Orbital cellulitis with endogenous panophthalmitis caused by Methicillin-sensitive Staphylococcus aureus in pregnancy

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Orbital Cellulitis with Endogenous Panophthalmitis caused by Methicillin-Sensitive Staphylococcus aureus in pregnancy.

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Abstract

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 a case of a 25-year-old female, in the second trimester of 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 intravenous therapy for severe anaemia. Despite intensive intravenous and topical antibiotics, she required an evisceration of the eye. The pregnancy however, continued uneventfully with the eventual delivery of a full-term, healthy child. 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 of 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. Generalised sepsis in general and orbital infections in specific during pregnancy are uncommon and must be treated promptly and adequately, at the same time exercising caution due to the potentially adverse effects of therapeutic interventions on the unborn child.

**Institutional Review Board approval and written, informed consent for photography and publication was obtained from the patient prior to preparation of the manuscript.**

A 25-year-old female patient, in her second trimester of pregnancy presented with complaints of sudden onset, 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 (haemoglobin: 4.5 g/dL). She was investigated and diagnosed as a case of severe iron deficiency anemia 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 intravenous 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 1.2g BID. On the fourth day, she developed fever, which was recorded at 102.1 F; she also complained of pain and reduced vision in the right eye for which an ophthalmology consult was sought.

She was seen the next day and on examination of the right eye, she denied perception of light in the right eye. Tense lid edema and ptosis along with proptosis was noted (Figure
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 picture of severe anemia along with sepsis: haemoglobin was 6.3g/dl, leukocytosis was noted with counts of 12,500/µL and thrombocytosis was also present with counts of 6,02,000/µL. Serological tests for HIV, Hepatitis B and Hepatitis C were negative. A blood culture from a sample drawn prior to institution of antibiotic therapy grew Methicillin sensitive Staphylococcus aureus (MSSA). An 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 (Figures 1B, 1C). In the interim, regular fetal scans were being done, to ensure viability. Drug sensitivity testing of the isolates showed that the MSSA was sensitive to cefuroxime, cefazoline, vancomycin, gentamycin, erythromycin, clindamycin and ciprofloxacin; and resistant to penicillin and co-trimoxazole. She was therefore treated with topical fortified cefazolin, analgesics, I.V. cefazolin 500 mg TID and I.V vancomycin 750 mg BD. On the three days of therapy, I.V. dexamethasone 8 mg BD 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 they too grew MSSA. 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. **Intravenous medications were stopped after seven 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 foetus (3). This down-regulation of the cell-mediated immunity which occurs in order to permit fetal retention also interferes with resistance to some infections. Peripartum endogenous endophthalmitis has been documented previously and while majority of these cases are usually post-partum or following a terminative procedure like abortion; there are very few cases that have 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. While both of them figure on the same spectrum of ocular infection, panophthalmitis is more severe and occurs when endophthalmitis worsens and progresses 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 *Staphylococcus aureus*, although rare, has 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 anaemic 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 Staphylococcus aureus* is responsible for nosocomial or health-care associated infections (15). The combined effects of immunodepression and concurrent severe anaemia, we believe, could have contributed to the rapid progression of our patient’s ocular condition: from initial complaints of blurred vision and pain to 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 optic neuritis as a reaction to adjacent or nearby infection; ischemia resulting from thrombophlebitis along the valveless orbital veins or; compressive/pressure ischemia possibly resulting in central artery occlusion (16).

Any infection in pregnancy, especially among women in developing countries should be promptly diagnosed and 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 on anemia in pregnancy.
Conflict of Interests:

None of the authors have any financial interests to disclose
References:


Legends:

Figure 1:

A: Clinical image showing lid edema, proptosis, chemosis and restricted motility.

B & 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