

# Clinical Insights of Acute Invasive Fungal Rhinosinusitis in a Tertiary Care Center in Gujarat

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## Keywords

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## ABSTRACT:

**Background and Aim:** Acute invasive fungal rhinosinusitis (AIFRS) is a severe, rapidly progressive infection that primarily affects immunocompromised individuals, often leading to significant morbidity and mortality. The disease involves various fungal species, including *Mucor*, *Rhizopus*, *Aspergillus*, and *Scedosporium*, and can rapidly extend from the paranasal sinuses to adjacent structures, such as the orbit and brain. The main aim of the study was to evaluate about the different clinical and epidemiological features of AIFRS patients in tertiary care centre.

**Material and Methods:** A retrospective observational study was conducted at a tertiary care center in South Gujarat for the duration of 1 year. A total of 176 patients diagnosed with AIFRS were included. Clinical features, presenting symptoms, and comorbidities were assessed, with a particular focus on the impact of underlying conditions such as diabetes mellitus.

**Results:** The most common presenting symptoms were facial pain (51.7%), palatal involvement (35.23%), and nasal obstruction/discharge (32.39%). The study also highlighted the high prevalence of diabetes mellitus (54.55%) as a major risk factor. Other symptoms included diminished vision (17.64%) and proptosis (13.23%). Most of the patients exhibited multiple comorbidities, further complicating the disease progression.

**Conclusion:** Early diagnosis and intervention are crucial for improving outcomes in AIFRS patients. A multidisciplinary approach, including timely surgical debridement and antifungal therapy, is essential to mitigate the rapid progression of this life-threatening infection. The study highlights the need for increased clinical awareness, especially in patients with diabetes or other immunosuppressive conditions.

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## Introduction

Acute invasive fungal rhinosinusitis (AIFRS) is a severe, rapidly progressive fungal infection that primarily affects immunocompromised patients, such as those with uncontrolled diabetes, hematologic malignancies, or those undergoing organ transplantation [1, 2]. The infection is caused by various fungal species, including *Mucor*, *Rhizopus*, *Aspergillus*, and *Scedosporium*. These fungi invade the paranasal sinuses and can extend to the orbit and brain, leading to significant morbidity and high mortality rates if not diagnosed and treated early [3, 4].

The clinical presentation of AIFRS can include facial pain, nasal congestion, fever, and headache, which can progress to more severe symptoms, such as vision impairment or neurological signs due to the spread of the infection [5, 6]. A clinicoepidemiological study conducted in a tertiary care center highlighted the importance of early diagnosis and intervention, noting that a considerable number of cases involved patients with comorbidities such as diabetes mellitus and immunosuppression [9].

Prompt identification and intervention are critical in AIFRS, which often requires surgical debridement combined with antifungal therapy for optimal outcomes [7]. The geographic distribution of fungal species responsible for AIFRS varies, with *Mucorales* being more common in tropical regions, while *Aspergillus* species predominate in temperate areas [8]. Early and accurate diagnostic methods, including imaging and molecular techniques, are crucial for improving prognosis [9].

The condition's rapid progression and high mortality rates underscore the necessity for a multidisciplinary approach involving otolaryngologists, infectious disease specialists, and intensivists in the management of AIFRS in tertiary care centers [5]. The main aim of the study was to evaluate about the different clinical and epidemiological features of AIFRS patients in tertiary care centre.

### **Material and Methods**

In response to the notable surge of acute invasive fungal rhinosinusitis (AIFRS) observed among COVID-19 patients, we conducted a retrospective observational study to investigate the clinical and epidemiological features of AIFRS in this specific cohort. The study was conducted at a tertiary care center in Gujarat, for the duration of 1 year. A total of 176 patients were included in the study, all of whom were clinically and radiologically diagnosed with AIFRS.

### **Inclusion Criteria**

The subjects included in the study were those who had been clinically and radiologically diagnosed with AIFRS. These patients underwent comprehensive diagnostic evaluations, including detailed history taking, clinical examinations, and nasal endoscopies. Radiological imaging, such as contrast-enhanced CT scans or MRI of the paranasal sinuses, was performed to confirm the diagnosis of AIFRS and assess the extent of sinus involvement. All patients enrolled in the study had their fungal infections diagnosed by histopathological examination or microbiological cultures obtained from tissue biopsies or nasal discharge.

### **Exclusion Criteria**

Pregnant patients were excluded from the study to avoid any potential complications associated with the treatment regimens, which may not be suitable for expectant mothers. Additionally, patients with incomplete medical records or those who had a prior history of chronic sinusitis without signs of acute invasion were not included in the study.

The study aimed to provide insights into the clinical presentation, risk factors, microbiological etiology, and treatment outcomes of AIFRS in COVID-19 patients. Given the rising incidence of this condition during the pandemic, the results of this study could inform better management strategies for AIFRS in immunocompromised and critically ill patients, particularly those recovering from COVID-19 in South Gujarat.

### **Statistical Analysis**

The clinical data of the enrolled patients were retrospectively collected from hospital records. A thorough analysis was performed, evaluating factors such as demographics, underlying comorbidities, duration of COVID-19 illness, and the onset of AIFRS. Statistical methods were used to determine the relationship between numerous factors and outcomes, with the aim of identifying key predictors for the severity and prognosis of the condition in this population.

The institutional ethics committee approved this study, and informed consent was obtained from the patients or their guardians for the use of their medical data in the research.

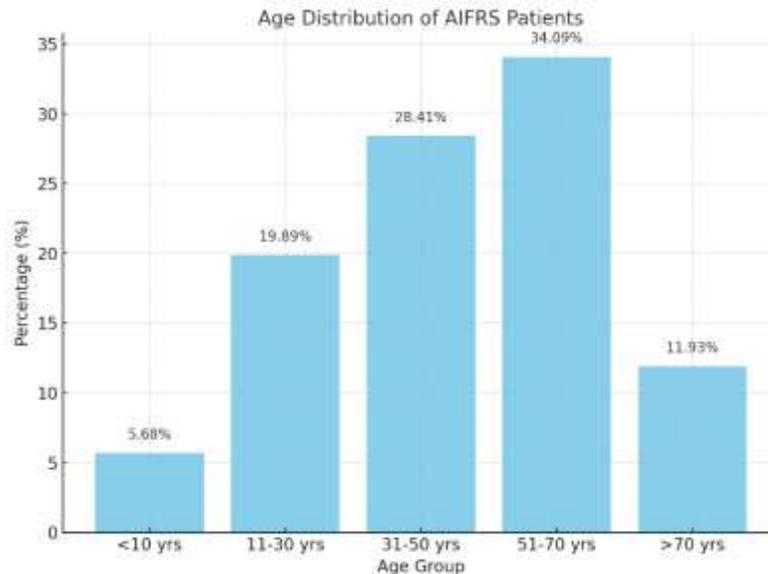
## Results

**Figure 1** illustrates the age distribution of 176 patients diagnosed with acute invasive fungal rhinosinusitis (AIFRS) between March 2021 and November 2021. The data shows that most patients fall within the age groups of 51-70 years (34.09%) and 31-50 years (28.41%), accounting for a substantial portion of the cases. The smallest proportion of patients are in the <10 years age group, representing 5.68% of the total cases. The other age groups—11-30 years and >70 years—represent 19.89% and 11.93% of the total, respectively. This distribution highlights the higher prevalence of AIFRS in middle-aged and older patients, particularly those with immunocompromised conditions.

Table 1 presents the demographic data and comorbidities of 176 AIFRS patients. The majority (71.02%) were male. The most common comorbidity was diabetes mellitus (54.55%), followed by hypertension (18.18%) and chronic kidney disease (10.23%). Other comorbidities include hypothyroid, renal transplant, cardiac conditions, and meningioma.

Table 2 presents the clinical features and symptoms of AIFRS in 176 patients. The most common presenting complaint was facial pain (51.70%), followed by palatal involvement (35.23%) and nasal obstruction/discharge (32.39%). Other notable symptoms included dental pain (27.84%), headache (21.59%), and diminution of vision (17.64%). Less common symptoms included facial swelling, proptosis, diplopia, altered sensorium, and skin involvement, with percentages ranging from 0.73% to 16.17%.

Figure 1: Age distribution of patients.



**Table 1: Demographic data associated comorbidities and histopathological evaluation.**

Variable	Number of Patients	Percentage
Total cases	176	100
Sex (male/females)	125/51	71.02
Comorbidities		
Diabetes mellitus	96	54.55
Hypertension	32	18.18
Chronic kidney disease	18	10.23
Hypothyroid	4	2.27
Renal transplant	5	2.84
Cardiac	5	2.84
Meningioma	1	0.57

**Table 2: Data of clinical features, symptoms of AIFRS.**

Presenting Complaints	Number of Patients	Percentage
Facial Pain	91	51.7
Facial Swelling	22	12.5
Nasal obstruction/discharge	57	32.39
Palatal involvement	62	35.23
Dental pain	49	27.84
Headache	38	21.59
Diminution of vision	24	13.64
Proptosis	18	10.23
Diplopia	8	4.55
Altered sensorium	3	1.7
Change in voice	1	0.57
Giddiness	1	0.57
Skin involvement	1	0.57

### Discussion

Acute invasive fungal rhinosinusitis (AIFRS) has become a significant concern, particularly among immunocompromised patients, and its prevalence has surged in recent years due to the COVID-19 pandemic. In our study, the most common presenting complaint was facial pain, which was observed in 51.7% of patients. This is consistent with findings that facial pain is one of the hallmark symptoms of AIFRS [3]. Palatal involvement (35.23%) and nasal obstruction/discharge (32.39%) were also frequently observed, aligning with previous studies highlighting the involvement of paranasal sinuses and adjacent structures in the infection [4].

Interestingly, the occurrence of diminished vision (17.64%) and proptosis (13.23%) reflects the aggressive nature of AIFRS and its ability to rapidly invade orbital structures, as also reported by previous studies [5]. These features are critical to the diagnosis of AIFRS, as delayed detection of such symptoms can lead to significant morbidity, including loss of vision and neurological deficits [1]. Our study also found that dental pain was present in 27.84% of patients, a symptom that may indicate deeper sinus involvement and is a key diagnostic clue [6].

While less common symptoms, such as altered sensorium (2.21%), diplopia (5.88%), and skin involvement (0.73%), were observed in a small proportion of patients, these findings are not unusual given the rapid progression of the disease in severe cases [7]. Skin involvement, though rare, has been documented in AIFRS cases, often due to direct extension of the fungal infection [9]. Altered sensorium, a potentially life-threatening sign, underscores the severity of AIFRS when intracranial spread occurs [8].

The high percentage of diabetic patients (54.55%) in our cohort supports the established association between diabetes mellitus and AIFRS. Diabetes is a known risk factor for fungal infections due to its effects on immune function and hyperglycemia, which promotes fungal growth [2]. Other significant comorbidities in our study included hypertension (18.18%) and chronic kidney disease (10.23%), both of which are frequently observed in AIFRS patients and contribute to a weakened immune response [1]. The presence of these comorbidities is consistent with previous studies that have emphasized the importance of identifying at-risk populations for early intervention [3].

The distribution of symptoms and comorbidities in our study highlights the need for heightened clinical awareness and early diagnostic workup in at-risk populations, particularly in those with diabetes or other immunocompromising conditions. Multidisciplinary collaboration, involving otolaryngologists, infectious disease specialists, and intensivists, is essential for timely intervention and optimal patient outcomes in AIFRS [5]. Given the high mortality rate associated

with delayed diagnosis, early surgical debridement combined with antifungal therapy remains the cornerstone of treatment [7].

### **Conclusion**

In conclusion, acute invasive fungal rhinosinusitis (AIFRS) is a rapidly progressing and life-threatening condition, particularly in immuno-compromised patients. Our study emphasizes the importance of early diagnosis and intervention, as common symptoms such as facial pain, nasal obstruction, and palatal involvement can quickly lead to severe complications like vision impairment and neurological deficits. The high prevalence of comorbidities such as diabetes mellitus underscores the need for heightened clinical awareness in at-risk populations. Early surgical debridement combined with antifungal therapy remains essential for improving patient outcomes and reducing mortality.