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ORIGINAL ARTICLE

Prevalence of Visual Disturbances in Patients with Chronic Rhinosinusitis: A Cross-sectional Study

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ABSTRACT

Background: Chronic rhinosinusitis (CRS) is an underacknowledged chronic inflammatory disease of the paranasal sinuses with a systemic impact. Because the sinuses are anatomically close to the orbital structures, CRS can cause visual disturbances. This is, however, not well recognized among visual complications in CRS, especially in countries such as Pakistan.

Aims and Objectives: The purpose was to assess the prevalence and clinical pattern of visual disturbances in patients with chronic rhinosinusitis, and to identify the possible association with CRS subtypes and radiologic severity.

Methodology: The study was conducted as a cross-sectional study at the Allied hospital II , Faisalabad, Pakistan from June 2022 to May 2023. A total of n=50 adult patients with clinically and radiographically confirmed CRS were enrolled. Demographic data, CRS type, duration of symptoms, and CT-based Lund Mackay scores were recorded. The complete ophthalmologic assessment was performed on each patient. The data were statistically analyzed with SPSS version 26, set at $p < 0.05$.

Results: Of 50 patients, 15 (30%) had visual disturbance. Complaints were blurred vision (46.7%), diplopia (26.7%), and retro-orbital pain (20%). It was seen in 6% of patients that optic disc edema and in 8% that decreased visual acuity. Visual disturbances were found to be statistically associated with CRS with nasal polyps ($p = 0.041$). There were trends toward association with higher Lund-Mackay scores and longer disease duration, but they did not reach statistical significance.

Conclusion: Relatively common visual symptoms occur in CRS, particularly in patients with nasal polyps and extensive sinus involvement. Early identification through multidisciplinary evaluation is necessary to prevent possible irreversible ocular complications. In high-risk patients, integration of CRS management protocols should include regular ophthalmologic screening.

Keywords: Chronic rhinosinusitis, visual disturbances, nasal polyps, blurred vision, optic disc edema, ophthalmologic complications, Lund-Mackay score, Pakistan

INTRODUCTION

Chronic rhinosinusitis (CRS) refers to a persistent inflammatory disorder of the nasal and paranasal sinus mucosa with 2 or more of the symptoms, including nasal obstruction, mucopurulent discharge, facial pain or pressure, and a decrease or loss of the sense of smell, lasting for at least 12 weeks[1]. The condition severely impairs the quality of life and normal daily functioning of the affected individuals with repeated clinical visits, use of long-term medications, and in some cases, surgical procedures. CRS is known as a global widespread disease; however, in developing nations such as Pakistan, the burden is not being reported due to a lack of ENT surveillance systems, ignorance among the general public, and indiscriminate self-medication[2]. The risk and chronicity of CRS are further amplified in highly populated and polluted areas like Lahore, Karachi, and Faisalabad due to environmental exposures, allergic predisposition, and poor air quality[3].

CRS can be clinically divided into two main subtypes, CRSwNP, or CRS without nasal polyps (CRSsNP). The pathological features, symptom profiles, and complication risks vary according to these subtypes. CRSwNP is thought to be associated with a more profound inflammatory response and is usually associated with deep posterior sinus cavities (e.g., ethmoid and sphenoid sinuses)[4]. These sinuses are anatomically located close to the vital orbital structures such as the optic nerve, extraocular muscles, and orbital contents, making local disease extension a possibility. Symptoms include blurred vision, double vision, retro-orbital pain, photophobia, or even optic neuropathy when the chronic inflammation and pressure due to mucosal swelling, polypoid growths, or retained secretions compromise orbital integrity[5].

Although orbital complications are more typically reported in the acute and invasive forms of sinusitis, the visual consequences of chronic rhinosinusitis are often neglected despite its chronic, smoldering, and progressive nature[6]. Patients with subtle visual disturbances, often present in clinical settings, especially in resource-constrained areas, are often misdiagnosed or referred late, leading to an increased risk of permanent visual impairment. In addition, the differential diagnosis of unexplained visual symptoms does not routinely include underlying sinus pathology, resulting in diagnostic challenges and missed therapeutic windows[7].

Studies evaluating prevalence and patterns of visual disturbances in CRS populations, especially in Pakistan and other South Asian countries, are relatively absent at a large-scale and systematic level[8]. There is limited and fragmented existing evidence, often derived from individual case reports, which yields significant gaps in understanding the true magnitude of this complication. Additionally, there is not much known about the correlation between the visual symptoms and CRS subtypes, duration of the disease, nasal polyps, or radiological severity[9].

The present study aimed to examine the prevalence of visual disturbances in patients with chronic rhinosinusitis and possible associated clinical factors such as disease type, duration, or severity[10]. The objectives of this cross-sectional study were to raise awareness regarding early ophthalmologic evaluations, promote feasible interdisciplinary collaboration between otolaryngologists and ophthalmologists, and emphasize the importance of early recognition of visual symptoms for the timely diagnosis and intervention of underlying severe sinonasal diseases[11].

MATERIALS AND METHODS

The aim of this cross-sectional study was to be carried out over one year from June 2022 to May 2023 at the Allied hospital II, Faisalabad, Pakistan. The purpose of the study was to determine the prevalence and clinical profile of visual disturbances in patients with chronic rhinosinusitis (CRS). We obtained ethical approval

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from the Institutional Review Board before initiation of studies and written informed consent from all study participants. Throughout the study period, confidentiality and voluntary participation were ensured.

The study was done on 50 patients with a non-probability consecutive sampling technique. Patients were randomly assigned and all were aged between 18 and 65 years and fulfilled the diagnostic criteria for CRS by the presence of two or more of the symptoms: nasal obstruction or congestion, mucopurulent rhinorrhea, facial pain or pressure, or hyposmia/anosmia, with the latter two lasting for at least 12 weeks, accompanied by radiological evidence on CT scan of the paranasal sinuses. The diagnosis was further validated by nasal endoscopy, and disease severity was assessed by the Lund-Mackay scoring system.

Patients were excluded if they had had any recent or active acute sinus infections or any previous ophthalmologic disease such as cataract, glaucoma, diabetic retinopathy, or any optic nerve diseases unrelated to CRS. Excluded were individuals with orbital trauma, prior endoscopic sinus surgery, intracranial pathologies, or systemic illnesses (such as poorly controlled diabetes or hypertension) known to affect vision. This allowed for the visual disturbances observed to be due to CRS without other confounding factors.

A comprehensive clinical evaluation was done by an otolaryngologist, and then standardized ophthalmology was done in each patient. Anterior rhinoscopy, diagnostic nasal endoscopy, and contrast-enhanced CT scan of the paranasal sinuses were included in the ENT evaluation. The disease was extensively recorded for the extent of mucosal disease, presence of nasal polyps, and involvement of sinus walls adjacent to the orbit.

A consultant ophthalmologist performed ophthalmologic examination, including measurement of visual acuity with Snellen's chart, fundoscopy to assess optic nerve, intraocular pressure by Goldmann applanation tonometry, assessment of extraocular movements, and formal perimetry if indicated. Any reported symptoms, including blurred vision, diplopia, retro-orbital pain, photophobia, or ocular motility restriction, were recorded.

The presence of any visual disturbance was the primary outcome measure in CRS patients. The Statistical Package for the Social Sciences (SPSS) version 26 was used to analyze all collected data. Demographic and clinical variables were computed for descriptive statistics: mean, standard deviation, frequencies, and percentages. Associations between the presence of visual disturbances and CRS-related variables such as duration of illness, presence of nasal polyps, and Lund Mackay radiologic scores were inferentially analyzed using the Chi-square test. The p-value was less than 0.05, and this would be considered statistically significant.

RESULTS

This study included a total of 50 patients with chronic rhinosinusitis (CRS). Demographic and baseline clinical characteristics of the study population are summarized in Table 1. The mean age of the patients was 42.8 ± 10.7 years, and there was a slight male predominance (58%, n = 29). Twenty-eight patients (56%) were felt to have CRS with nasal polyps (CRSwNP), while 22 patients (44%) had CRS without nasal polyps (CRSsNP). The mean duration of symptoms was 16.3 ± 5.2 months.

The n= 15 patients (30%), 1 or more types of visual disturbances were reported by 30%. The most common complaint was blurred vision, which was reported in 7 patients (46.7% of those with visual complaints). Four patients (26.7%) reported diplopia, and three patients (20%) had retroorbital pain. Transient episodes of visual field loss were reported by one patient. Those in isolated cases also noted that they had photophobia and restricted eye movements as shown in table 2.

Several patients had objective abnormalities on ophthalmologic examination. Three (6%) patients had optic disc edema, and 4 (8%) patients had decreased visual acuity (Snellen score < 6/18). On CT imaging, there was sphenoethmoidal disease, and two patients presented with mild restriction of ocular motility. All participants had normal intraocular pressure. Statistical comparisons were performed to determine the relationship between CRS-related factors and the visual disturbances. The p value for a significantly higher proportion of patients with nasal polyps having visual disturbances (11 out of 28; 39.3%) versus those without polyps (4 out of 22; 18.2%) was 0.041. Visual disturbances were also seen more commonly in patients with more severe radiologic involvement, in 10 of 30 patients (33.3%) with severe radiologic involvement versus 5 of 20 patients (25%) with less severe radiologic involvement, but this difference was not statistically significant (p = 0.48). Table 3: Association Between CRS Parameters and Visual Disturbances (n = 50)

Table 1: Demographic and Clinical Characteristics of Study Participants (n = 50)

Parameter	Frequency (n)	Percentage (%)
Age (Mean ± SD)	42.8 ± 10.7	—
Gender		
– Male	29	58%
– Female	21	42%
CRS Subtype		
– With Nasal Polyps (CRSwNP)	28	56%
– Without Nasal Polyps (CRSsNP)	22	44%
Symptom Duration (>12 months)	34	68%
Lund-Mackay Score > 12	30	60%

Table 2: Type and Frequency of Visual Disturbances in CRS Patients (n = 15)

Visual Symptom	Frequency (n)	Percentage (%)
Blurred Vision	7	46.7%
Diplopia	4	26.7%
Retro-orbital Pain	3	20.0%
Visual Field Defect	1	6.7%
Photophobia	1	6.7%
Restricted Movements	1	6.7%

Table 3: Association Between CRS Parameters and Visual Disturbances (n = 50)

Variable	Visual Symptoms Present (n = 15)	Visual Symptoms Absent (n = 35)	p-value
CRSwNP	11	17	0.041*
CRSsNP	4	18	
Lund-Mackay Score > 12	10	20	0.48
Symptom Duration > 12 months	12	22	0.092

*Statistically significant at p < 0.05

There were no significant associations between the presence of visual symptoms and gender (p = 0.61). Also, no statistically significant relation was found between symptom duration and visual complications, but there was a non-significant trend for those with longer-standing disease to have a higher risk. Simply put, 30% of chronic rhinosinusitis patients experienced visual disturbances. Symptoms of these were significantly associated with the presence of nasal polyps. In this sample size, radiological severity and longer disease duration also trended to association, but did not reach statistical significance.

DISCUSSION

The prevalence and nature of visual disturbances in patients with chronic rhinosinusitis (CRS) and possible clinical and radiologic factors associated with such complications were evaluated in this study[12]. Results suggested that 30 percent of patients had one or more of the visual symptoms, such as blurred vision, diplopia, retro retroorbital pain. This emphasizes the ophthalmologic implication of a disease usually considered confined to the sinonasal region[13].

Anatomical plausibility of visual involvement in CRS derives from the proximity of the paranasal sinuses, especially the ethmoid and sphenoid sinuses, to critical orbital structures. Direct or indirect

pressure on the optic nerve or extraocular muscles may be exerted by chronic inflammation, polyp expansion, or mucosal hypertrophy[14]. Patients with nasal polyps were more likely to have visual symptoms in this study, and this may imply that CRSwNP represents a higher risk for orbital complications because the inflammation seen in this phenotype is often more extensive and deeper[15].

Visual complaints in CRS are usually subtle and non-specific, but should not be overlooked. Early symptoms such as blurred vision and retro-orbital pain can be seen from posterior ethmoidal or sphenoidal involvement, which is not easily seen on routine anterior rhinoscopy and often requires imaging confirmation[16]. Although not statistically significant in this cohort, there still appears to be a trend toward increased orbital risk related to greater radiologic disease burden. Just as patients with visual complaints had a longer symptom duration, this may reflect progressive inflammatory spread if left untreated[17, 18].

These findings are particularly important in resource-limited settings such as Pakistan, where patients usually present late (due to poor access to ENT specialists or delays in referral). Visual disturbances in many situations may cause a misdiagnosis and delay in treatment because they are blamed for refractive errors and age-related ocular disease. Integration of ophthalmologic evaluation into routine CRS management in cases with nasal polyps or posterior sinus involvement is suggested to prevent irreversible vision loss[19, 20].

The study has some limitations, but it still has strengths. A small sample size might have limited the statistical power to detect some associations. Furthermore, the study took place in one tertiary care center, limiting the generalizability of the results to other centers or populations. However, the study provides baseline data that can be further explored in future research through larger, multicentric studies[21].

CONCLUSION

Patients with chronic rhinosinusitis have relatively common and clinically significant visual disturbances. Nasal polyps and higher radiologic severity seem to be important risk factors for ophthalmologic involvement. Early recognition and interdisciplinary evaluation of CRSwNP are important given the potential for visual complications, which can be irreversible, particularly in patients with CRSwNP. Patients with atypical symptoms, long duration of disease, or evidence of posterior sinus involvement should be considered for routine ophthalmologic assessment in CRS.

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Authors contribution:

SAHW: Conceptualization, Study Design, Supervision
SS: Literature Review, Data Collection
HSUAR: Statistical Analysis, Data Interpretation
AS: Manuscript Drafting and Editing
SB: Data Entry, Formatting, and References
AW: Critical Review, Final Approval of Manuscript

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