

## Orbital Complication of Allergic Fungal Rhino-sinusitis

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**Background:** Allergic fungal rhino-sinusitis (AFRS) is a benign non-invasive sinus disease related to hypersensitivity to fungal inhalation which occurs in young immunocompetent individuals. AFRS could present with serious orbital complication.

**Objective:** To evaluate the common features of orbital complications due to allergic fungal rhino-sinusitis.

**Design:** A Retrospective Study.

**Setting:** Aseer Central Hospital, Abha, Saudi Arabia.

**Methods:** Sixty patients were diagnosed and treated for allergic fungal rhino-sinusitis from 2010 to 2013. The diagnosis was based on Bent-Kuhn criteria and CT scan report; the data was coded, edited and analyzed using SPSS IBM version 22.

**Results:** Twenty-seven (45%) orbital complications were encountered: 16 (26.7%) eye proptosis, 7 (11.7%) diplopia and 4 (6.7%) unilateral complete blindness. Fungal hyphae were not demonstrated histopathologically in any of these patients. The presence of fungal mucin was prevalent in all patients. Eye proptosis had good response to surgical and postoperative treatment while diplopia took longer to improve after surgical and medical treatment.

**Conclusion:** Allergic fungal rhino-sinusitis (AFRS) could present with serious orbital complications: eye proptosis, diplopia and/or unilateral complete blindness. All patients with orbital involvement should be evaluated clinically and radiologically for sinus disease even in the absence of the stigma of rhino-sinusitis. Early diagnosis and immediate treatment is extremely essential to prevent serious complications such as visual loss.

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Young et al described allergic fungal sinusitis in 1987<sup>1</sup>. They described a case with pan-sinusitis with bone erosion. They described the contents of maxillary sinuses to be abundant in mucous admixed with eosinophils, necrotic debris and scattered fractured fungal hyphae. The condition "Allergic fungal sinusitis" as a clinical entity was described in 1981 by Millar et al<sup>2</sup>. Katzenstein et al described the pathophysiologic resemblance between allergic bronchopulmonary aspergillosis and 7 cases of chronic fungal sinusitis.

The term allergic fungal sinusitis was coined in 1989<sup>3</sup>. Since then, several studies have been done to describe the disease as an immunologically mediated disorder (IgE mediated) rather than a precursor of invasive fungal disease<sup>4,7</sup>. Allergic fungal sinusitis is non-invasive. It is a severe inflammatory response to mold in immuno-competent patients with chronic sinusitis and nasal polyposis. It occurs in patients with allergic hypersensitivity<sup>8</sup>. The paranasal sinuses of these patients are characteristically filled with eosinophil-rich mucin. Thick fungal debris and mucin having carbohydrate-rich glycoprotein develop in the sinus cavity<sup>9</sup>.

The mucin is characteristically known as "allergic mucin". Allergic fungal sinusitis patients commonly suffer from asthma. Studies revealed that asthma associated with AFS is estimated to be 20% to 40%<sup>10</sup>. IgE-driven eosinophilic inflammation within the paranasal sinuses causes the disease. The classic features in allergic fungal sinusitis are caused by the cytokines released from the inflammation.

Proptosis, diplopia, blepharoptosis, epiphora, ophthalmoplegia, orbital abscesses and rarely visual loss (1.46% to 3.7%) have been reported<sup>11-13</sup>. The visual loss has been proposed to be either through direct or indirect optic nerve compression or an inflammatory process<sup>13-14</sup>.

The diagnostic criteria of allergic fungal sinusitis include gross production of eosinophilic mucin containing non-invasive fungal hyphae, nasal polyposis, characteristic radiological findings, immuno-competence and allergic mucin<sup>4</sup>.

Radiological findings include asymmetrical involvement of paranasal sinuses seen on plain radiographs and CT imaging,

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bone erosion, sinus expansion, Heterogenous areas of signal intensities seen in CT imaging; this is due to accumulation of heavy metals like iron and manganese<sup>15-18</sup>.

Histological features include branching non-invasive fungal hyphae within sheets of eosinophils and Charcot-Leyden crystals<sup>19</sup>.

The aim of this study is to evaluate the common features of orbital complications due to allergic fungal rhino-sinusitis.

## METHOD

Sixty patients were reviewed from 2010 to 2013. All patients were diagnosed and treated for allergic fungal rhino-sinusitis. The diagnosis was based on Bent-Kuhn criteria and analysis of CT scan reports of these patients.

Bent and Kuhn, five criteria for the diagnosis of allergic fungal sinusitis, include type I hypersensitivity (atopy), positive skin test, serology, nasal polyposis, characteristic CT scan findings, positive fungal smear (this feature was not seen in any of the patients in our study) and allergic mucin. The data were coded and analyzed using SPSS IBM version 22.

## RESULT

All patients were healthy with no associated medical illnesses. Twenty-seven (45%) were males and 33 (55%) were females with a median age of 31 years (range 8 to 61). Hospital stay ranged from 3 to 6 days with a mean of 4 days. Twenty-seven (45%) patients had orbital complications: eye proptosis in 16 (26.7%), diplopia in 7 (11.7%) and complete unilateral blindness in 4 (6.7%), see table 1.

**Table 1: Orbital Complications due to AFRS**

Orbital Complication	Number (%)
Eye Proptosis	16 (26.7%)
Diplopia	7 (11.7%)
Unilateral Complete Blindness	4 (6.7%)
Complication Total	27 (45%)
No Complication Total	33 (55%)

## DISCUSSION

Allergic fungal sinusitis (AFS) is a well-known type of chronic fungal rhino-sinusitis. AFS could be differentiated clinically, histopathologically and prognostically from other types of chronic fungal rhino-sinusitis.

Histopathological specimen from the sinus surgery is still the mainstay of diagnosis of AFS despite the classical clinical presentation of AFS history and clinical examination, increased level of total serum IgE, positive inhalant allergy skin test and CT findings of chronic rhino-sinusitis. The presence of orbital periosteum is a deterrent to spread of these lesions into the orbit.

Treatment, other than surgical drainage, consists of systemic corticosteroids to prevent recurrence of the disease. Eye proptosis has a positive response to surgical and postoperative treatment. Diplopia takes longer to improve after surgical and medical treatment.

It is clear from our study that AFRS is associated with variable complications which include eye proptosis, diplopia and blindness. All patients with orbital involvement should be evaluated clinically and radiologically for sinus disease, even in the absence of stigma of rhino-sinusitis.

This study used a single large group of patients involving many forms of orbital complications of AFRS, compared to previous studies, which included only proptosis<sup>8</sup>.

## CONCLUSION

**Proptosis and a high suspicion from ophthalmologist is a key for initial diagnosis of allergic fungal sinusitis. It is important to differentiate AFS from the invasive form because the treatment modalities are different. AFS treatment includes extirpation of the fungus and allergic mucin, aeration of the sinus, systemic and topical corticosteroids.**

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