# Orbital Cellulitis in Sickle Cell Anemia

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***Abstract-***

*To report a case of three patients of orbital cellulitis in pediatric age group with incidental correlation with Sickle Cell Anemia. Patients were presented with similar complaints of decrease vision, painful protrusion and swelling of eyelid with the history of fever. A diagnosis of orbital cellulitis was made and conservatively managed by intravenous antibiotics. Three patients responded to treatment while one did not respond and progressed to NO PLPR. So we highlight that early diagnosis and treatment can prevent the possible loss of vision and severe life threatening complications.*

***Keywords*** *–Orbital cellulitis, COVID -19, Pediatric, Sickle Cell Anemia*

## INTRODUCTION:

This is a case series of patients of pediatric age group with known case of sickle cell disease with acute peri orbital swelling coming to the Ophthalmology OPD at tertiary care hospital of Durg, Chhattisgarh. An acute spread of infection from the blood, nearby sinuses, and facial skin causes orbital cellulitis, a common life-threatening infection of the post-septal tissues of the orbit and one of the most common causes of orbital inflammation in children and young adults [(1,2)]. Periorbital trauma and dental infection are other sources of spread to the orbit [2]. They reported 11% cases of orbital cellulitis results in visual loss [3].



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**Case Report 1 –** A 14 years old female presented with history of fever and cough for 10 days with diminution of vision associated with lid swelling and pain in both eyes which progressed rapidly over 4 days. On ocular examination - Visual acuity was 6/60 in both eye with periorbital oedema (Fig 1), conjunctival chemosis (Fig 2), corneal erosion (Fig 3) and all the extra ocular movements was restricted. The fundus examination was normal. CT scan revealed bilateral post septal Cellulitis with marked mucosal thickening of bilateral maxillary, ethmoid and sphenoid sinuses (Fig 4 ). Laboratory investigation shows – Hb 8.8gm%, TLC- 14,290 cells/mm3, Platelet – 3.67 lacs/Cumm, Rapid Antigen Test – Negative, Blood culture and sensitivity shows no growth. Patient was received i.v. Ceftriaxone 1 gm TDS, Metrogyl 50 ml TDS, Vancomycin 650 mg TDS . Topical antibiotic e/d Tobramycin (0.3%) QID, e/dMoxifloxacin (0.5%) QID, e/o Neosporin BD. After 7 days of treatment extra ocular movements improved(Fig 5), edema was decreased ,and visual acuity improved to 6/6 in both the eyes.

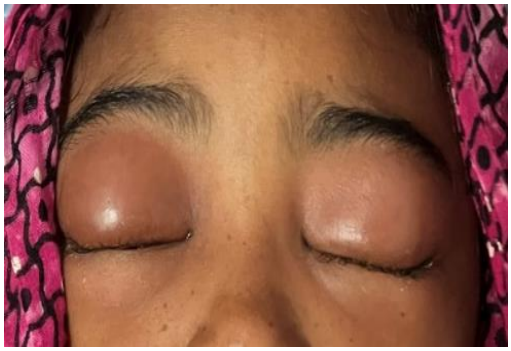


**Fig 1 Lid Edema**

**Fig 2 Conjunctival Chemosis**

**Fig 3 Corneal Erosions**

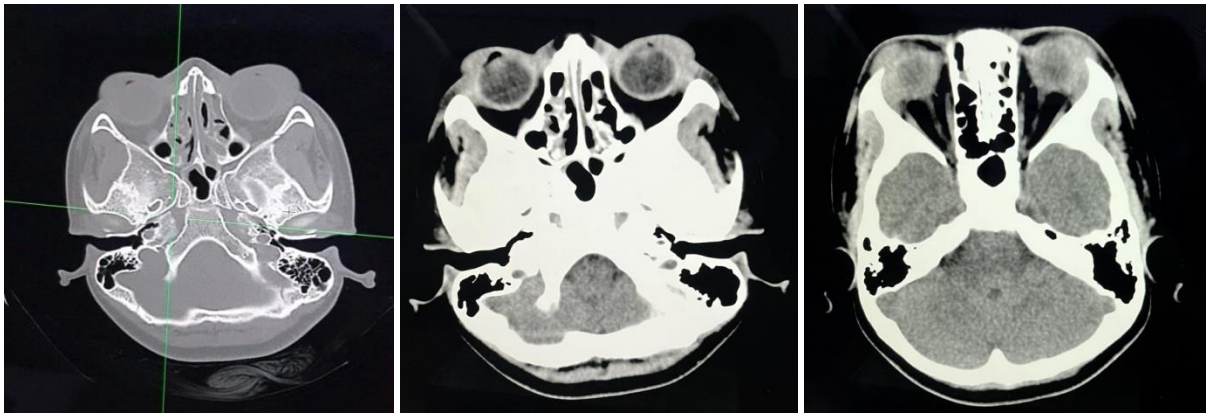


**Fig 4 CT Scan**

**Fig 5 - After Treatment**

## Case Report 2-

A 15 years old male presented with history of fever 7 days back with polyache and headache since 5 days and swelling in left eye since 5 days. On examination in left eye there was mild restriction of movements with upper lid edema (Fig 6)and conjunctival chemosis with BCVA 6/9.On indirect ophthalmoscopy fundus was normal. Laboratory investigations shows- Hb 8%,TLC – 12160 cells/cumm ,platelet- 1.50 lakhs/cumm ,Total bilirubin – 6.65mg/dl , RAT – Negative,Blood culture and sensitivity shows no growth.

CT scan revealed mild medullary expansion of bilateral zygomatic bone(left >right), mastoiditis , bilateral subgleal hematoma(Fig 7). He was started on intravenous vancomycin and ceftriaxone for 7 days and the signs and symptoms subsided with the improvement in extra ocular muscle movements (Fig 8) and visual acuity was 6/6.

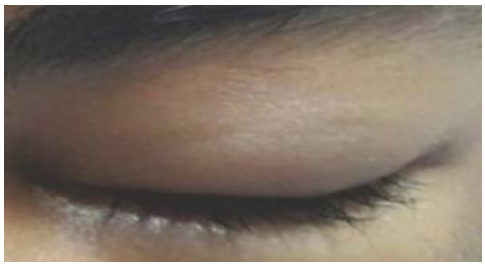


**Fig 6 Upper Lid Edema**

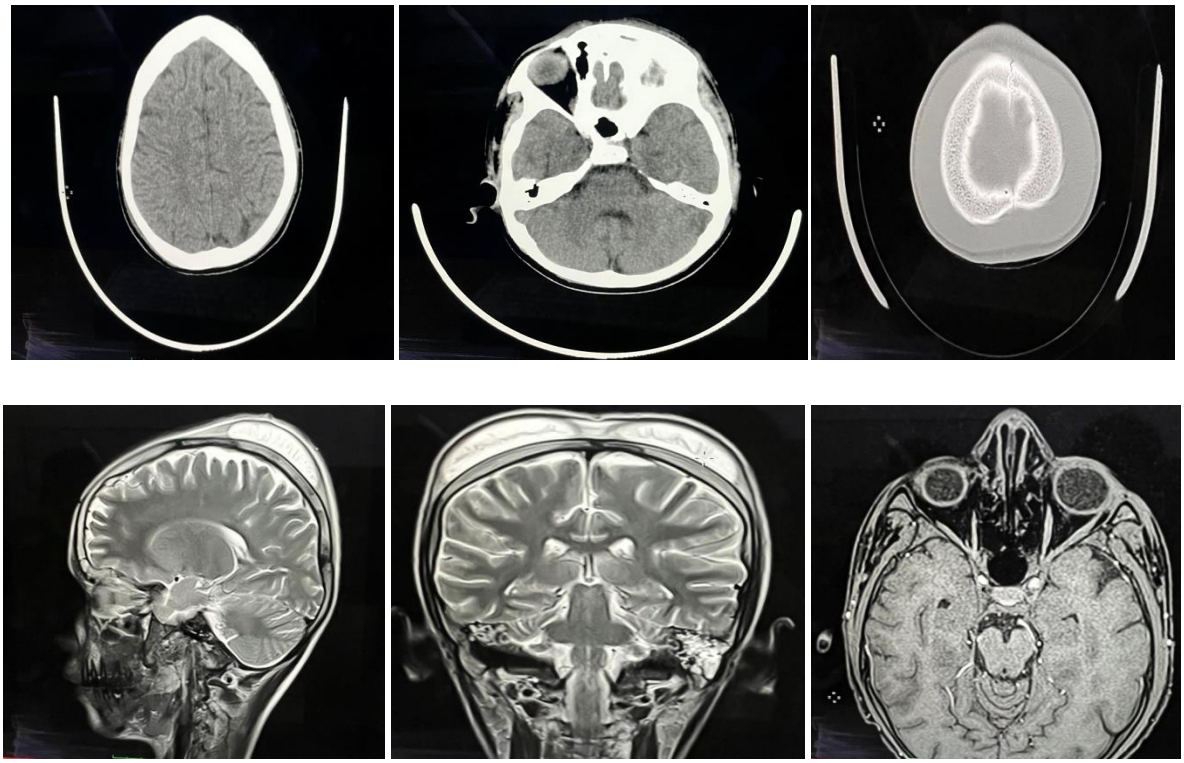


**Fig 7 – CT Scan Findings showing – a, b and c Medullary extension of bilateral zygomatic bone, d and e Showing Subgleal Hematoma, f – showing mastoidits**

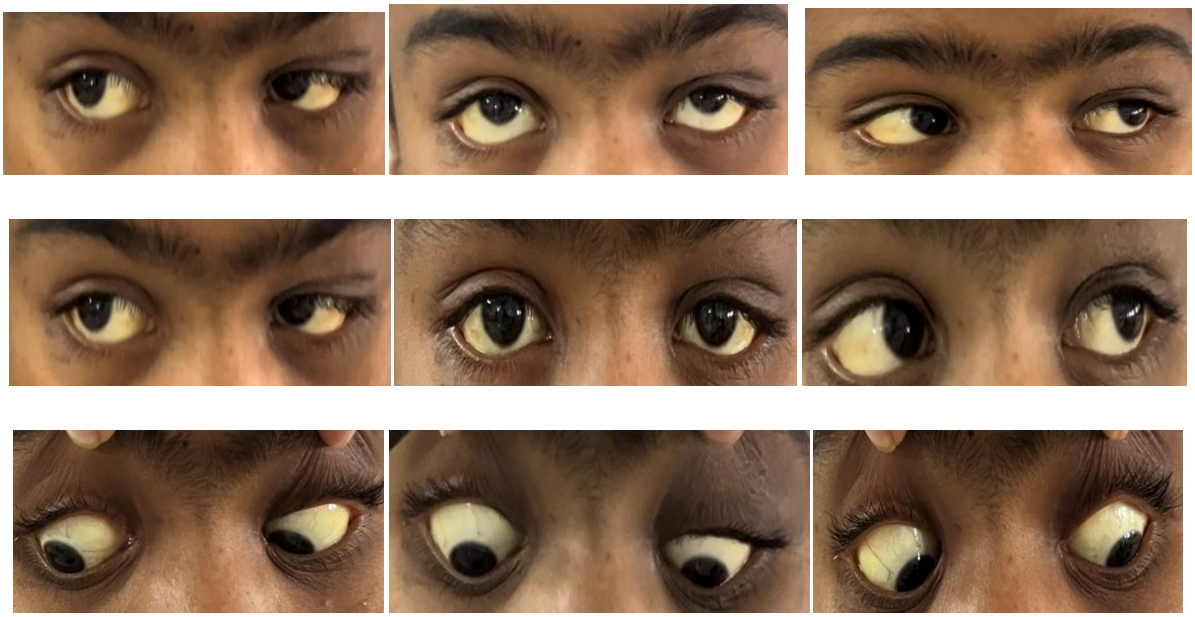


**Fig 8 – ExtraOcular Muscle Movements**

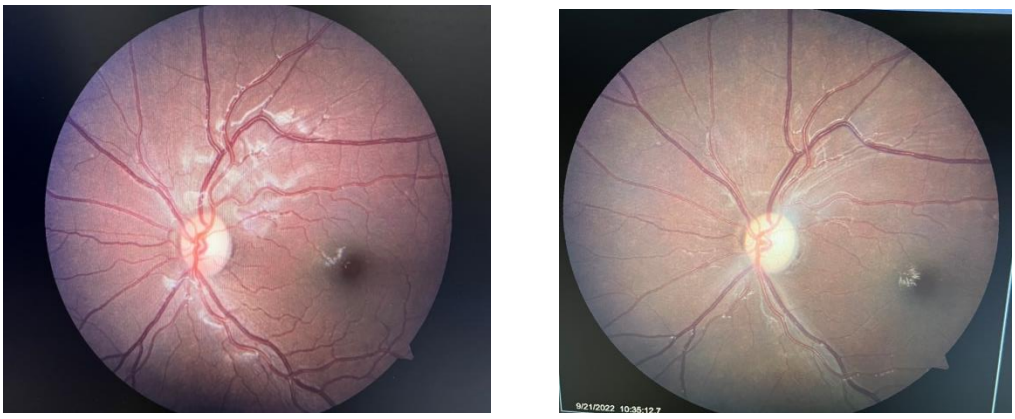
**Case Report 3-**

A 7 years old female presented with swelling of both eyes, left more than right since 1 week with history of fever and headache since 5 days. On examination visual acuity of LE was No PL PR with restricition of all the movements associated with lid edema ( Fig 9a), moderate ptosis with RAPD in left eye(Fig 9b). On indirect ophthalmoscopy there was hyperameic disc with tortorus vessels(Fig 10a).Laboratory investigations –Hb – 10.1 gm%, TLC – 12910 cells/ccum, Platelet-3.01 lakhs/cumm ,Rapid Antigen Test – Negative, CSF shows -WBC count 210 cells/mm, CSF fluid cytology shows meningitis. Blood culture and sensitivity shows Staphylococcus aureus (MSSA). CT face and orbit revealed – CT Scan Mild pre and post septal soft tissue fullness over left orbit , Left superior recuts muscle appears bulky ,soft tissue density in left maxillary, bilateral ethmoid and sphenoid sinuses.(Fig 11). MRI reveal basal meningitis ( Fig 12) She was prescribed intravenous Cefrtiaxone 1 gm TDS,Vancomycin 50 ml TDS, Acyclovir 400mg TDS, Tab. Ecosporin 75 mg OD, Tab. Folic acid ½ OD, Syrup PCM 5ml TDS, e/d Timolol 5%BD .

After 10 days of treatment the lid edema improved, extra ocular muscle movements improved (Fig 13) but no improvement in visual acuity was seen. On follow up after one month on fundus examination patient had signs of optic atrophy in left eye(Fig 10b).

Before Treatment -

**Fig 9 a) Left eyelid edema b) Rapid Afferent Pupillary Defet in left eye**



**Before Treatment** **After one month on followup**

**Fig 10 a) Fundus picture showing – hyperemic dis and tortous vessels b) Fundus picture showing – pale disc on 1 month followup**

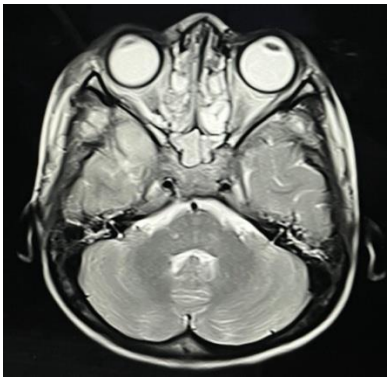


**Fig 11 – CT Scan Mild pre and post septal soft tissue fullness over left orbit , Left superior recuts muscle appears bulky ,soft tissue density in left maxillary, bilateral ethmoid and sphenoid sinuses.**

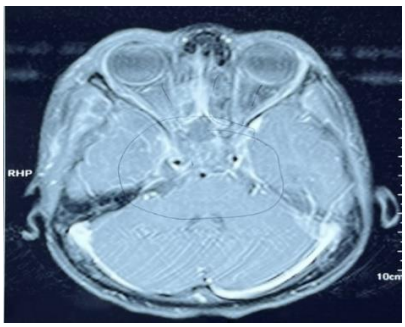



**Fig 12 MRI showing Basal meningitis**

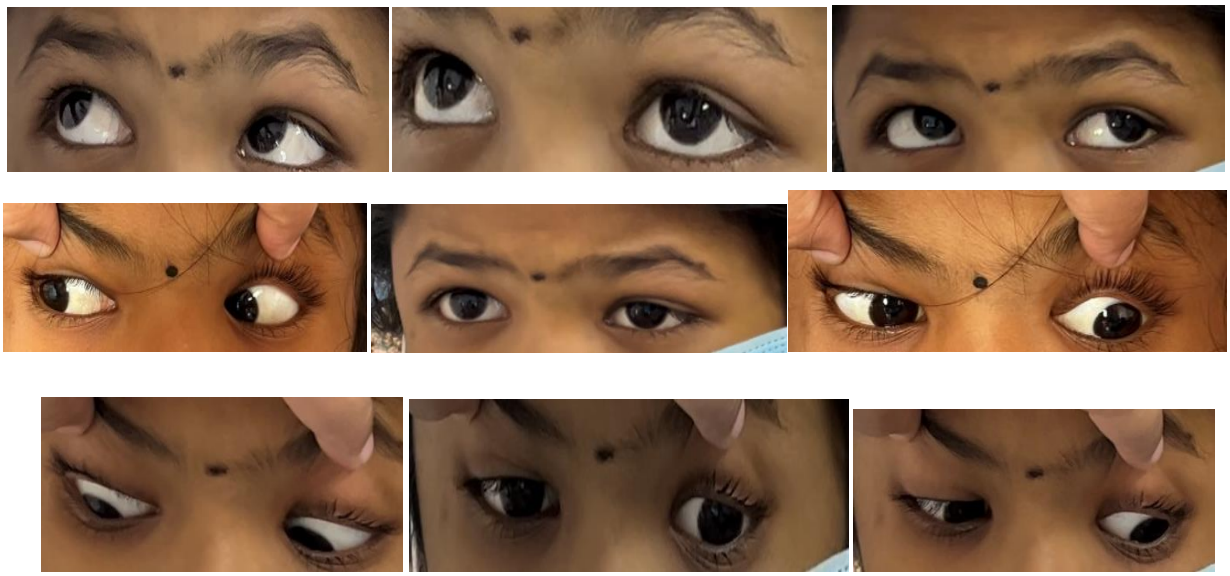


**Fig 13 – Extra Ocular Muscle Movements**

## DISCUSSION:

Because they pose a risk to life, infections of the orbit and periorbital tissues are significant and necessitate prompt diagnosis and specialized therapeutic therapy. These infections may disseminate via the venous drainage of the orbit or by the bone dehiscence of the orbital wall. These veins, which typically lack valves, empty into the cavernous sinus or pterygoid plexus.[4],[5] Septic thrombosis, bilateral cavernous sinus infection, meningitis, or brain abscess may occur if an infection spreads to the cavernous sinus.[3]

Most typically, a continuous expansion to the opposite orbit originates from the cavernous sinus's bilateral involvement. According to the suggested mechanism, cerebral abscess may be accompanied by altered consciousness and result in bilateral orbital cellulitis.[3] In one instance, a child sought medical attention three days after the onset of symptoms, displaying proper orientation in time, place, and person. There was no apparent posterior spread to the cavernous sinus, but the child exhibited rhinitis swelling in both eyes, with decreased vision and ophthalmoplegia featuring restrictive muscle movements and conjunctival chemosis. The diagnosis pointed to orbital cellulitis secondary to rhinosinusitis, a common complication in children with rhinosinusitis[6],[7]. Other potential complications include subperiosteal abscess, intraorbital abscess, and cavernous sinus thrombosis[6],[7], with the ethmoidal sinus frequently being the source of infection in children due to the delayed development of the frontal and sphenoidal sinuses until age 7.

The initial case, involving an adolescent, aligns with findings in similar reports describing bilateral orbital cellulitis[8]. Radiological investigations, especially CT scans and MRIs, play a crucial role in diagnosing orbital disorders and would have clearly depicted the orbit's changes[4]. Despite this, it was assumed that the infection source might have been the ethmoidal sinus. The CT scan revealed bilateral preseptal cellulitis with ethmoid, maxillary, and sphenoid sinusitis. Anatomically, vulnerabilities such as dehiscences in the orbital wall, particularly through the thin lamina papyracea, neurovascular foramina, and valveless veins, elevate the risk of orbit infection via the ethmoidal sinus[8],[9].

Clinically, orbital cellulitis manifests as discomfort, proptosis, globe displacement, chemosis, ophthalmoplegia, double vision, and/or vision loss. Patients commonly report headaches and fatigue as accompanying symptoms. Fever can be absent in adults 66% of the time but is equally common in children (62%)[10] as it is in preseptal cellulitis.[11]

A recent upper respiratory tract infection, rhinitis, sinusitis, nasal discharge, and significant prior medical history could all be antecedent conditions. (which existed in each of the three circumstances) Optic neuropathy and optic disc edoema can quickly result in decreased visual acuity, pupillary symptoms, and vision loss (as demonstrated in case no. 3). All of the aforementioned characteristics become more pronounced and bilateral in bilateral cases, as described in orbital cellulitis categories, because the cavernous sinus is involved.[6],[12]

All the instances described exhibited a majority of the clinical characteristics mentioned earlier, and none showed any signs of altered sensorium. A retrospective analysis of cases involving orbital cellulitis as a complication of sinusitis revealed a predominant association with the left orbit in 55% of the cases (Reference 13). The duration of treatment is contingent upon the patient's response. Patients are recommended to receive parenteral treatment until they demonstrate clear clinical improvement. In this particular case, the patient responded positively to the prescribed therapy and was discharged after a 7-day hospital stay with intravenous medication. Various studies have indicated an average hospitalization period of 15 days, with a range spanning from 10 to 25 days (References 14, 10).

## CONCLUSION –

Individuals diagnosed with sickle-cell anemia exhibit a heightened susceptibility to severe bacterial infections, primarily attributed to the impairment of spleen function. Orbital cellulitis poses the risk of complications affecting both the orbital and intracranial regions. The potential consequences encompass severe visual impairment, often stemming from optic neuritis, cavernous sinus thrombosis, and increased intraocular pressure (IOP). Therefore, it becomes imperative to conduct daily patient observations, assessing both antibiogram results and any signs of swelling. The objective of this discourse is to underscore sickle-cell disease as a noteworthy risk factor for sinusitis in the pediatric age group. Since, these were the cases presented to us from 15 July 2022 to 15 August 2022 during which the Covid infection was more prevalent in pediatric age group. We can find some correlation with it.

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