

Short Communication

Orbital Cellulitis with Endogenous Panophthalmitis Caused by Methicillin-Sensitive *Staphylococcus aureus* in Pregnancy

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SUMMARY: Orbital cellulitis along with panophthalmitis is uncommon. The causes are usually trauma-related or endogenous. The prognosis in terms of globe salvage is very poor, with most cases usually requiring enucleation or evisceration of the affected eye. Immunosuppression in some form is usually present, which accounts for the aggressive course of the infection. In this communication, we report on a case in a 25-year-old female, who in the second trimester of pregnancy had developed orbital cellulitis and panophthalmitis caused by methicillin-sensitive *Staphylococcus aureus* (MSSA), with the primary source of infection being cellulitis on her forearm following intravenous therapy for severe anemia. Despite intensive intravenous and topical antibiotics, she required an evisceration of the eye. However, the pregnancy continued uneventfully with the delivery of a full-term, healthy infant. Bacteremia, although rare in pregnancy, can cause endogenous panophthalmitis and orbital cellulitis, especially in a background of immunosuppression.

Orbital cellulitis along with panophthalmitis is a rare occurrence, most commonly being trauma-related or endogenous (1). Panophthalmitis is a purulent inflammation of all the coats of the eyes and the intraocular contents, resulting from either an endogenous or exogenous source of infection. In this communication, we describe a case in a 25-year-old female, in the second trimester of her pregnancy, who developed orbital cellulitis and panophthalmitis caused by methicillin-sensitive *Staphylococcus aureus* (MSSA), with the primary source of infection being cellulitis on her forearm following an intravenous injection. During pregnancy, generalized sepsis (in general) and orbital infections (in specific) are uncommon and must be treated promptly and adequately; at the same time, caution must be exercised due to the potentially adverse effects of therapeutic interventions on the unborn child. Institutional Review Board approval and written, informed consent from the patient for photography and publication were obtained prior to preparation of this manuscript.

A 25-year-old female patient, in her second trimester of pregnancy, presented with complaints of sudden on-

set, painful, loss of vision in right eye, associated with eyelid swelling and outward protrusion of the eye. She had been under the care of her obstetrician for severe anemia (hemoglobin, 4.5 g/dL) and was being treated with intravenous (IV) administration of ferrous sucrose. On the third day of therapy, she developed severe pain, swelling, and redness at the site of IV access in the right forearm. A diagnosis of cellulitis was made, the site of the injection was changed to the other hand, and she was empirically treated with IV amoxicillin clavulanate (1.2 g, twice a day). On the fourth day, she developed a fever, which was recorded at 102.1°F; the patient also complained of pain and reduced vision in the right eye, for which an ophthalmology consult was sought.

The next day, during the ophthalmology examination of the right eye, she denied perception of light in the right eye. Tense lid edema and ptosis along with proptosis was noted (Fig. 1A). Ocular motility was severely restricted in all gazes. There was severe conjunctival chemosis with corneal edema and anterior chamber reaction. Pupil was normal in size and sluggishly reacting to light. The intraocular tension was raised on digital palpation. The fundus details were not visualized due to corneal haze. The left eye was normal with a recorded vision of 6/6, N6. At this time, her hematological investigations reflected a picture of severe anemia along with sepsis: hemoglobin was 6.3 g/dL, leukocytosis was noted with counts of 12,500/μL and thrombocytosis was also present with counts of 602,000/μL. Serological tests for human immunodeficiency, Hepatitis B, and Hepatitis C were negative. A blood culture from a sample drawn prior to institution of antibiotic therapy grew MSSA. An

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ultrasound of the right globe showed thickened coats of the right eye with mobile vitreous echoes. Subtenon's fluid was documented, suggesting panophthalmitis with orbital cellulitis. Magnetic resonance imaging (MRI) scans of the orbit showed proptosis, disorganized ocular coats, grossly thickened extraocular muscles, and dense orbital reaction and fat stranding (Fig. 1B, 1C).

In the interim, regular fetal scans were being performed to ensure the viability of the fetus. Antibiotic sensitivity testing of the isolates showed that the MSSA was sensitive to cefuroxime, cefazolin, vancomycin, gentamycin, erythromycin, clindamycin, and ciprofloxacin and resistant to penicillin and co-trimoxazole. She was therefore treated with topical fortified cefazolin, analgesics, IV cefazolin (500 mg, 3 times a day), and IV vancomycin (750 mg, twice a day). On the 3 days of therapy, IV dexamethasone (8 mg, twice a day) was also added, following which proptosis, ocular motility, and lid edema improved. However, the cornea perforated with frank discharge of purulent material along with uveal tissue.

A decision to eviscerate the eye was taken. Intraoperatively, frank scleral melt was noted and all the purulent intraocular contents were evacuated, a frill evisceration was done. All purulent material from the orbit was evacuated. Samples drawn from the ocular contents were sent for microbiological analysis and MSSA growth was noted in these samples. The patient's post-operative course was uneventful. During the entire duration of hospital stay, the site of cellulitis was cleaned thoroughly, topical asepsis with povidone-iodine solution and compression was done to ensure early resolution. The cellulitis site on the forearm healed with no sequelae. IV medications were stopped after 7 days of therapy. Eventually, the pregnancy was uncomplicated with no

recurrence of infection; and the patient delivered a full-term, healthy male.

Endogenous endophthalmitis is a relatively rare occurrence, accounting for 5% of all cases of endophthalmitis (1). Endogenous bacterial endophthalmitis is the result of bacterial multiplication within the eye after bacteria cross the blood-ocular barrier resulting from hematogenous spread of micro-organisms from a septic focus elsewhere in the body (2). Pregnancy itself renders the patient susceptible to infection because the maternal immune response is reduced to protect the immunologically distinct fetus (3). This down-regulation of the cell-mediated immunity that occurs in order to permit fetal retention also interferes with resistance to some infections. Peripartum endogenous endophthalmitis has been documented previously; majority of these cases were postpartum or following a terminative procedure like abortion and very few cases developed ocular infections during pregnancy (4). As highlighted by Sahu et al., drugs that are administered during pregnancy may have many short-term and long-term effects on the unborn child, which remain unknown. More importantly, the safety of any interventional procedure to the pregnant patient is also a concern (5).

While reports of endophthalmitis with concurrent cellulitis have also been documented, it is important to differentiate between endophthalmitis and panophthalmitis. Although both are on the same spectrum of ocular infection, panophthalmitis is more severe, occurring when endophthalmitis worsens and progressing to involve the entire globe and all the coats of the eye. Contemporaneous orbital cellulitis and panophthalmitis is uncommon and has a very poor prognosis in terms of globe salvage, with all previously reported cases requiring either evisceration or enucleation (6–10). Furthermore, immunosuppression of some form is seen in all reported cases, which accounts for the relatively fulminant course with most cases developing symptoms of cellulitis soon after onset of symptoms. Panophthalmitis caused by *S. aureus*, although rare, has been reported to have poor outcomes despite intensive therapy (11,12).

Invasive procedures such as a surgery or the placement of an intravenous line are known to be a risk factor for endogenous endophthalmitis and panophthalmitis. As mentioned earlier, pregnancy is believed to be a state of subtle immunosuppression characterized by physiologic suppression of proinflammatory host responses that are meant to promote embryonic implantation (13). It has been postulated that this "immunodepression" in anemic women renders them more susceptible to infection and increased morbidity due to infection (14). Furthermore, it has been noted that in recent times, MSSA, rather than methicillin-resistant *S. aureus* is responsible for nosocomial or health-care associated infections (15). The combined effects of immunodepression and concurrent severe anemia, we believe, could have contributed to the rapid progression of our patient's ocular condition: from initial complaints of blurred vision and pain to

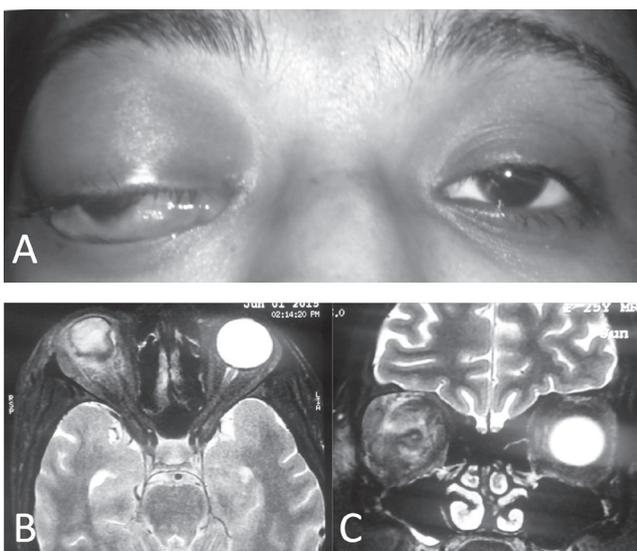


Fig. 1. A: Clinical image showing lid edema, proptosis, chemosis, and restricted motility. B and C: Axial and coronal slices of Magnetic Resonance Imaging (MRI) showing proptosis, thickened extraocular muscles, thickened ocular coats, tenting of the globe dense orbital reaction, and fat stranding

complete loss of vision and development of proptosis with motility restriction that transpired within 24 hours. As has been elucidated by Chaudhry et al., the possible mechanisms for rapid loss of vision in orbital inflammatory conditions such as cellulitis may be due to i) optic neuritis as a reaction to adjacent or nearby infection, ii) ischemia resulting from thrombophlebitis along the valveless orbital veins, or iii) compressive/pressure ischemia possibly resulting in central artery occlusion (16).

Any infection during pregnancy, especially among women in developing countries, should be promptly diagnosed to prevent other infective foci especially in and around the eye. Panophthalmitis with orbital cellulitis has a poor outcome that almost always requires removal of the eye in concurrence with systemic antibiotic therapy. Bacteremia, although rare in pregnancy, can cause endogenous panophthalmitis and orbital cellulitis. Not only is prompt intervention to remove the infective focus imperative, but also it is equally important to address the prevalence of anemia in pregnancy.

Conflict of interest None to declare.

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