CASE REPORT

SUCCESSFUL MANAGEMENT OF NEONATAL ORBITAL CELLULITIS: A RARE CASE REPORT

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ABSTRACT

Objective: To report a rare case of neonatal orbital cellulitis along with the successful management.

Introduction: Orbital cellulitis is a sight- and life-threatening infection of the post-septal tissues of the orbit, and is a considerably rare finding in neonates. Prompt diagnosis and treatment is essential, as 11-26% of cases of orbital cellulitis result in death and visual loss.

Case Presentation: A one-month-old neonate presented with rapidly progressive swelling and redness of the right eyelid along with persistent subfebrile fever seven days before admission to the hospital. Blinking reaction to light stimulation was good on the left eye. Ocular motility was difficult to be evaluated. Conjunctival appearance on the right eye showed severe chemosis, while the other parts of both eyes were within normal limit. Orbital Computed Tomography (CT) scan revealed diffuse soft-tissue swelling at the superior and inferior palpebra of the right eye and partial erosion of the lateral wall of the right ethmoidal sinus, suggesting sino-orbital inflammation. Diagnosis of orbital cellulitis was confirmed on the right eye in this patient. Incision and drainage surgery of the right eyelids were done immediately as improvement was only seen on the upper eyelid after empirical intravenous (IV) antibiotic administration. Strain of Methicillin-Resistant Staphylococcus Aureus (MRSA) was found from the discharge's culture. At one month follow up, the swelling of the right eyelid had markedly decreased with no signs of inflammation.

Conclusion: This case highlights and showed a rare case and successful management of neonatal orbital cellulitis. Early diagnosis and prompt treatment of neonatal orbital cellulitis may benefit patient and prevent sight- and life-threatening condition.

Keyword: orbital cellulitis, neonatal infection, antibiotic administration, drainage surgery, orbital CT scan.

INTRODUCTION

Cellulitis is a sight- and life-threatening infection of the post-septal tissues of the orbit, also as the common cause of orbital inflammation in children and young adults. 11-26% of cases of orbital cellulitis result in death and visual loss. Other complications of orbital cellulitis are cavernous sinus thrombosis, meningitis, subdural emphysema, and brain abscess.[1-5] Orbital cellulitis in childhood is at least twice as common among males as females. [5]

Orbital cellulitis is thought to occur as a result of the acute spread of infection from blood,

adjacent sinuses, and facial skin.[6] Sinusitis, predominantly of the ethmoid sinus, is the most common predisposing factor for orbital cellulitis. Other routes of infection such as extension of infection from adjacent structures (upper respiratory tract infection, dacryocystitis, hordeolum, dental infection, conjunctivitis), direct inoculation via cutaneous or orbital trauma, ophthalmological surgery, animal bite, or cutaneous infection such as impetigo or herpes.[5, 7, 8]

In neonates, orbital cellulitis is extremely rare, Pratik et al Saodi reported 16 cases of neonatal orbital cellulitis in India, while a study in Nigeria by Eberechukwuet et al reported only a few cases of neonatal orbital cellulitis. Currently, there is no data about this case in Indonesia. This study aims to report a rare case of neonatal orbital cellulitis along with its successful management. Early diagnosis and prompt treatment are crucial in this patient, because it is an emergency condition that can lead to life-threatening complications.[5, 10,11]

CASE ILLUSTRATION

One-month-old neonate presented with rapidly progressive swelling and redness over the right eyelid along with persistent subfebrile fever since seven days before hospital admission. Patient was previously hospitalized at another hospital and given ofloxacin eye drops six times a day, hydrocortisone and chloramphenicol eye ointment three times a day, paracetamol syrup three times a day, cefixime syrup two times a day, and normal saline compress on the affected eye.

Patient was discharged after three days of inpatient care due to clinical improvement of the right eyelid. Unfortunately, progressive swelling and redness on the right eyelid appeared again. The patient was then suggested to go to Cipto Mangunkusumo Hospital for further management on the seventh day since the initial symptom presentation. Patient had unremarkable birth history and was delivered aterm through caesarean-section surgery.

Figure 1. Massive swelling, marked erythema and increased temperature

of the upper and lower right eyelids

Figure 2. Chemosis in right eye at the first eye examination.

Upon physical examination, patient appeared to be quite active, his vital signs were normal, with no signs of rhinitis or cough. There was progressive swelling and redness over the right eyelids (Figure 1). Blinking reaction to light stimulation was good on the left eye. Ocular motility was difficult to be evaluated. Conjunctival appearance on the right eye showed severe chemosis (Figure 2), while the other parts of both eyes were within normal limit.

Abnormal laboratory results were elevated monocyte (28,9%) and lymphocyte count (5.09 x 10^3/µL). Procalcitonin and CRP-Quantitative were also elevated (1,69 ng/mL and 42 mg/L, respectively). Orbital CT scan revealed diffuse soft-tissue swelling at the superior and inferior palpebral of the right eye and partial erosion of the lateral wall of the right ethmoidal sinus suggested a sino-orbital inflammation (Figure 3). The ear, nose, throat (ENT) specialist diagnosed the patient with acute rhinosinusitis. Blood and urine cultures were sterile.

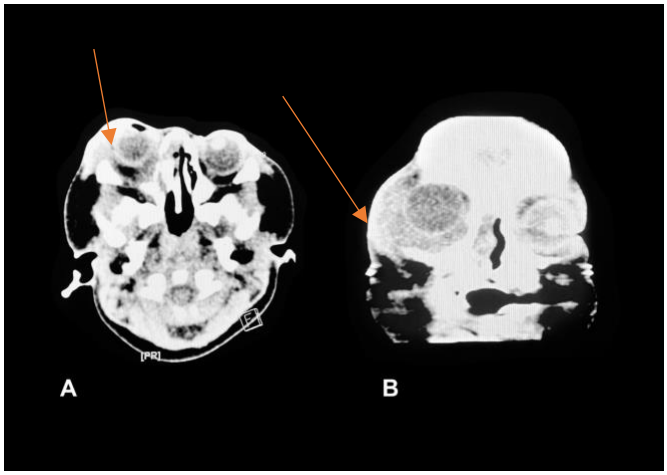

Figure 3. Orbital CT-scan showed (A) ethmoidal sinusitis ; (B) periorbital cellulitis with no sign of intra-cranial abnormalities

The patient was started empirically on IV ampicillin-sulbactam 200 mg/6 hours, chloramphenicol eye ointment/4 hours, artificial tears/4 hours, and normal saline eye compress. On the tenth day since the initial symptom appeared, there was only improvement on the right upper eyelid (Figure 4A), then incision and drainage surgery of the lower eyelid was performed

immediately. The purulent discharge from drainage was taken for culture, which was later confirmed as the strain of Methicillin-Resistant *Staphylococcus Aureus* (MRSA).

After surgery, there was no fever, remarkable improvement on the right eyelid, and the patient was then discharged. Patient was prescribed an oral suspension of amoxicillin-clavulanate 300 mg/eight hours, oral methylprednisolone 4 mg/eight hours, and levofloxacin eye drops/six hours. He was scheduled to return for follow-up in one month. The swelling of the right eyelid had markedly decreased with no signs of inflammation at one month follow-up (Figure 4b).

Figure 4. (A) On the tenth day, only improvement on the right upper eyelid ; (B) Appearance of the eyelid at one month after surgery

DISCUSSION

Orbital cellulitis is an uncommon life-threatening infection in newborns.[1, 9] Neonatal orbital abscess is extremely rare. [12] It commonly occurs as a result of contiguous spread from surrounding periorbital structures, and can happen as the immature tissue planes in neonates inadequately serve as barrier against the spread of infection compared to children and adults. [9]

In children, orbital cellulitis is diagnosed clinically by the presence of proptosis, orbital pain, conjunctival chemosis, and restriction of the extraocular muscles.[13] Prompt diagnosis with orbital scan, discharge culture, blood culture, and immediate treatment with intravenous broad spectrums antibiotic are essential in managing orbital cellulitis.[7] In our case, most of the clinical manifestations existed. Signs of inflammation and bacterial infection were present and confirmed by examination and laboratory findings.

Orbital cellulitis is the most common complication of rhinosinusitis in children. [2, 14, 15] The ethmoid sinus is the most common source of orbital infection in children accounting for more than 90% of cases, especially in neonates who have not yet formed their frontal sinuses. [9, 16] The frontal and sphenoidal sinuses do not develop until 7 years of age. [16] Orbital CT scan

in our patient showed an indication of ethmoidal sinusitis. (Figure 3A). Since our patient was confirmed with orbital cellulitis with the post probable cause being ethmoidal sinusitis, empirical antibiotic (ampicillin sulbactam) was immediately given to the patient.

In children, the most common causes of orbital cellulitis are *Staphylococcus aureus*, *Haemophilus influenza*, *Streptococcus species*, and anaerobic organisms.[4-6] This is in line with our findings, in which the spectrum of bacteria isolated from our patient's discharge was *Staphylococcus aureus*. MRSA is used to describe strain of *Staphylococcus aureus* resistant to all β-lactam antibiotics.[17] Empirical antibiotic therapy of suspected orbital cellulitis should cover a wide spectrum of pathogens, including gram-positive, gram-negative, and anaerobic bacteria.[18, 19] Hence, it is recommended to administer antibiotic such as vancomycin, ampicillin, and first generation cephalosporin. This is in accordance with our treatment in which ampicillin sulbactam was given intravenously. [19]

Transmission of MRSA in this patient is suspected to be acquired through the mother's contaminated nipple during breastfeeding, which could have then spread subperiosteally entering the soft tissue, resulting in orbital cellulitis.[20]

The management of orbital cellulitis in neonate and infant is challenging and must be undertaken urgently to prevent more serious complications. [20, 21] The presence of a well-defined mass, significant visual impairment, and/or complete ophthalmoplegia, and no clinical improvement despite appropriate antibiotic therapy were indications for surgical drainage for orbital cellulitis, and all these were found in our patient. [7, 18] The surgery decreases bacterial load and eliminate focal infection, hence accelerating the healing process.

CONCLUSSION

This case highlights early and prompt management of a rare case of neonatal orbital cellulitis. Empirical antibiotic administration and urgent incision and drainage surgery in our patient allowed for decrease in bacterial load and elimination of focal infection, hence accelerating the healing process. Early diagnosis, investigation of the source of infection, orbital scan, blood culture, and treatment as indicated are essential in managing orbital cellulitis to prevent poor outcomes and life-threatening complication.

REFERENCE

1. Jain A, Rubin PAD. Orbital cellulitis in children. Int Ophthalmol Clin. 2001;41(4):71–86.
2. Pushker N, Tejwani LK, Bajaj MS, Khurana S, Velpandian T, Chandra M. Role of oral corticosteroids in orbital cellulitis. Am J Ophthalmol. 2013;156(1):1–9.
3. Rahbar R, Robson C, Petersen R, DiCanzio J, Rosbe K, Trevor M, et al. Management of orbital subperiosteal abscess. Arch Otolaryngol Head Neck Surg. 2010;281–6.
4. Nwaorgu O, Awobem F, Onakoya P, Awobem A. Orbital cellulitis complicating sinusitis: a 15-year

review. Niger J Surg Res. 2010;6(1–2):14–6.
5. Santos JC, Pinto S, Ferreira S, Maia C, Alves S, da Silva V. Pediatric preseptal and orbital cellulitis: A 10-year experience. Int J Pediatr Otorhinolaryngol [Internet]. 2019;120(February):82–8. Available from: https://doi.org/10.1016/j.ijporl.2019.02.003
6. Achigbu E, Achigbu K. Bilateral orbital cellulitis: A case report and management challenges. Niger J Ophthalmol. 2017;25(1):52.
7. Nageswaran S, Woods CR, Benjamin DKJ, Givner LB, Shetty AK. Orbital cellulitis in children. Pediatr Infect Dis J. 2006;25:695–9.
8. Seltz LB, Smith J, Durairaj VD, Enzenauer R, Todd J. Microbiology and antibiotic management of orbital cellulitis. Pediatrics. 2011;127(3).
9. Gogri PY, Misra SL, Misra NS, Gidwani H V., Bhandari AJ. Neonatal orbital abscess. Oman J Ophthalmol. 2015;8(2):128–31.
10. Sharma A, Liu ES, Le TD, Adatia FA, Buncic JR, Blaser S, et al. Pediatric orbital cellulitis in the Haemophilus influenzae vaccine era. J AAPOS [Internet]. 2015;19(3):206–10. Available from: http://dx.doi.org/10.1016/j.jaapos.2015.02.004
11. Liao JC, Harris GJ. Subperiosteal abscess of the orbit: Evolving pathogens and the therapeutic protocol. Ophthalmology [Internet]. 2015;122(3):639–47. Available from: http://dx.doi.org/10.1016/j.ophtha.2014.09.009
12. Lin CY, Chiu NC, Lee KS, Huang FY, Hsu CH. Neonatal orbital abscess. Pediatr Int. 2013;55(3):63–6.
13. Cruz AAV, Mussi-Pinhata MM, Akaishi PMS, Cattebeke L, Torrano da Silva J, Elia J. Neonatal orbital abscess. Ophthalmology. 2001;108(12):2316–20.
14. Kayhan FT, Sayn I, Yazc ZM, Erdur Ö. Management of orbital subperiosteal abscess. J Craniofac Surg. 2010;21(4):1114–7.
15. Ozkurt FE, Ozkurt ZG, Gul A, Akdag M, Sengul E, Yilmaz B, et al. Managment of orbital complications of sinusitis. Arq Bras Oftalmol. 2014;77(5):293–6.
16. Leung AKC, Hon KL, Chu WCW. Acute bacterial sinusitis in children: an updated review. Drugs Context. 2021;9(July):1–11.
17. Bæk KT, Gründling A, Mogensen RG, Thøgersen L, Petersen A, Paulander W, et al. β-lactam resistance in methicillin-resistant Staphylococcus aureus USA300 is increased by inactivation of the ClpXP protease. Antimicrob Agents Chemother. 2014;58(8):4593–603.
18. Lee S, Yen MT. Management of preseptal and orbital cellulitis. Saudi J Ophthalmol [Internet]. 2011;25(1):21–9. Available from: http://dx.doi.org/10.1016/j.sjopt.2010.10.004
19. Al-Salem KM, Alsarayra FA, Somkawar AR. Neonatal orbital abscess. Indian J Ophthalmol. 2014;62(3):354–7.
20. Chandravanshi S, Sutrakar S, Bajaj N. Community-acquired Methicillin-Resistant Staphylococus aureus Bilateral Acute Dacryocystitis in a Neonate. Indian J Ophthalmol. 2012;60(2):155.
21. Chaudhry A I, Waleed A-R, Sheikh O, Arat Y. Diagnosis and Management of Orbital Cellulitis. Intech [Internet]. 2012; Available from: https://www.intechopen.com/chapters/44463

Figure legends

Figure 1. Massive swelling, marked erythema and increased temperature of the upper and lower eyelids

Figure 2. Chemosis in right eye at the 1st eye examination.

Figure 3. (a,b) Orbital CT scan imaging showed periorbital cellulitis with no sign of intra-cranial abnormalities

Figure 4. (a) On the tenth days, only improvement on the right upper eyelid (b) Appearance of the eyelid at 1 month after surgery