Asymmetric, bilateral vision loss in the setting of Ludwig’s Angina

Abstract
Here we present a case of bilateral vision loss following complications associated with Ludwig’s Angina, a rare, but devastating infectious cellulitis of the soft tissues of the neck and jaw.

Patient demographics
  • 50 year-old Caucasian male with past history of complicated hospital stay associated with Ludwig’s Angina
  • This infection developed following routine dental procedure (root canal)
  • Patient was diagnosed with Ludwig’s Angina and was hospitalized
  • 25-day hospital course with multiple complications arising
  • Multi-organ failure, septicemia, internal jugular thrombosis and bilateral vision loss.
    o The patient required multiple surgical drainage procedures in the regions of the jaw, neck and chest.
    o Placement of tracheostomy tube was required to maintain airway integrity
    o Hemodialysis was conducted following kidney failure
  • Resulting impairments include significant loss of physical and cognitive function. Impaired motor skills involving the patient’s limbs as well as difficulty with communication and attention were observed clinically.
  • Prior to this event, the patient was healthy with no reports of health conditions or medication use.
  • All current medications are related to his care following this episode and are not important for this presentation.
  • Patient denied any past eye disease and vision was reported to be clear at distance in both eyes without spectacle aid prior to this incident.

Pertinent Findings
  • Initial eye exam took place 11 months following the inciting event
  • Three eye exams took place over a 3 month time period
  • Chief complaint of vision loss in both eyes
  • Visual acuity ranged from 20/80 to 20/400 to NLP, OD
  • Vision remained stable in the range of 20/80 to 20/60, OS
  • Optic nerve atrophy present OD only (2+ diffuse pallor)
  • 2+ to 4+ afferent pupillary defect observed clinically
  • Ocular health otherwise unremarkable
  • OCT/Visual Field testing not obtained due to patient inability
  • MRI findings not significant for acute or ongoing pathology
    o Generalized loss secondary to hypoxic/metabolic encephalopathy
**Differential Diagnosis**

- Primary: Asymmetric ischemic optic nerve damage
- Ischemic optic neuropathy is the leading cause of vision loss following surgical procedures of the heart, spine and neck (6)
- Other possibilities: compressive, infectious, metabolic optic nerve damage
  - MRI was unremarkable and blood testing did not reveal metabolic abnormalities
- Also considered cortical vision loss, although this would typically be equal bilaterally and would not cause an afferent pupillary defect or optic nerve pallor.

**Diagnosis and Discussion**

- Ludwig's Angina is one of several “fulminant odontogenic infections” (1/2)
- Etiology is odontogenic infection 70% of time although other causes exist (3)
- It most commonly originates from infection of the 2nd and 3rd mandibular molars (3)
- Most cases occur in previously healthy individuals although any condition that predisposes a patient to compromised oral health is at increased risk (3)
- Spreads through the submandibular space and possibly to the neck and chest in advance cases (4)
  - Lack of physical barriers in this anatomical region allows for this rapid spread (4)
- Complications are numerous and vary based on severity of disease
  - Airway compromise is most concerning in acute phase (5)
  - Mediastinitis, Lung/Heart involvement, internal jugular thrombosis, sepsis can occur in later stages (3)
- Vision loss is not an officially recognized complication of Ludwig’s angina and does not appear to have been reported elsewhere in literature
  - Vision loss has been reported in association with odontogenic infection; however, it has been in the setting of infection originating in the maxillary molars with direct spread to the sinuses and orbit leading to direct damage of ocular structures (1)
- Vision Loss secondary to odontogenic infection originating at the mandibular molars is therefore a unique occurrence without previous report

**Treatment**

- Typical treatment of Ludwig’s angina includes systemic antibiotics, airway management and surgical drainage (4)
  - Advanced cases often require admittance to intensive care (3)
- Treatment options for ischemic optic nerve damage are very limited
  - Optic nerve sheath fenestration and administration of oral steroids have been studied without significant benefit (7)
  - Vision typically stabilizes 6-8 weeks following the initial insult or injury in the setting of ischemic optic neuropathy (8)
Further vision loss is unlikely in this patient, and considerations moving forward will include maximizing remaining vision and monitoring for additional ocular pathologies that may further compromise vision.

**Clinical Pearls**
- Damage to the visual system is not limited to the setting of disease within the eyes, and knowledge of the anatomy and physiology of surrounding structures is important within the setting of eye care.
- Vision loss in the setting of complicated systemic disease and surgical intervention is not always well understood. Eye care professionals have an important role to play in expanding this understanding.
- Awareness of the effects that various systemic diseases and therapies can have on the eyes needs to be raised to a higher level, as vision loss is often a debilitating complication.

**References**


4. Chow AW. Submandibular Space Infections (Ludwig’s angina). In: UpToDate, Calderwood SB (Ed), UpToDate, Waltham, MA. (Accessed on August 20, 2014.)


