	19	21	40

CRS: Chronic rhinosinusitis

Table 2: Signs and symptoms of LPR among patients with CRS

Signs and symptoms	Number of patients <i>n</i> - 40 and (%)
Symptoms	
Foreign body sensation	15 (38)
Change in voice	7 (18)
Chronic cough	6 (15)
Sore throat	6 (15)
Heartburn	4 (10)
Difficulty in swallowing	1 (3)
Signs	
Posterior larynx congestion or edema	9 (23)
Anterior larynx congestion or edema	3 (8)
Posterior pharyngeal wall congestion or edema	5 (13)

n: Number of patients, %: Percentage of patients, CRS: Chronic rhinosinusitis, LPR: Laryngopharyngeal reflux

Table 3: Signs and symptoms of CRS among patients in both groups at initial visit

Signs and symptoms	Study group <i>n</i> - 20	Control group <i>n</i> - 20	Total <i>n</i> - 40 (%)
Symptoms			
Nasal obstruction	17	18	35 (88)
Nasal discharge	14	13	27 (68)
Headache	9	11	20 (50)
Facial pain	10	8	18 (45)
Loss of smell	8	9	17 (48)
Posterior nasal discharge	8	8	16 (40)
Signs			
Nasal polyp	7	8	15 (38)
Mucopurulent discharge	15	16	31 (78)
Mucosal edema	16	15	31 (78)

n: Number of patients, %: Percentage of patients, CRS: Chronic rhinosinusitis

of 3rd visit in the study group (80%) where PPI were added to treatment as compared to control group (60%) without PPI. 30% of patients had no improvement in the control group as compared to only 10% in study group [Tables 6 and 7].

The odds ratio for the significance of PPI in the treatment of CRS was calculated regarding the relief among patients in study group where PPI were given as compared to control group without PPI, and it was found to be around 2.6 which was statistically significant.

DISCUSSION

There were more incidences of CRS among middle age group in our study. There was no major difference between males and females in our study [Table 1]. Other studies have shown equal incidence among sexes and age groups.^[14] 45% of patients with refractory CRS had symptoms of LPR in our study. Ozmen *et al.* had also shown the relationship between CRS and LPR.^[15] DiBaise *et al.* showed a higher number 81.8% of patients with CRS had reflux disease^[16] and Phipps *et al.* had reported 63% of patients with CRS had reflux.^[17] Foreign body sensation in throat was the most common symptom, and posterior laryngeal congestion was the most common sign in our study [Table 2]. Ulualp *et al.* also found signs of posterior laryngitis in patients with refractory CRS.^[18]

Nasal obstruction and nasal discharge were the most common symptoms in our study. Nasal polyps were seen in 38% of patients of refractory CRS in our study [Table 3]. In our study, there was an almost equal reduction of symptoms in both groups at 1st visit after 1 month. However, more improvement was seen in the symptoms of nasal obstruction, nasal discharge, PND and signs of mucopurulent discharge and mucosal edema in study group where PPI were given as compared to control group without PPI at the end of 2nd month post-treatment

Table 4: Signs and symptoms of CRS among patients in study group at each visit

Signs and symptoms	Initial evaluation <i>n</i> - 20 (%)	First follow-up <i>n</i> - 20 (%)	2 nd follow-up <i>n</i> - 20 (%)	3 rd follow-up <i>n</i> - 20 (%)
Symptoms				
Nasal obstruction	17 (85)	8 (40)	5 (25)	4 (20)
Nasal discharge	14 (70)	7 (35)	4 (20)	4 (20)
Headache	9 (45)	4 (20)	2 (10)	1 (5)
Facial pain	10 (50)	4 (20)	2 (10)	2 (10)
Loss of smell	8 (40)	2 (10)	1 (5)	1 (5)
Posterior nasal discharge	8 (40)	4 (20)	2 (10)	1 (5)
Signs				
Nasal polyp	7 (35)	0 (0)	0 (0)	0 (0)
Mucopurulent discharge	15 (75)	7 (35)	4 (20)	4 (20)
Mucosal edema	16 (80)	7 (35)	4 (20)	4 (20)

n: Number of patients, %: Percentage of patients, CRS: Chronic rhinosinusitis

Table 5: Signs and symptoms of CRS among patients in control group at each visit

Signs and symptoms	Initial evaluation <i>n</i> - 20 (%)	First follow-up <i>n</i> - 20 (%)	2 nd follow-up <i>n</i> - 20 (%)	3 rd follow-up <i>n</i> - 20 (%)
Symptoms				
Nasal obstruction	18 (90)	9 (45)	7 (35)	7 (35)
Nasal discharge	13 (65)	7 (35)	6 (30)	6 (30)
Headache	11 (55)	5 (25)	3 (15)	2 (10)
Facial pain	8 (40)	4 (20)	2 (10)	2 (10)
Loss of smell	9 (45)	2 (10)	2 (10)	1 (5)
Posterior nasal discharge	8 (40)	5 (25)	5 (25)	5 (25)
Signs				
Nasal polyp	8 (40)	0 (0)	0 (0)	0 (0)
Mucopurulent discharge	16 (80)	8 (40)	6 (30)	6 (30)
Mucosal edema	15 (75)	8 (40)	7 (35)	7 (35)

n: Number of patients, %: Percentage of patients, CRS: Chronic rhinosinusitis

Table 6: Comfort level and relief among patients in study group at each visit

Comfort level	1 st follow-up visit <i>n</i> - 20 (%)	2 nd follow-up visit <i>n</i> - 20 (%)	3 rd follow-up visit <i>n</i> - 20 (%)
Very comfortable (total relief)	5 (25)	8 (40)	9 (45)
Comfortable (improvement)	6 (30)	8 (40)	7 (35)
No change	7 (35)	2 (10)	2 (10)
Uncomfortable (worsening)	2 (10)	2 (10)	2 (10)

n: Number of patients, %: Percentage of patients

Table 7: Comfort level and relief among patients in control group at each visit

Comfort level	1 st follow-up visit <i>n</i> - 20 (%)	2 nd follow-up visit <i>n</i> - 20 (%)	3 rd follow-up visit <i>n</i> - 20 (%)
Very comfortable (total relief)	4 (20)	6 (30)	6 (30)
Comfortable (improvement)	6 (30)	6 (30)	6 (30)
No change	8 (40)	6 (30)	6 (30)
Uncomfortable (worsening)	2 (10)	2 (10)	2 (10)

n: Number of patients, %: Percentage of patients

(2nd post-treatment visit). This difference was more marked at the end of 3rd post-treatment visit [Tables 4 and 5]. Regarding the comfort level and relief among patients in both groups, more patients had relief or felt comfortable at the end of 3rd visit in study group (80%) where PPI were added to treatment as compared to control group (60%) without PPI [Tables 6 and 7]. The odds ratio regarding the relief of symptoms of the study group with PPI as compared to without was also statistically significant. This shows that PPI do have a role as an adjuvant therapy along with FESS in patients of refractory CRS.

Similar results were obtained by other studies by Phipps *et al.* who showed 80–90% patients had improvement with PPI.^[17] Pincus *et al.* also reported 56% improvement of sinonasal symptoms with PPI.^[19] DiBiase *et al.* reported the improvement most discreet after 3 months of treatment with PPI^[6] which goes along with our study results. Vaezi *et al.* showed that patients receiving PPI (lansoprazole) had maximum improvement of PND.^[20] Our study also showed greater improvement of PND in the study group as compared to control group. However, a study by Durmus *et al.* showed no improvement in symptoms of refractory CRS in patients with PPI.^[21] Studies have shown that reflux leads to poor post FESS symptomatic outcomes.^[6] In our study also we found that in patients of control group where PPI were not added to treatment, patients had much lesser improvement with FESS alone as treatment as compared to study group.

The limitation of our study was a shorter follow-up period for 3 months to study the impact of treatment. Longer follow-up studies for a year or more are needed. Second, studies with larger sample size as compared to our study are needed in the future.

CONCLUSION

There is a strong incidence of LPR symptoms and signs in patients with refractory CRS. The adjuvant therapy of PPI along with FESS gives greater relief of signs and symptoms of CRS mainly nasal obstruction, nasal discharge, and PND. PPI as an adjuvant therapy along with FESS leads to better relief and improvement among patients with refractory CRS. Further studies are needed to be done in this field with larger sample size and for a longer follow-up period.

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