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RESEARCH ARTICLE

ACUTE RHINOSINUSITIS: CASE SERIES OF ORBITAL COMPLICATIONS

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Key words:-

Acute rhinosinusitis, orbital complications.

Abstract

Introduction:- Acute rhinosinusitis is an inflammatory condition involving the lining mucosa of the nasal cavity and paranasal sinuses. Orbital complications of acute rhinosinusitis (ARS) occur in approximately 7.8% of cases. Without prompt treatment, these complications can result in significant morbidity and mortality.

Aim:- To evaluate the clinical presentation, management, and outcomes of orbital complications secondary to acute rhinosinusitis.

Materials and Methods:- A retrospective study was conducted at D.Y. Patil Medical College Hospital and Research Institute, Kolhapur, a tertiary care center. The study period was from January 2024 to January 2026. A total of 12 patients with orbital complications of acute rhinosinusitis were included. Data on demographic profile, clinical features, imaging findings, and management were analyzed.

Results:- Among the 12 patients, 7 were male, and 5 were females. Half of the patients were in their third or fourth decade of life. The ethmoid sinus was most frequently involved, followed by the maxillary, frontal, and sphenoid sinus. Subperiosteal abscess was the most common complication (75%) we encountered followed by orbital cellulitis (16.6%) and orbital abscess. (8.4%) All patients received broad-spectrum intravenous antibiotics with anaerobic coverage. Endoscopic sinus surgery with orbital decompression and drainage of pus was performed when indicated. All patients experienced favorable outcomes.

Conclusion: Orbital complications of acute rhinosinusitis are potentially life-threatening. Early diagnosis, combined with prompt medical and surgical intervention, is essential for achieving a favorable prognosis.

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Introduction:-

Rhinosinusitis is defined as inflammation of the mucosa of the nasal cavity and paranasal sinuses.¹ Based on duration, it is classified as acute, subacute and chronic rhinosinusitis.^{1,2} Acute rhinosinusitis is most commonly of viral origin. Pathogens include rhinovirus, coronavirus, and adenovirus.^{2,3} This can be complicated by secondary bacterial infections. The most common bacteria are Coagulase-negative Staphylococcus aureus, Haemophilus influenzae, Streptococcus viridans, and Streptococcus pneumoniae.³ Acute rhinosinusitis is a prevalent condition affecting individuals of all ages and represents a frequent cause of outpatient consultations. It is also a primary indication for antibiotic prescriptions, particularly amoxicillin-clavulanate, in otorhinolaryngology practice. Although complications of acute rhinosinusitis are relatively uncommon, they can be severe. Complications are

classified as orbital, intracranial, or bony.⁴ Orbital complications are the most frequent, attributable to the close anatomical proximity between the paranasal sinuses and the orbit. The thin lamina papyracea, which forms the medial orbital wall, facilitates the spread of infection from the ethmoid sinuses to the orbit.

Chandler classified the orbital complications of ARS as follows.⁵:-

Stage I - Preseptal Cellulitis, in which inflammation is seen in the eyelid soft tissues, and the patient presents with redness of the eyelid, edema, normal vision, and painless eye movements.

Stage II - Orbital Cellulitis, in which the orbital soft tissue is inflamed, and the patient presents with eyelid swelling, redness, proptosis, chemosis, ophthalmoplegia, and reduced vision with raised Intraocular pressure.

Stage III – Subperiosteal Abscess, where the abscess is seen between the periosteum and the lamina papyracea and presents with intense eye pain, ophthalmoplegia, proptosis, marked edema and erythema, and reduced vision/diplopia.

Stage IV– Orbital Abscess, which presents with severe pain on eye movements, marked proptosis, ophthalmoplegia, decreased vision, diplopia and raised intraocular pressure.

Stage V- Intracranial complications- although less common, are potentially life-threatening and include meningitis, epidural abscess, subdural abscess, encephalitis, intracerebral abscess, and cavernous sinus thrombophlebitis.

This study aimed to evaluate the clinical presentation, radiological findings, management, and outcomes of patients with orbital complications secondary to acute rhinosinusitis.

Materials and Methods:-

This retrospective observational study was conducted at D.Y. Patil Medical College Hospital and Research Institute, Kolhapur, Maharashtra, a tertiary care center, over a period of 2 years from January 2024 to January 2026. Institutional ethical committee approval and patient consents for photography were obtained. The study included 12 patients diagnosed with Acute Rhinosinusitis who presented with orbital symptoms and radiological evidence (CT or MRI) of orbital complications during the study period. Patients with chronic rhinosinusitis or solely clinical features without radiological confirmation were excluded. Data was collected retrospectively from hospital records. Collected data included demographic details (age, gender), clinical presentation (symptoms, signs), radiological findings (CT and MRI of paranasal sinuses and orbit), and type of orbital complication. All patients received broad-spectrum intravenous antibiotics with anaerobic coverage. Surgical intervention in the form of endoscopic sinus surgery with orbital decompression was performed in all the cases, with drainage of pus when required.

Statistical Analysis:-Descriptive analysis was performed using frequency distributions and percentages for study variables. These included patient biodemographic data, clinical symptoms, affected sinus, and type of orbital complication.

Results:-

A total of 12 patients with orbital complications of ARS were included. Patient ages ranged from 17 to 70 years, with a mean age of 43.5 years. The majority of our patients were males. (Table 1) The ethmoid sinus was most frequently involved, followed by the maxillary, frontal, and sphenoid sinus. Of the 12 patients, subperiosteal abscess was the most common complication (75%). These patients presented with headache, fever, nasal discharge, ophthalmoplegia, reduced vision, and severe downward and lateral displacement of the eyeball (Figure 1).



Figure 1: Clinical pre operative and post-operative photographs of patient with right subperiosteal abscess showing downward and lateral displacement of the eye.

Orbital cellulitis was found in 16.6% of patients who had presented with uniform orbital swelling, severe eye pain, and ophthalmoplegia. (Figure 2) 8.4% of patients had orbital abscess.



Figure 2: Clinical photograph of patient with right orbital cellulitis showing periorbital edema

These patients had presented with painful eye swelling, diminished vision, diplopia, and raised intraocular pressure. All patients received intravenous broad-spectrum antibiotics with anaerobic coverage. Radiological investigations, including CT (plain and contrast) of the paranasal sinuses (PNS) and orbit, as well as MRI of the PNS and orbit, were performed. Surgical intervention for orbital complications consisted of endoscopic sinus surgery with orbital decompression and/or abscess drainage.

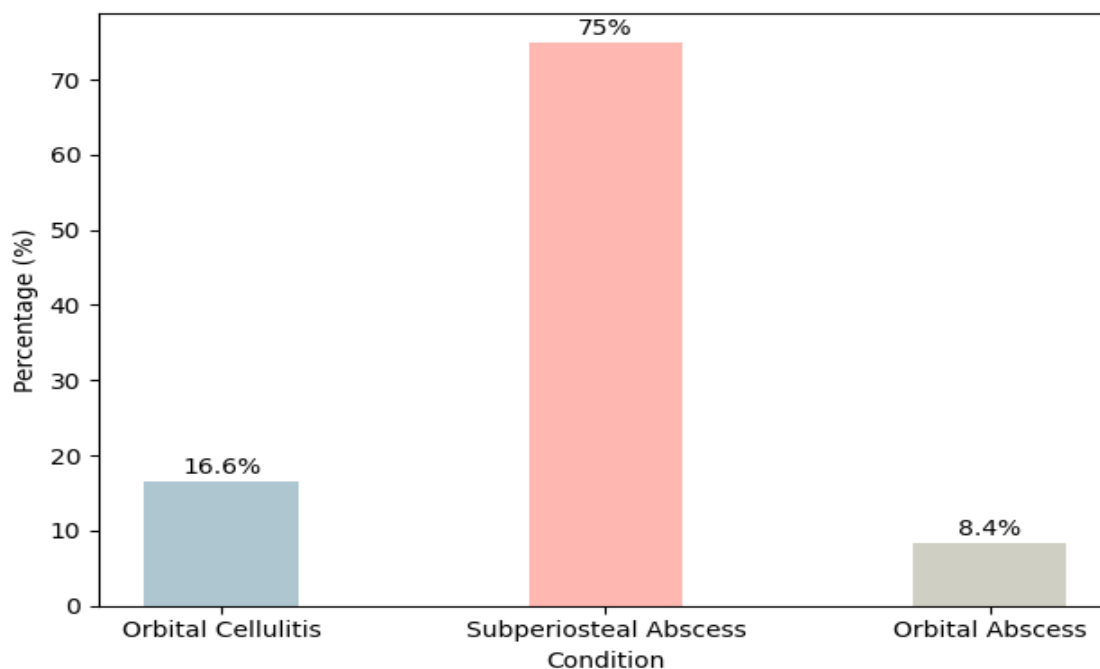


Figure 3: Percentage of Orbital complications of Acute Rhinosinusitis



Figure 4: CT coronal cut of a patient showing sinusitis with right orbital cellulitis

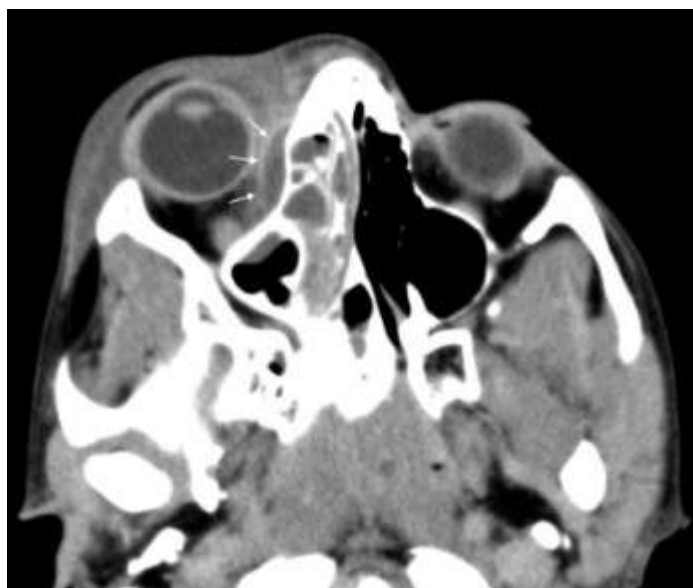


Figure 5: CT PNS (axial cut) showing Subperiosteal abscess

Discussion:-

Orbital complications of acute rhinosinusitis are serious because of the close anatomical relationship between paranasal sinuses and the orbit. These are considered medical emergencies and need prompt management.⁶

In our study, 75% of patients had subperiosteal abscess, 16.6% had orbital cellulitis (Figure 3), and a smaller proportion of 8.3%, had orbital abscess (Figure 4). In a study by Asiri M A et al. subperiosteal abscess was found in 48.2% followed by orbital cellulitis in 37.5% and preseptal cellulitis in 17.2% of patients which was comparable with our study.⁷ In our study, the most common complication observed was a subperiosteal abscess, followed by orbital cellulitis and orbital abscess (Table 2). The ethmoid sinus was the most commonly involved sinus, followed by the maxillary and frontal sinuses. This is consistent with the known anatomical predisposition, given the thin lamina papyracea. However, Chaudhry IA et al.⁸ have reported the maxillary sinus as the most commonly involved,

indicating variability in sinus involvement and highlighting the importance of radiological evaluation for sinus involvement. Imaging is crucial for diagnosis and management. CT of the paranasal sinuses shows sinus opacification, air-fluid levels, and mucosal thickening over 5 mm (see Figure 5). CT helps assess bony erosion and provides a three-dimensional view of abscess size and its relation to the eyeball, muscles, and optic nerve (see Figure 6).

Clary et al. reported that radiologic and surgical findings are not always identical, but CT remains the main diagnostic tool. MRI provides better soft-tissue detail and helps evaluate the extent of orbital involvement and potential complications. All patients in our study were managed with a combination of broad-spectrum intravenous antibiotics with anaerobic coverage and surgical intervention. Surgical management included endoscopic sinus surgery (ESS) with clearance of the involved sinuses, along with orbital decompression and intranasal drainage of subperiosteal and orbital abscesses, as indicated, which was comparable with studies by Rueda Vega M et al.⁸ and Sansa-Perna A et al.⁹ No significant postoperative morbidity was observed, and all patients had favorable outcomes. These findings highlight the importance of early diagnosis and appropriate imaging. Timely medical and surgical intervention is also critical to prevent disease progression and intracranial complications. This approach ensures a good prognosis in orbital complications of acute rhinosinusitis.¹⁰

Conclusion:-

Complications of acute rhinosinusitis must be promptly recognized and effectively managed to prevent serious sequelae such as permanent vision loss. Although orbital complications are more commonly seen in the pediatric population, they can also occur in adults, as our study demonstrates. A multidisciplinary approach involving the otorhinolaryngologist, ophthalmologist, and, when required, the neurologist, is involved. Early radiological evaluation with CT and MRI to delineate the extent of disease, initiation of appropriate intravenous antimicrobial therapy and timely surgical intervention for sinus clearance and abscess drainage when indicated, are crucial for optimal prognosis.

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Nil

Conflicts of interest:-

There are no conflicts of interest.

AI use declaration:-

The authors declare that artificial intelligence (AI) tools were used solely to assist in language editing, grammar correction, and improvement of readability during the preparation of this manuscript titled "Acute Rhinosinusitis: case series of orbital complications." No AI tools were used for data collection, data analysis, interpretation of results, or generation of scientific conclusions. All clinical data, observations, and interpretations presented in this study are original and were performed by the authors. The authors take full responsibility for the integrity, accuracy, and originality of the work.

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