International Journal of Basic and Applied Medical Sciences ISSN: 2277-2103 (Online)
An Online International Journal Available at http://www.cibtech.org/jms.htm
2013 Vol. 3 (2) May-August, pp.382-396/Neelam et al.
Research Article

A PROSPECTIVE STUDY OF CHRONIC RHINOSINUSITIS IN KASHMIRI CHILDREN FOR 2 YEARS

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ABSTRACT.
The objective was to study the evaluation & management of chronic rhinosinusitis among Kashmiri children as it is a very common disorder increasing in both incidence and prevalence with significant impact on quality of life and substantial health care costs. This is a prospective study of 2 years carried out from Dec. 2010 to Dec. 2012; a total of 2023 pediatric patients attended the Department of ENT, SMHS Hospital, out of which 809 patients in the age group of 5-15 years presented with nasal symptoms. Out of 809 patients, 74 patients met the criteria for chronic rhinosinusitis & following conclusions were drawn from this study. The most common age group suffered is 11-15 years. The prevalence rate in Kashmiri children is 9.1% & is more common in male children in the ratio of 1.4:1 & more common in urban population (63.51%). The presenting symptom in 95.94% cases is Nasal obstruction. Purulent nasal discharge, headache, cough, fetid breath & PND are other major presenting symptoms. Allergy is associated in 25.67% of pediatric patients & URTIs in 20.27% cases; Non-obstructive DNS is an incidental finding in 58.11% of patients. Culture sensitivity is helpful in resistant cases; CT ParaNasal Sinus is an important diagnostic tool. Co-Amox-Clav is 1st line of medicine. Ciprofloxacin showed a good response in resistant cases. Other drugs like, Topical decongestants & Corticosteroid sprays have good results (in c/o allergic history). Adenoid hypertrophy should be ruled out if not responding to medical treatment. So, Adenoidectomy has a role in relieving symptoms. Complications of sinusitis are rare in pediatric patients. It was seen that Co-Amoxclav was given to 73 (98.65%) patients out of which 71 patients (97.26%) were cured and surgical intervention was done in 2 patients. Among which adenoidectomy was done in 1 patient (1.35%) and external incisional drainage in 1 patient (1.35%) so adenotonsillectomy can be considered as a treatment modality for chronic rhinosinusitis.

Key Words: *Rhinosinusitis, Upper Respiratory Tract Infection, Allergy, Sinus*

INTRODUCTION

As little as 10 years ago, many physicians doubted that sinusitis was a pediatric disease. It was widely believed that the sinuses were not developed in infants and young children and the bacterial infections seldom occurred. Advances in imaging techniques, the development of quartz-rod optical telescopes for nasal endoscopy and others into the pathophysiology of pediatric sinus disease have changed the understanding and approach to this disorder (Glenn Isaacson *et al.,* 1996) Average child has between 6 and 8 colds annually, and it has been estimated that 5% to 10% of all URTIs are complicated by sinusitis (Vanderberg *et al.,* 1997) Sinusitis is therefore a significant and common problem in pediatric primary care practice.

The symptoms of anterior or posterior nasal discharge, nasal obstruction, headache, etc. may easily point to the diagnosis of sinusitis in adults; however complaints in young children are less specific and considerable overlap with those of the common cold. Nasal obstruction and day time cough usually resolve spontaneously within 5 – 7 days with typical upper respiratory infection if these symptoms persist beyond 10 days, a bacterial infection of paranasal sinuses is likely. Headache and facial pain more commonly are reported by children > 5 years of age with chronic rhinosinusitis (Isaacson *et al.,* 1996). To foster effective communication among physicians and researchers and to standardize the reporting of rhinosinusitis, the task force on rhinosinusitis was created in 1996, sponsored by the American Academy

of Otolaryngology Head & Neck Surgery; their work resulted in the publishing of "working definitions" for rhinosinusitis in 1997. The task force prepared a symptom based format for the diagnosis of rhinosinusitis, with major and minor symptom categories (Sobol *et al.,* 2005). According to the duration of symptoms, rhinosinusitis was defined as –

Acute – when symptoms lasted 4 weeks or less.

Subacute – when symptoms were present for 4 – 12 weeks.

Chronic – symptoms lasting longer than 12 weeks.

Recurrent – reserved for patients with 4 or more episodes per year with disease free intervals in between.

Paranasal sinuses are divided into 5 groups based on their location and routes of drainage. Maxillary and ethmoid sinuses though present at birth, are fully developed at 3 years of age. Frontal and sphenoid sinuses become clinically important at 7 years and 2nd decade of life respectively (Isaacson *et al.,* 1996). The frontal, maxillary and anterior ethmoid sinuses all drain into a common space in middle meatus called the hiatus semilunaris. This cleft and the surrounding structures together comprise the OMC (Osteomeatal complex). Obstruction in this narrow, critical region is believed to be a key event in the development of chronic sinusitis. This obstruction may be anatomic or physiologic (Isaacson *et al.,* 1996). Anatomic variants believed to lead to sinus obstruction, are ethmoid air cells located on inferior orbital wall called Haller cells, abnormal pneumatization of the middle concha (concha bullosa); a laterally displaced uncinate process; or nasal septal spurs at the level of OMC (Isaacson *et al.,* 1996). The general architecture of the nasal chamber and nasopharynx and the dynamic aspects of facial growth also contribute to relative risk for involvement of each sinus, e.g. the position of the maxillary sinus ostium high on the medial border of the sinus cavity prevents gravitational drainage of the secretions and thus leads to sinus infection (Melter *et al.,* 1983).

In addition to or superimposed on these anatomical factors, obstruction to drainage of paranasal sinuses may be physiological as well.

Two important factors for physiological obstruction are mucosal oedema and abnormal mucociliary functions. While nasal allergy, upper respiratory viral infections are responsible for the former. Ciliary dyskinesis, cystic fibrosis are two causative factors for the later (Isaacson *et al.,* 1996). In addition certain systemic factors like disorders of immune functioning, chronic diseases and immuno-suppression can also predispose to bacterial infection of sinuses. Partial obstruction by adenotonsillar hypertrophy may also lead to changes in micro-environment, fostering bacterial growth and hence chronic sinusitis (Gungor *et al.,* 1997). GERD is being found to be an important cause of ear and sinus disease in children and must be considered in all preoperative evaluation before FESS (Nishioka *et al.,* 1996).

Allergies seem to be an important factor because 10% to 15% of children have perennial or seasonal allergic rhinitis by the age of 16 years. Allergic children with symptoms with rhinitis have a high frequency of sinusitis. Sinus disease prevalence was found to be 63% in atopic children with chronic respiratory disease symptoms (Gungor *et al.,* 1997).

Diagnosis of chronic rhinosinusitis in children is usually made on clinical grounds yet thorough history is the single most important component of the evaluation for sinusitis in children. Though it is quite challenging to distinguish the symptoms of sinusitis from those of various other nasoadenoidal problems (Lusk *et al.,* 1996).

CT scans has become gold standard radiograph study for determining the presence of mucosal inflammation. CT scanning is performed late in the final week of therapy and should be obtained when both the parents and surgeon feel surgical intervention is warranted. If significant radiographic findings are identified, concern that the child may be exhibiting subacute or chronic sinusitis is justified (Lusk *et al.,* 1996). It has been shown that there is high incidence of opacification of anterior ethmoid and maxillary sinuses with acute rhinosinusitis infection.

In children, the accuracy of sinus radiographs as a measure of sinus infection has not been validated. Caution concerning radiographic interpretation has been advised by caffey (Melter *et al.,* 1983). The Royal College of Radiologists (1995) has advised that plain sinus radiographs have no place in the routine

management of rhinosinusitis, as thickened mucosa is a non-specific finding and may occur in asymptomatic patients (Jones *et al.,* 2002). Neither ultrasonography nor MRI has found a place in the routine evaluation of sinusitis (Isaacson *et al.,* 1996). Transillumination is not reliable.

The goals of therapy in sinusitis are to eradicate the infection, to provide reversal of sinus obstruction, and to return effective mucociliary clearance (Gungor *et al.,* 1997).

Use of surface cultures as a part of evaluation and as a guide to the bacteriology and therapy in sinusitis is not recommended as no correlation between cultures obtained from the nasal cavities and cultures of sinus aspirate in maxillary sinusitis has been found. However, comparison of results of cultures obtained from the middle meatus and those obtained from the sinus secretions shows a better correlation (Eli O Melter *et al.,* 1983). Obtaining sinus aspirates by antral wash outs for such culture and sensitivity study is not routinely recommended in children.

The empirical use of antibiotics remains the main stay of treatment for sinusitis and amoxicillin remains the drug of choice. Optimum duration of antimicrobial therapy for controlling acute episodes is 10-14 day course and for chronic sinusitis longer courses of therapy (3-4 weeks) is more effective.

Patients who fail to show response to amoxicillin or with high prevalence of beta-lactamase producing bacteria. Amoxicillin – potassium clavulanate is better choice (Paul R Cook *et al.,* 1996). A high failure rate with amoxicillin and subsequent success with amoxicillin and clavulinic acid suggests that the later, if used for 3-4 weeks may be more effective than amoxicillin alone for 3-4 weeks (Malti Ravonta *et al.,* 1989).

Patients, who fail to respond clinically to several 3-4 weeks courses of antibiotics, may be candidate for surgery. Surgery is rarely indicated for the treatment of sinusitis in children (Glenn Isaacson *et al.,* 1996). Most pediatric otolaryngologists perform an adenoidectomy in children with enlarged adenoids before considering sinus surgery. Adenoidectomy should be considered before functional endoscopic sinus surgery (FESS) even if the adenoids are non-obstructing (Pransky *et al.,* 1996).

Hence the key to treat sinusitis are proper evaluation and treatment of sinus infection. FESS is reserved for the more recalcitrant cases of chronic or recurrent sinusitis in children after medical therapy has proved ineffective. Adenoidectomy plays an important role in reducing sinus disease and should be carried out prior to FESS in most cases (Cook *et al.,* 1996).

Though sinusitis is a significant and common problem in pediatric primary core practice, its diagnosis is usually made on clinical grounds. Rhinosinusitis in children is not a surgical disease and 'watchful waiting' is advised. The clinical spectrum of sinusitis is extensive.

MATERIALS AND METHODS

The present study is a Prospective Study & was conducted in the ENT outdoor and indoor patient Department of SMHS Hospital, an associated hospital of Government Medical College Srinagar. 2023 new paediatric patient's attendant the department of SMHS hospital from Dec. 2010 to Dec. 2012. Out of which 809 patients in the age group of 5-15 years presented with nasal symptoms. From 809 patients, 74 patients were considered for study who met the criteria for chronic rhinosinusitis.

Selection Criteria

- Age 5 to 15 years
- Patients presenting with recurrent attacks of symptoms like nasal obstruction, nasal congestion, cough, fetid breath, sore throat, headache, behavior changes lasting for 12 weeks or more than 12 weeks.

A detailed clinical history and physical examination including anterior rhinoscopy, otoscopy, oral examination, oropharynx examination, complete neck examination and endoscopic examination, was done (e.g; to rule out adenoid hypertrophy, laryngopharyngeal reflux, other diseases etc.) routine investigations done. Specific investigations like, X-ray STN for adenoids, Chest x-ray (in some patients), CT paranasal sinuses (in some patients) and scored using the Lund Mackay Score system.

Sinonasal Endoscopy was done (in some patients), Nasal swab from middle meatus was taken for culture and sensitivity after stopping antibiotics for at least one week (for Patient who did not respond to empirical medical therapy and continued to have mucopurulent discharge)

Observations

Table 1: Prevalence rate of chronic rhinosinusitis in Kashmiri Children attending Hospitals

Total number of cases studied	809
Number of cases with symptoms of Chronic Rhinosinusitis(CRS)	74
Prevalence rate (%)	9.15

Bar Diagram depicting prevalence of CRS in Kashmir children

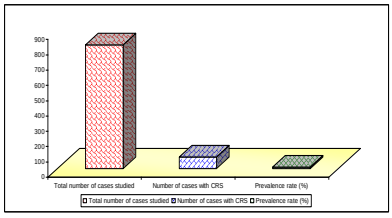

Table 2 & Bar Chart: Showing age distribution of all enrolled patients (n=74)

Age (Years)	No. of Patients	Percentage
1 – 5	5	6.76
6 – 10	26	35.13
11 – 15	43	58.11
Total	74	100.00

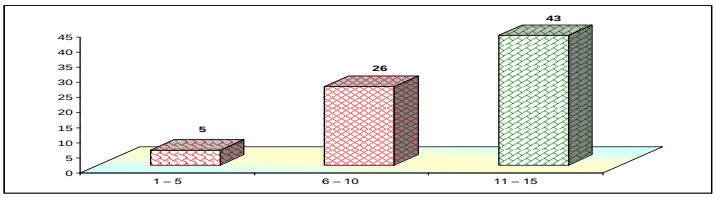

Table 3 & Bar Chart: Sex Distribution of all Enrolled Patients (n=74)

Gender	No. of Patients	Percentage
Males	43	58.11
Females	31	41.89
Total	74	100.00

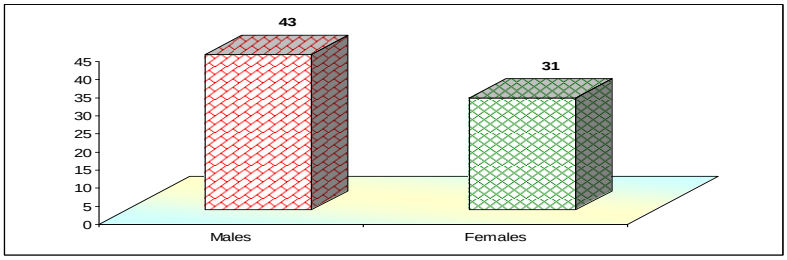

Table 4 & Bar Chart: Distribution of enrolled patients with chronic rhinosinusitis with respect to Residential Status (n=74)

Residential Status	No. of Patients	Percentage	P-Value
Urban	47	63.51	0.010
Rural	27	36.49	
Total	74	100.00	

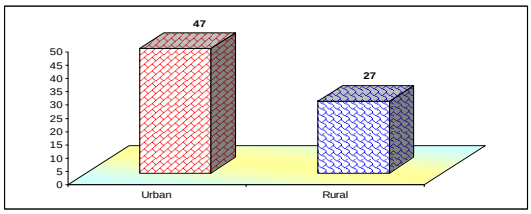

Table 5 & PIE- Chart: Distribution of CRS with respect to Symptoms (Major)

Major Symptoms	No. of Patients	Percentage	P-Value
Nasal obstruction	71	95.94	0.0001
Purulent nasal discharge	62	83.78	0.0001
Headache	62	83.78	0.001
Cough	42	56.76	0.040
Fetid breath	46	62.16	0.020
PND	40	54.05	0.057
Behavior changes	43	58.11	0.046

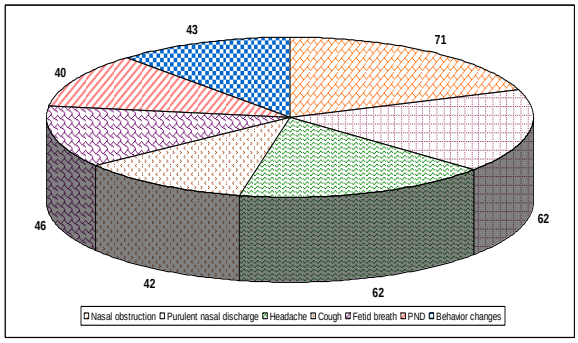

Table 6 & Bar Chart: Depicting Details of nasal obstruction

Nasal Obstruction	No. of Patients	Percentage
Right	17	23.94
Left	05	07.04
Bilateral	49	69.02
Total	71	100.00

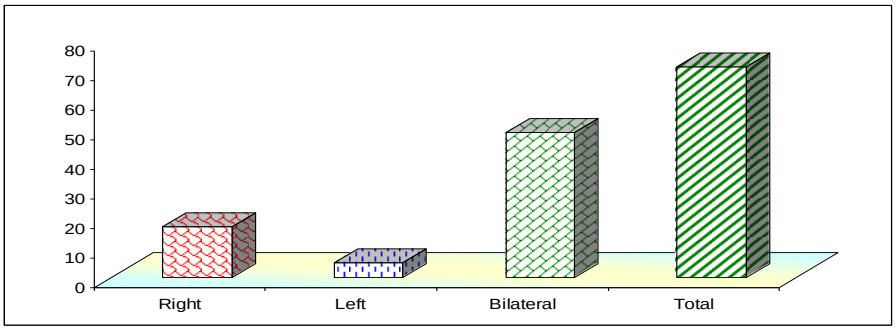

Table 7: Distribution of Rhinosinusitis in with respect of minor symptoms (n=74)

Symptoms	No. of Patients	Percentage
Recurrent sore throat	16	21.62
Intermittent fever	15	20.27
Facial pain / puffiness	21	28.38
Epistaxis	18	24.32
Insomnia	17	22.97
Epiphora	08	10.81
Otalgia	04	05.40
Sleep disorder breathing	08	10.81
Sneezing	19	25.67

Table 8: Distribution of enrolled patients with CRS with respect to comorbid conditions

Comorbid Condition	No. of Patients	Percentage
Allergy	19	25.67
URTI	15	20.27
DNS	43	58.11
Adenoids	2	02.70
Foreign body	0	0.00
Nasal polyps	0	0.00

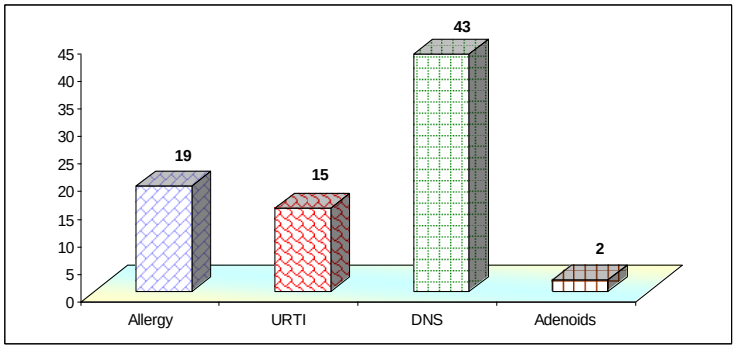

Table 9 & pie-chart: Clinical findings on Anterior Rhinoscopy in enrolled patients (n=74)

Anterior Rhinoscopy Findings	No. of Patients	Percentage
DNS (non-obstructing)	43	58.11
Congested nasal mucosa	17	22.97
Mucopurulent discharge	17	22.97
Hypertrophy of turbinates	50	67.57
Nasal mass	0	0.00
Foreign body	0	0.00

Table 10: Details of DNS in all enrolled patients with CRS

DNS	No. of Patients	Percentage
Anterior	42	56.76
Posterior	01	01.35
Right	26	35.13
Left	17	22.97

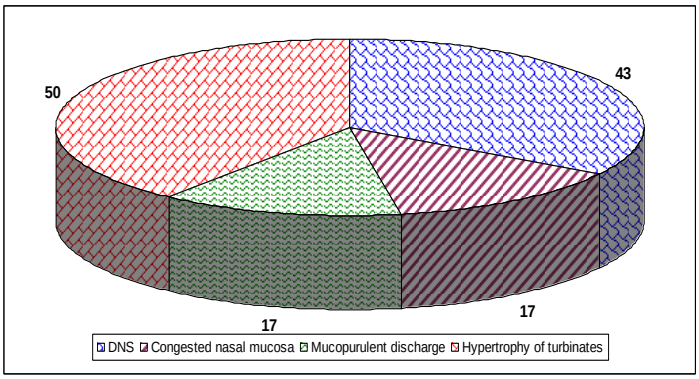

Table 11: Prior diagnosis & prior treatment received before consultation

Prior Diagnosis	Prior Treatment	No. of Patients	Percentage
DNS	Antimicrobials / oral antihistamines	08	10.81
Adenotonsillitis	Antimicrobials analgesics	10	13.51
Recurrent URTI	Antimicrobials / topical decongestants	23	31.08
Allergic rhinitis	Topical corticosteroids / antihistamines	27	36.49

Table 12 & BAR CHART: Investigations conducted on enrolled patients

Investigations	No. of Patients	Percentage
X-ray soft tissue neck	14	18.92
Culture sensitivity	10	13.51
Sinonasal endoscopy	05	06.76
CT PNS	25	33.78

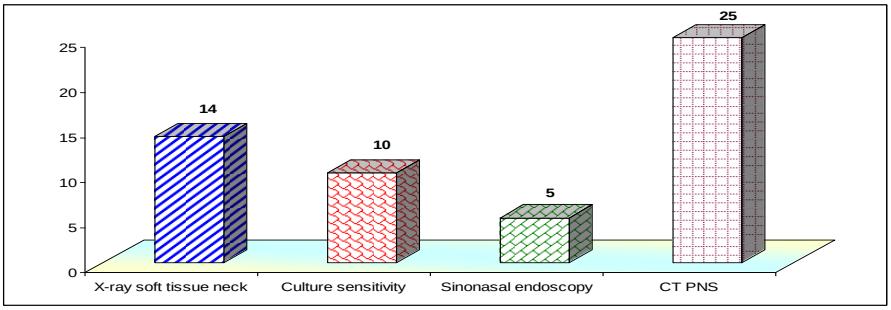

Table 13: Total number of patients on whom CT was done (n=25)

Lund-Mackay Score	No. of Patients	Percentage
0 – 5	19	27.10
5 – 10	05	20.00
10 – 15	01	01.40

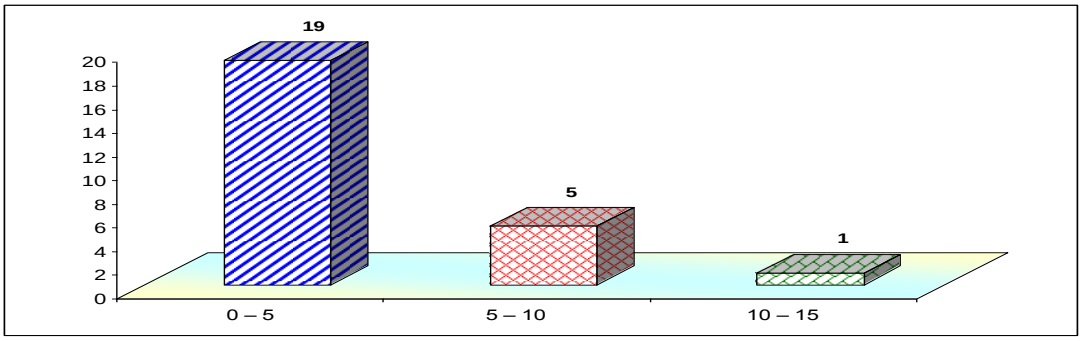

Table 14: Structural Abnormalities with chronic rhinosinusitis on CT Nose and PNS

Findings	No. of Patients	Percentage
Hypertrophied inferior turbinate (HIT)	6	24.00
Anterior septal deviation (non obstructing)	12	48.00
Hypertrophied middle turbinate (HMT)	01	04.00
Post septal deviation	01	04.00

Table 15: Sinus disease on CT PNS in enrolled patients (n=25)

Sinus Opacification	No. of Patients			
	Partial U/L	Partial B/L	Complete U/L	Complete B/L
Maxillary	5 (20.00%)	3 (12.00%)	5 (20.00%)	9 (36.00%)
Anterior ethmoid	-	-	7 (28.00%)	4 (5.71%)
Posterior ethmoid	-	-	7 (28.00%)	3 (12.00%)
Frontal	-	-	3 (12.00%)	2 (8.00%)
Sphenoid	-	-	-	3 (12.00%)
Blocked OMC	-	-	5 (20.00%)	9 (36.00%)

Table 16: Results of culture sensitivity and Antibiotic Sensitivity in Patients with CRS

C/S Report	Drug Sensitivity	No. of Patients (%)
Staph aureus	Cefixine / Ciprofloxacin /Salbactum /Gentamycin/Methicillin/Vancomycin	2 (20.00%)
Methicillin resistant staph	Amikacin / Cefotaxime / Clindamycin / Ciprofloxacin	3 (30.00%)
Staph epidermidis	Cefixime / Ciprofloxacin / Vancomycin / Clindamycin	2 (20.00%)
Non-specific	-	3 (30.30%)

Table 17: Duration of symptoms of patients under study (n=74)

Duration	No. of Patients	Percentage
3 – 6 months	23	31.08
6 – 1 year	24	32.43
1 – 2 years	07	09.46
2 – 3 years	06	08.11
3 – 4 years	03	04.05
> 4 years	11	14.86

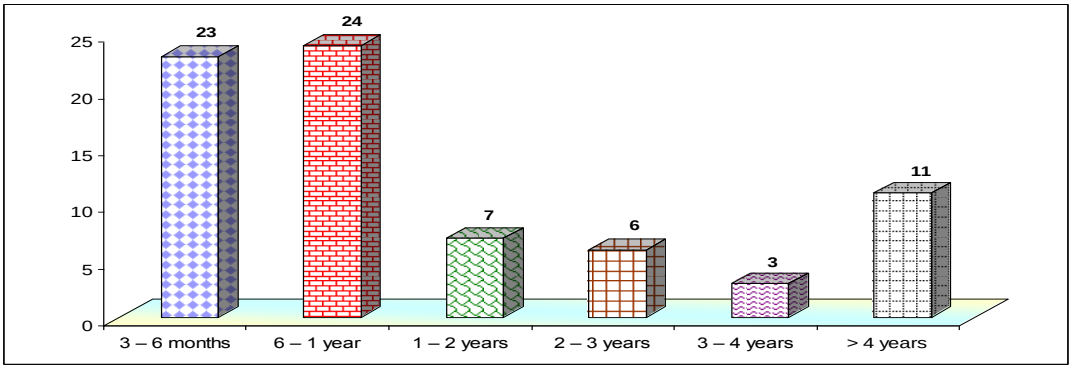

Table 18: Medical management of patients with chronic rhinosinusitis CRS

Management		No. of Patients	Percentage
Antimicrobials	Co-Amox Clav	73	98.65
	Ciprofloxacin	3	04.05
Topical decongestants		74	100.00
Oral decongestants		2	02.70
Corticosteroid sprays		17	22.97
Analgesics		3	04.05
Nasal saline irrigation		20	27.03

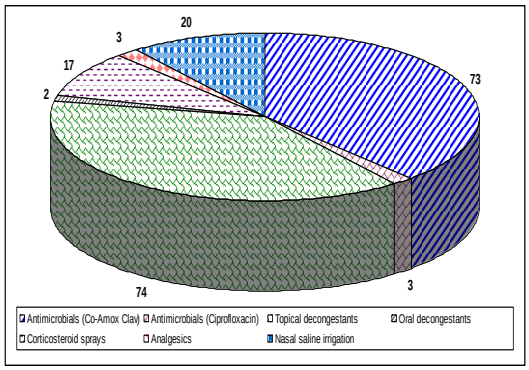

Table 19: Maximal duration of medical treatment in all enrolled patients

Antibiotics	Duration	No. of Patients (%)
Co-Amox-Clav	2 weeks	15 (20.27%)
	3 weeks	04 (5.40%)
	4 weeks	45 (60.81%)
	6 weeks	09 (12.16%)
Ciprofloxacin	1 week	02 (2.70%)
	2 week	1 (1.35%)

Table 20: Response to Medical Management

Antimicrobials	No. of patients on treatment	No. of patients cured	Percentage
Co-Amoxclav	73	71	97.26
Ciprofloxacin	3	3	100.00

Table 21: Surgical Intervention

Surgical Procedure	No. of Patients	Percentage
Adenoidectomy	1	1.35
External incisional drainage	1	1.35
FESS	-	-
Septoplasty	-	-

Table 22: Complications of Chronic Rhinosinusitis

Complications	No. of Patients	Percentage
Orbital cellulites	2	2.70

Treatment

All those patients in the age group of 5-15 years, who were diagnosed as a case of chronic rhinosinusitis, after thorough history, examination and investigations were put on medical therapy like antibiotics, topical decongestants and nasal saline irrigations. Among antibiotics a combination of Co-Amox-Clav was considered as first line of drug given for a period of 2-6 weeks depending upon the response of patients. In some patients resistant to Amox-Clav, Ciprofloxacin was given for a period of 1-2 weeks. Topical decongestants were used for 1 to 2 weeks in all patients. Oral antihistaminics or corticosteroid

sprays were given for treating the widely predisposing allergy. Surgical intervention was considered in those patients who fail to respond maximum medical therapy.
Regular follow up was done after 2 weeks, 4 weeks, 12 weeks. Patients and parents of patients were asked to complete a questionnaire regarding improvement of symptoms of chronic rhinosinusitis.

RESULTS AND DISCUSSION

Before the 1980s, pediatric sinusitis, especially in the young children or infant, was rarely entertained as a distinct clinical entity. Most cases were apparently dismissed as an unimportant "allergy" or as a "cold" and were rarely treated beyond decongestants or antihistamines, or, both. The multifactorial cause of sinusitis continues to fuel the controversy regarding the underlying pathophysiology of chronic sinusitis in the pediatric age group.
Age is clearly one of the most significant factors in pediatric sinusitis. The younger the child, the higher the incidence of sinusitis and the more likely the maxillary sinus will be diseased. Younger children appear to be at a greater risk of sinusitis because of their smaller anatomical structures, more frequent viral infections, increased exposure to indoor allergens and irritants and immature immune system (Chang, 2004). Hence greater 'care and attention' is needed for diagnosis and appropriate management of these patients. In the present study Out of the total number of 809 children, 74 patients were found to have chronic rhinosinusitis and as such the prevalence rate in our study was found to be 9.14%. In a study conducted by Lusk *et al.,* (2006) they found Rhinosinusitis as a frequent problem in children with a prevalence rate of about 8%. Wald *et al.,* (1981) in their study found 4-7.3% of children in day care centers developing sinusitis as a complication of upper respiratory tract infections (Isaacson *et al.,* 1996; Sharpire, 1988). These results are similar to those found in our study.
Although the prevalence of pediatric Chronicrhinosinusitis is unknown, symptoms compatible with its diagnosis such as chronic mucopurulent rhinorrhea may affect as many as 20% of the pediatric population at some point during childhood. There were 43 males and 31 females in our study giving a male to female ratio of 1.4:1.0 (Sobol, 2005). In a study conducted by Chang (2004) the male to female ratio was 1.4: 1.0. Hence males are slightly more affected compared to the females. We also found slight male predominance in our study. In our study, we found most of the patients (58.11%, 43 patients) in the age group of 11-15 years. The second most commonly affected age group of patients in our study was 6-10 years (26 patients, 35.13%). In a study conducted by Lazar *et al.,* (1993) they also found the most commonly affected age group as 10-16 years (60%) (Lusk *et al.,* 2006). These results are similar to those found in our study. However the second most commonly affected age group in their study was 3-7 years. The difference in the results with our study may be due to the comparatively smaller sample size of patients in our study.
We found a gross difference in the distribution of cases with respect to their residential status. There were 47 patients (63.51 %) belonging to urban areas in our study while the rest of 27 patients (36.49%) belonged to the rural areas. The rural urban distribution of cases observed in our study may be due to the difference in environmental conditions of the two areas, levels of the pollutants present, presence of allergens as well as to the availability of facilities like Day Care Centers. The most common symptoms of Chronic rhinosinusitis observed in our patients in order of decreasing frequency were nasal obstruction in 71 patients (95.94%) purulent nasal discharge in 62 patients (83.78%) and headache in 62 patients (83.780/0). Other less common symptoms found in our patients were cough in 42 patients (56.76%), fetid breath in 46 patients (62.16%), Postnasal drip in 40 patients (54.05%) and behavioral changes in 43patients (58.11 %). In our study we found facial pain/puffiness in 28.38%, recurrent sore throat in 21.62%, fever in 20.27%, epistaxis 24.32% and insomnia in 22.97% and otalgia in 5.40% of the patients. Parson *et al.,* (1996) in their study found seven cardinal symptoms of chronic rhinosinusitis in their patients. These were nasal obstruction in all the patients (100%), purulent nasal discharge in 90 %, cough in 71 %, and fetid breath in 67%, Postnasal drip in 63% and behavioral changes in 63%. The less frequent symptoms found in their study were recurrent sore throat, sneezing insomnia, epistaxis and otalgia; all

these symptoms contributing to about 20% of their patients. All these results are in accordance with the results found in our study.

In a study conducted by Gungor *et al.,* (1997) purulent nasal discharge was found almost universally in all their patients. We also found this symptom in more than 83% of our patients (Chang *et al.,* 2004). On the basis of co-morbid conditions/predisposing factors, we found 19 patients (25.67%) with allergy, Upper Respiratory Tract Infection was present in 15 patients (20.27%), Deviated Nasal Septum in 43 patients (58.11 %) and adenoid hypertrophy in only 2 patients (2.70%). We could not find nasal polyp or foreign body in any of our patients. Lusk *et al.,* (2006) in their study found allergic inflammation as a precursor to chronic rhinosinusitis in approximately 20 % of their patients. They reported allergies in 40% of their patients having chronic rhinosinusitis. Philip Fireman (1992) in another study reported that 10-15% of children experience seasonal or perennial allergic rhinitis by 16 years of age.

Wald *et al.,* (1981) found that 6-13% of children with Upper Respiratory Tract Infection lasting for more than 15 days suffered sinusitis. In another study conducted by the same author, URTI as a cause of sinusitis was found in 5-10 % of the cases. Lazar *et al.,* (1993) in their study commented that adenotonsillar hypertrophy or infection and chronic otitis media with effusion are commonly associated with sinusitis in children.

Lusk *et al.,* (2006) concluded in their study that the severity of septal deviation appears greater in older children; septal deviation seems to be associated with more disease on the side of deviation.

The first line of drug used for the medical management of patients in our study was Co-Amoxiclav.1t was given to 73 patients (98.65 %) out of whom 71 were cured. Two patients who did not respond to the above treatment were put on ciprofloxcin after culture and sensitivity testing and were cured. In one of the patients, culture sensitivity test showed sensitivity to the ciprofloxcin and it was given prior to Co-Amoxiclav in this patient and he was cured.

Clement *et al.,* (1996) in a consensus Meeting, Brussels, Belgium recommended Co-Amoxiclav as first drug of choice for Chronic rhinosinusitis. Gungor (1997) and Corey have also recommended Co-Amoxiclav as drug of choice for chronic rhinosinusitis. As per Issacson (1996) antibiotics remains the mainstay of treatment for sinusitis with Amoxicillin being the drug of choice. In areas with high rates of resistance or in children who fail to respond to Amoxicillin, an alternative antimicrobials including Amoxiclav are given with good results. Optimum duration of antibiotic therapy for sinusitis has not been established by any prospective study, however maximum duration of antibiotic therapy for acute Rhinosinusitis was considered from 1-2 weeks and for the chronic rhinosinusitis the duration was 3-4weeks. In our study we gave co -Amoxiclav for a maximum period of 6 weeks and most of our patients (60.81 %) were cured by using the therapy for 4 weeks. Symptoms were not resolved fully in 9 patients in our study, in whom we had to extend the therapy for 6 weeks. Gungoor *et al.,* (1997) concluded that for the treatment of Chronic rhinosinusitis, the duration of medical therapy is longer, continued for 3-6 weeks with extensive medical treatment consisting of a course of atleast 3-6 weeks. Clement (1996) admitted that for chronic rhinosinusitis especially with frequent exacerbations an initial course of 2 weeks of oral antimicrobials should be given with good response up to a maximum duration of 4-6 weeks. Wald *et al.,* in 1981 concluded that medical therapy with antimicrobial agents is recommended in children diagnosed to have chronic sinusitis and amoxicillin (40 mg / kg / day in three divided doses) is appropriate agent. Patients who are resistant to penicillin, a combination agent should be prescribed.

Parson (1996) recognizes the complexity of the disease and insists on comprehensive medical evaluation with appropriate therapies before considering surgical intervention. In our study most of the patients responded well to the medical management except one patient where response was poor to the medical therapy with a maximum duration of 6 weeks. In this patient adenoidectomy was done. In regular follow up of 2 weeks, most of the symptoms were relieved. Adenoidectomy has a role in relieving symptoms of Chronic rhinosinusitis in children as shown in one of the studies conducted by Vandenberg in 1997 in which he conducted adenoidectomy in 48 patients with symptoms of Chronic rhinosinusitis. As a result of such treatment, the average no. of symptoms experienced by each patient in his study decreased from 5.3-

2.0%. Adenoidectomy was recommended by members of the consensus Panel in Brussels, Belgium in the presence of moderate to severe nasal obstruction secondary to adenoid hyperplasia and has been shown to be effective in Chronicrhinosinusitis (Acute and Chronic Rhinosinusitis, 2001). Rosen feld *et al.,* (1995) made a study and he concluded that additional antibiotic therapy and adenoidectomy should be considered before FESS, even if the adenoids are non-obstructing. Parson (1993) concluded that an adenoidectomy should be considered as a separate surgical step prior to consideration of FESS where medical therapy for sinusitis is not effective in children. Huggill and Ballantyne (1997) concluded that children with chronic sinusitis who undergo adenoidectomy, the number of sinonasal symptoms and the severity of those symptoms are lessened. Ramadan (1999) noted that adenoidectomy was successful in 47% of children compared with 77% success rate for those who underwent FESS.

Ramadan (2007) supports a potential role for adenoidectomy in the management of refractory paediatric sinusitis despite the fact that the adenoid may not be enlarged. Parsons *et al.,* (1993) found retrospectivelly that FESS is effective in treating medically recalcitrant severe chronic sinusitis in children. Lazer (1993) made a retrospective analysis that underwent FESS after failing to respond to optimal medical treatment and revealed an overall improvement rate of 80%. Parsons (1993) made a study in a series of 200 pediatric patients who underwent FESS with a mean of 21.8 months of follow-up, 56% stated that chronic nasal obstruction resolved, purulent nasal discharge resolved in 60%, PND resolved in 39%, chronic cough resolved in 62%, halitosis resolved in 66%, and headache resolved in 55%. Chang *et al.,* (2004) concluded that limited approach or FESS is an effective and safe procedure for treating refractory rhinosinusitis in children, main differences between adult and paediatric studies are related to surgical methods, postoperative care, and outcome assessment. Ramaden and Tiu (2007) made a study and found that those children who fail adenoidectomy for chronic rhinosinusitis who require FESS are mainly children who are younger than 7 years of age and have asthma and they require a salvage FESS at a mean of 24 months after the adenoidectomy. In our study, out of the 74 patients, two patients suffered complications of the CTS i.e. orbital cellulitis. One patient reported with orbital cellulitis with loss of the vision and another patient with orbital abscess which was drained by external approach.

Conclusion

In this prospective study of 2 years from December 2010 to December 2012, a total of 2023 pediatric patients attended the Department of Otorhinolaryngology, SMHS Hospital, out of which 809 patients in the age group of 5-15 years presented with nasal symptoms. Out of 809 patients, 74 patients were included in this study who met the criteria for chronic rhinosinusitis. On the basis of various observations, following conclusions were drawn from this study:

1) The most common age group who suffered chronic rhinosinusitis in pediatric population is 11-15 years.
2) The prevalence rate of chronic rhinosinusitis in Kashmiri children is 9.15.
3) Chronic rhinosinusitis is more common in male children compared to female children in the ratio of 1.4:1.
4) Chronic rhinosinusitis in children is more common in urban population (63.51%) as compared to rural population (36.49%).
5) Nasal obstruction is presenting symptom is 95.94% of patients.
6) Purulent nasal discharge, headache, cough, fetid breath, PND and behaviour changes are other major presenting symptoms.
7) Less common symptoms found in pediatric patients are recurrent sore throat, fever, facial pain, epistaxis, insomnia, epiphora, otalgia, Sleep Disorder Breathing and sneezing.
8) Allergy is associated in 25.67% of pediatric patients.
9) Upper Respiratory Tract Infection is associated in 20.27% of patients with chronic rhinosinusitis.
10) Non-obstructive DNS is an incidental finding in 58.11% of patients.
11) Culture sensitivity is helpful in management of cases resistant to conventional treatment.
12) CT ParaNasal Sinus is an important diagnostic tool in chronic rhinosinusitis.

13) Co-Amox-Clav is 1st line of drug in patients with chronic rhinosinusitis and is given for a period of 2-6 weeks.
14) Ciprofloxacin showed a good response in patients resistant to Co-Amox-Clav.
15) Topical decongestants are given to patients for a minimum duration of two weeks.
16) Corticosteroid sprays have good results in patients in whom history is suggestive of allergy.
17) Adenoid hypertrophy should be ruled out in patients not responding to medical treatment.
18) Adenoidectomy has a role in relieving symptoms of chronic rhinosinusitis.
19) Drainage of abscess is done in patients with orbital abscess.
20) Complications of sinusitis are rare in pediatric patients.

REFERENCES

Isaacson Glenn *et al.*, (1996). Sinusitis in children. *Pediatric Clinics of North America* **43**(4).
Vanderberg Steven J *et al.*, (1997). Efficacy of adenoidectomy in relieving symptoms of chronic sinusitis in children. *Archives of Otolaryngology Head & Neck Surgery* **123**.
Sobol Steven E *et al.*, (2005). Trends in the management of pediatric chronic sinusitis: Survey of the American Society of Pediatric Otolaryngology. *Laryngoscope* **115**.
Melter Eli O *et al.*, (1983). Chronci rhinitis in infants and children etiology, diagnostic and therapeutic considerations. *Pediatric Clinics of North America* **30**(5).
Gungor Anil *et al.*, (1997). Pediatric sinusitis: A literature review with emphasis on the role of allergy. *Otolaryngology Head & Neck Surgery* **116** 4-15.
Nishioka Gary J *et al.*, (1996). Paranasal sinus disease in patients with cystic fibrosis. *OCNA* **29**(1).
Lusk Rodney P *et al.*, (1996). Anatomic variation in pediatric chronic sinusitis: A CT study. *OCNA* **29**(1).
Jones NS *et al.*, (2002). The intracranial complications of rhinosinusitis: can they be parented? *Laryngoscope* **112**.
Paul R Cook *et al.*, (1996). Allergic rhinosinusitis in the pediatric population. *OCNA* **29**(1).
Ravonta Malti *et al.*, (1989). The diagnosis and follow up of pediatric sinusitis: Water's view. Radiograph versus Ultrasonography. *Laryngoscope* **99**.
Pransky Seth M *et al.*, (1996). Pediatric sinusitis.*OCNA* **29**(1).
Chang Po-Hung *et al.*, (2004). Functional endoscopic sinus surgery in children using a limited approach. *Archives of Otolaryngology Head & Neck Surgery* **103**.
Lusk Rodney P *et al.*, (2006). Long term follow up for children treated with surgical intervention for chronic rhinosinusitis. *Laryngoscope* **116**.
Wald Ellen R *et al.*, (1981). Sinusitis and its complications in the pediatric patients. *Pediatric Clinics of North America* **28**(4).
Sharpire Gail G (1988). Sinusitis in children. *Journal of Allergy and Clinical Immunology* **81** 1025-1027.
Lazer Rande H *et al.*, (1993). Functional endonasal sinus surgery in adults and children. *Laryngoscope* **103**.
Parson David S *et al.*, (1996). Otitis Media and Sinusitis. *OCNA* **29**(1).
Fireman Philip (1992). Diagnosis of sinusitis in children: Emphasis on the history and physical examination. *Journal of Allergy and Clinical Immunology* **90** 433-6.
Clement Peter AR *et al.*, (1996). Management of rhinosinusitis in children. Consensus Metting, Brussels, Belgium Set 13.
Parsons David S *et al.*, (1996). Chronic sinusitis: A Medial or Surgical disease? *OCNA* **29**(1).
Acute and Chronic Rhinosinusitis (2001). Progress in allergic rhinitis and rhinosinusitis: A symposium report 33-37.
Richard M and Rosenfeld (1995). Pilot study of outcomes in pediatric rhinosinusitis. *Archives of Otolaryngology Head & Neck Surgery* **121**.

Parsons David S *et al.*, (1993). Functional endoscopic surgery in children: A retrospective analysis of results. *Laryngoscope* **103**.
Huggill PH and Ballantyne JC (1952). An investigation into the relationship between adenoids and sinusitis in children, *Journal of Otolaryngology* **66** 84—91.
Ramadan HH and Adenoidectomy VS (1999). Endoscopic sinus surgery for the treatment of pediatric sinusitis, *Archives of Otolaryngology Head & Neck Surgery* **125** 1208—1211.
Ramadan HH and Tiu J (2007). Failures of adenoidectomy for chronic rhinosinusitis in children: for whom and when do they fail, *Laryngoscope* **117** 1080—1083.