



A CLINICO-PATHOLOGICAL STUDY OF CHRONIC RHINOSINUSITIS OF BOTH POLYPOIDAL AND NON POLYPOIDAL VARIETY WITH COMPARISON BETWEEN THE MEDICAL AND SURGICAL MANAGEMENT

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Dr. Soumen Biswas	Dept. of ENT; Institute of Otolaryngology and Head & Neck Surgery; IPGMER; Kolkata; India.
Dr. Bijoy Krishna Bhadra*	Dept. of ENT; Institute of Otolaryngology and Head & Neck Surgery; IPGMER; Kolkata; India. *Corresponding Author
Dr. Debarshi Jana	Institute of Post-Graduate Medical Education and Research, A.J.C. Bose Road, Kolkata-700020, West Bengal, India

ABSTRACT

This study evaluates the subjective and objective improvement in patients of CRS after initial 3 weeks of medical management and based on their percentage of improvement management plan is decided either to continue medical treatment or to be taken for FESS. The patients who were taken for either medical treatment only or taken for FESS with combined medical treatment were assessed again after six weeks.

The study was conducted in the Department of ENT, IPGMER & SSKM Hospital, Kolkata from 1 Year 6 Month (April 2018 to September 2019).

Also eyeing the statistically significant correlation of high Eosinophil count in tissue specimen of a patient with high disease load Tissue eosinophil aggregates appear to be an important driving factor for increased medicine (steroids) requirements after sinus surgery to control the mucosal disease. This key finding may identify patients at high risk for failure after sinus surgery and guide more proactive postoperative management.

KEYWORDS

Chronic Rhinosinusitis, Clinico-pathological Study, Treatment, Polypoidal And Non Polypoidal Variety

INTRODUCTION

Chronic rhinosinusitis (CRS) affects 1 in 8 people in India; about 5-15% of the urban population. The prevalence of sinusitis (146/1000 population) has been reported to exceed that of any other chronic condition and is apparently on the increase. Sinusitis is a common health problem that leads to frequent visits to primary care physicians and to ear, nose and throat specialists all over the world. It contributes to a significant amount of health care expenditure due to direct costs arising from physician visits and antibiotics, as well as indirect costs related to missed days at work and a general loss of productivity due to a decrease in life-quality of those affected.

People with rhinosinusitis usually need lifelong treatment to keep the symptoms in check. Potential treatment for CRS includes – lifestyle modification for people who have environmental allergies. Daily nasal saline washing is applied to clear away and reduces its interference with medications. Glucocorticoid nasal sprays, washes and drops are used as anti-inflammatory drugs as well as to decrease mucous production and shrink any polyp that may be present.

In 1996, the American Academy of Otolaryngology-Head and Neck Surgery Multidisciplinary Rhinosinusitis Task Force (RTF) defined adult rhinosinusitis diagnostic criteria. Major factors included facial pain or pressure, nasal obstruction or blockage, nasal discharge or purulence or discoloured postnasal discharge, hyposmia or anosmia, purulence in nasal cavity and fever. Glucocorticoid pills deliver higher doses in circulation compared with nasal sprays. Antibiotics and leukotriene modifiers are also involved in medication.

In spite of these above, when there is evidence of persistent sinus disease on sinus computed tomography (CT Scan) such as complete blockage of one or more sinuses, when nasal polyps are present that do not sufficiently shrink with steroid treatment or when allergic fungal rhinosinusitis having one or more sinuses completely blocked on sinus CT Scan, when there is severe deviation of the septum causing a nasal blockage- are referred to as endoscopic sinus surgery (ESS). ESS was introduced in the 1960s by Professors Messerklinger and Wigand. Recent advances in endoscopic technology and a better understanding of the importance of the osteo-meatal complex in the pathophysiology of sinusitis have led to the establishment of Functional Endoscopic Sinus Surgery (FESS). As the surgical procedure of choice. FESS restores adequate aeration and drainage of the sinuses, de-bulk severe polyposis and causes less damage to normal nasal functioning. FESS is successful in restoring sinus health with complete or moderate relief of symptoms in 80-90% patients with supportive medical treatment pre and postoperatively.

treatments for chronic rhinosinusitis (CRS) is insufficient. This study evaluates the subjective and objective improvement in patients of CRS after initial 3 weeks of medical management and based on their percentage of improvement management plan is decided either to continue medical treatment or to be taken for FESS. The patients who were taken for either medical treatment only or taken for FESS with combined medical treatment were assessed again after six weeks.

METHODOLOGY

The study was conducted in the Department of ENT, IPGMER & SSKM Hospital, Kolkata from 1 Year 6 Month (April 2018 to September 2019).

INCLUSION CRITERIA:

1. Established cases of CRS as Defined in Rhino sinusitis Task Force (RSTF), which was established by the American Academy of Otolaryngology—Head and Neck Surgery (AAO- HNS) in 1996. Presence of 2 or more major or 1 major and 2 minor factors >12weeks. **Major factors** include Facial pain/pressure, Nasal obstruction/ Blockage, Nasal purulent discharge, Hyposmia/ Anosmia or Purulence in nasal cavity on examination. **Minor factors** includes Headache, Fever, Halitosis, Fatigue, Dental pain, Cough or Ear pain/pressure.
2. Age greater than 16 years and less than 55 years.

EXCLUSION CRITERIA:

1. Patient with chronic diseases like Cystic fibrosis, Primary culinary dyskinesia immunodeficiency etc..
2. Pregnancy.
3. Neoplastic Lesion.
4. Patient not compliant to treatment.
5. Medical and Surgical treatment influencing study.

I. METHODOLOGY

The study was conducted on 60 adult patients in the age group of 16 to 55 years of age who fulfilled criteria of CRS. All patients were medically treated for CRS and observed after 3 weeks. The medical treatment mainly Nasal Saline Irrigation, Antibiotics, Antihistaminic, Topical Intranasal and Oral Corticosteroids constitute as the first line of therapy. In case treatment was not effective i.e. SNOT22 score improvement <50%, they were scheduled for FESS intervention with combined medical therapy. The improvement of the patient who was taken for either medical treatment only or taken for FESS with combined medical treatment was measured by Sino Nasal Outcome (SNOT) Score, Lund Kennedy Endoscopic Score (LKS) and Lund Mackay CT scan Score (LMS) and observed again after 6 weeks.

J. Statistical Analysis Plan

Data would be summarised by routine descriptive statistics, namely

Evidence evaluating the comparative effectiveness of various

Mean, Standard deviation or Median for numerical variable and counts & percentages for categorical variables. Continuous variables are presented as mean $\pm$ SD, and categorical variables are presented as absolute numbers and percentage. The comparison of normally distributed continuous variables between the groups was performed using Student's t test. Within the groups, unpaired t test was used. Nominal categorical data between the groups were compared using Chi-squared test or Fisher's exact test as appropriate. For all statistical tests, a p value less than 0.05 was taken to indicate a significant difference.

RESULT AND ANALYSIS

Our study showed that out of the 60 patients, 35 were male and 25 were females. The predominant age group among the patients with CRS was 26-35 years of age.

We found that 60 patients were categorised into two groups on endoscopic examination, one with CRS with Nasal Polyp (CRSwNP) and other CRS without Polyps (CRSsNP). There were 26 (43.3%) patients in CRSwNP group and 34 (56.67%) in CRSsNP group. These two groups were given three weeks of medical management. Based on improvement in SNOT22 score, patients were either continued on medical treatment or planned for FESS with combined medical therapy. 34 (56.67%) patients showed improvement with medical treatment and 26 (43.33%) had to undergo FESS. Out of 34 patients treated medically, 10 were from CRSwNP group and 24 were from CRSsNP group. Similarly out of 26 patients undergoing FESS 16 were from CRSwNP and 10 were from CRSsNP.

It was found that out of 35 male patients, 19 (54.2%) were medically treated and 16 (45.7%) were treated with FESS after medical treatment. Out of 25 (41.66%), female patient 15 (60%) were medically treated and 10 (40%) were surgically treated. These two groups i.e. CRSwNP and CRSsNP are compared pre-intervention as well as post-intervention in term of three parameter's data (SNOT 22, LKS and LMS) using t-test calculator in GraphPad QuickCalc. P-value

SNOT 22 Analyses

We found that mean SNOT at baseline for CRSwNP undergoing medical regimen was 72.8 $\pm$ 6.3 and after 6 weeks of treatment was 14.1 $\pm$ 3.9. Similarly, mean SNOT for the surgical regimen at baseline 87.37 $\pm$ 6.56 and after 6 week was 20.19 $\pm$ 5.31. Mean SNOT at baseline for CRSsNP undergoing medical regimen was 31.5 $\pm$ 11.9 and after 6 weeks of treatment 5.08 $\pm$ 2.53. Similarly, mean SNOT for the surgical regimen at baseline 56.2 $\pm$ 6.96 and after 6 week was 17 $\pm$ 4.71.

Our study showed that percentage of improvement with medical management for CRSwNP was 82.10% and CRSsNP was 83.87%. Whereas same for surgical management with CRSwNP 76.9% and CRSsNP 69.75%. Therefore both surgical and medical management seems to yield significant result in term of SNOT score.

Since many of the questions in the SNOT-22 questionnaire cluster together, for the analysis, we grouped the questions into 4 main categories:

- **Nasal related** ("need to blow nose", "sneezing", "runny nose", "nasal obstruction", "loss of smell/taste", and "post-nasal drip" (PND),
- **Ear and Facial related** ("ear fullness", "dizziness", "ear pain", "facial pain and pressure"),
- **Quality of Life-related** ("difficulty falling asleep", "wake up at night", "wake up tired", "fatigue", "reduced productivity", "reduced concentration"), and **Psychologically related** ("frustrated/ restless/irritable", "sad", "embarrassed").

In our study, the most common cluster of symptoms was Nasal related (86.67%) followed by Ear and Facial related symptoms (75%).

LKS Analysis

Analysis of Lund Kennedy nasal endoscopy score was done and its statistical significance was determined with the help of student t test for independent samples.

It was found that mean LKS at baseline for CRSwNP treated with the medical regimen 4.6 $\pm$ 0.97 and after 6 week of treatment 3.2 $\pm$ 1.03. Similarly Mean LKS for the surgical regimen at baseline 8.38 $\pm$ 2.85 and after 6 week of treatment 2.38 $\pm$ 1.67.

Our study showed that mean LKS at baseline for CRS without Nasal Polyp the medical regimen is 3.75 $\pm$ 1.03 and after 6 week of treatment is 1.08 $\pm$ 1.17. Similarly Mean LKS for surgical regimen at baseline 6.6 $\pm$ 0.97 and after 6 week of treatment 4.1 $\pm$ 2.02.

We found that percentage of improvement with medical management for CRS with Nasal Polyp 30.43% and without Polyp 71.2% whereas same for surgical management with Nasal Polyp 71.68% and without Polyp 37.87%.

Therefore improvement in terms of LKS for CRS with NP significantly higher with surgical management as compared to medical management. Whereas almost reverse is true for CRS without NP where medical management give significant better result as compared to surgical.

LMS Analysis

Our study found that mean LMS at baseline for CRS with Nasal Polyp the medical regimen 8 $\pm$ 1.89 and after 6 weeks of treatment 5.8 $\pm$ 2.20. Similarly, Mean SNOT for the surgical regimen at baseline 16.125 $\pm$ 5.24 and after 6 weeks of treatment 3.125 $\pm$ 2.63.

We found that mean LKS at baseline for CRS without Nasal Polyp the medical regimen is 1.08 $\pm$ 1.17 and after 6 weeks of treatment is 0.95 $\pm$ 1.49. Similarly, Mean LKS for surgical regimen at baseline 12.6 $\pm$ 2.84 and after 6 weeks of treatment 5.5 $\pm$ 3.75.

It was found that percentage of improvement with medical management for CRS with Nasal Polyp 27.5% and without Polyp 84.67% Whereas same for surgical management with Nasal Polyp 80.62% and without Polyp 56.34%.

Therefore an improvement in terms of LKS for CRS with NP significantly higher with surgical management as compared to medical management. Whereas almost reverse is true for CRS without NP where medical management give significant better result as compared to surgical.

Additional Interpretation of LMS

1. The LMS score for CRSwNP (13) is significantly higher than that CRSsNP (8.1) with (p-value<0.005)
2. Higher bilateral diseases with involvement of multiple sinuses
3. Maxillary Sinus is most commonly involved in both group of CRS

HISTOPATHOLOGICAL ANALYSIS

It was found that of the 16 CRSwNP specimens who underwent surgery, 6 were grade I (<100), 5 were grade II (100-500), and 8 were grade III (500-1000). Mean eosinophil count was 536.69 $\pm$ 290.25 cells/HPF.

Of the 10 CRSsNP specimens who underwent surgery, 4 were grade I (<100), 6 were grade II (100-500), and none were grade III (500-1000). Mean eosinophil count was 163.8 $\pm$ 103.393 cells/HPF.

1. Eosinophil count is directly associated with the presence of a nasal polyp. Mean EC for CRSwNP is 536.69 $\pm$ 290.25 cells/HPF in comparison to CRSsNP 163.8 $\pm$ 103.393 cells/HPF.
2. There is a statistically significant correlation between disease load (i.e. high LMS) and eosinophil count per HPF. p-value 0.0000013 (<0.05) and for CRSwNP in comparison to CRSsNP with p-value 0.00053085 (<0.05).

DISCUSSION

Chronic rhinosinusitis (CRS) remains an extremely common clinical condition with an estimated lifetime prevalence of 12%. Nasal Polyp usually manifests after the age of 20. Male is more commonly affected than female. Several previous studies show male predominance previously¹⁻⁴.

In our study, the number of people (56.67%) improved with medical treatment and doesn't require surgical treatment. Similar results were found by Ragab S et al have also shown in their study that such patients should be initially targeted with maximal medical therapy with surgical treatment being reserved for cases refractory to medical treatment⁵.

In yet another study by Dufour et al, it was concluded that cases refractory to intensive medical management showed improvement in

the quality of life after surgical management⁶. Similar was the case in 26 (43.33%) in our study.

The mean LMS for CRSwNP⁵ was significantly higher than that of CRSsNP(8.1) (P-value < 0.005). The mean Lund Kennedy endoscopy score of NP(6.9) was significantly higher than that of CRS(4.6) (P-value < 0.005). In our study, we have found higher bilateral disease with involvement of multiple sinuses in NP as compared to CRS. Toros SZ et al. have observed significantly higher CT scan and endoscopy scores in patients of NP as compared to CRS⁷.

In our study, there was a statistically significant improvement in subjective parameter (SNOT-82.10% vs 76.9%) in the patient of CRSwNP after both medical and surgical treatment. But in term of objective parameters (LKS30.43% vs 71.68% and LMS-27.5% vs 80.62%), the medical regimen were found much less effective as compared to a surgical regimen. This is in line with finding by Timothy L. Smith et al, demonstrated the improvement in the quality of life (QOL) in both medically treated and surgically treated patients, and with CRS though patients treated surgically experienced significantly more improvement in disease-specific QOL⁸. Also, Ebba Heden Blomqvist et al medical treatment is sufficient to treat most symptoms of nasal polyposis except in the case where the nasal obstruction is the main problem after steroid treatment where surgical treatment is indicated⁹.

Conversely for the patient with CRSsNP the medical regimen and surgical both give statistical significant improvement (SNOT- 83.87% vs 69.75%, LKS71.2% vs 37.9% and LMS-84.67% vs 56.34%) however surgical regimen was found less effective in both subjective and objective parameter. So as Khalil et al demonstrated in a large review of randomised controlled studies comparing the two arms of surgical and medical therapy, ESS does not clearly confer an additional clinical benefit to medical treatment¹⁰.

Also in our study Maxillary sinus was most commonly involved in CRS (100%), followed by Osteomeatal complex blockade and involvement of anterior ethmoid air cells. Hence, the Messerklinger technique of clearing & widening the sinus Ostia from anterior to posterior seems more rational than Wigand.

Thus, we found most of our outcomes were in good conjunction with earlier studies over medical versus surgical treatment of CRS.

CONCLUSION

Medical treatment was found to be sufficient to treat most symptoms of CRS (with and without polyp). 34 patients showed an average improvement of 82.10% (CRSwNP) and 83.87%(CRSsNP).

Patients who underwent only medical treatment and those who were treated with combined medical and surgical treatment showed similar improvements after six weeks. However, it is also evident that CRS with higher diseases spectrum especially of polypoidal variety tends to give less than the satisfactory outcome at least in objective parameter and ultimately end up doing FESS.

Henceforth CRS should be initially targeted with maximal medical therapy with surgical being reserved for cases refractory to medical therapy.

Also eyeing the statistically significant correlation of high Eosinophil count in tissue specimen of a patient with high disease load Tissue eosinophil aggregates appear to be an important driving factor for increased medicine (steroids) requirements after sinus surgery to control the mucosal disease. This key finding may identify patients at high risk for failure after sinus surgery and guide more proactive postoperative management.

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