Endogenous Endophthalmitis

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Introduction:

Endogenous endophthalmitis is a relatively uncommon problem. But recently, the frequency of its appearance in clinical practice is on the rise. The management of this complex situation requires a team approach involving multiple medical specialities.

Predisposing factors:

The predisposing factors for endogenous endophthalmitis are:

1. Long term intravenous line placement.
2. Parenteral nutrition.
3. Prolonged antibiotic therapy
4. Systemic steroids
5. Immunosuppressive therapy
6. Abdominal or gyecological surgery
7. Haemodialysis
8. I.V. drug abuse
9. Malignancy
10. Diabetes Mellitus
11. AIDS
12. Alcoholism, Liver disease
13. Pregnancy
14. Post Partum
15. Genitourinary manipulation

There are various conditions which can be confused for endogenous endophthalmitis and fall as a differential diagnosis:

1. Toxoplasmosis
2. Sarcoidosis
3. Tuberculosis
4. Pars planitis - severe
5. Ocular lymphoma
6. Retinoblastoma
7. Toxocara canis
8. Behcet's disease
9. Amyloidosis
10. Harada's disease
11. Necrotizing herpetic retinitis
12. APMPPE
13. Serpiginous choroiditis

These conditions can be diagnosed by careful evaluation, clinical features and detailed review of history.

Various organisms that have been reported in various papers to cause endogenous endophthalmitis are:

A) Bacteria
1. Gram Positive organisms
   a) Staphylococcus aureus
   b) Streptococcus species
   c) Bacillus species
   d) Enterococcus faecalis
   e) Listeria monocytogenes
2. Gram Negative organisms
   a) Pseudomonas aeruginosa
   b) Klebsiella species
   c) Proteus
   d) Escherichia coli
   e) Serratia marcescens
   f) Salmonella
   g) Neisseria meningitides

B) Fungi
1. Yeasts
   a) Candida species
   b) Cryptococcus species
2. Moulds
   a) Aspergillus species
   b) Fusarium species
   c) Coccidoides immitis
   d) Pseudoallescheria boydii
   e) Paecilomyces species

C) Rare organisms
1. Nocardia Asteroides
2. Mycobacterium chelonii

Therapeutic Considerations

Initially various antibiotic drops are given through multiple routes for control. In bacterial endophthalmitis we give intravitreal + periocular + toppical + systemic antibiotics as follows:

1. Intravitreal antibiotics
a) Vancomycin 1.0 mg/0.1 ml
b) Ceftazidime 2.25 mg/0.1 ml
c) Amikacin 0.4 ml/0.1ml
d) Dexamethasone 0.4 mg/0.1 ml can be optional as it is controversial.

2. Topical drops are started on the first postoperative day.
a) Vancomycin 50 mg/ml q 1hrly
b) Ceftazidime 50 mg/ml q 1hrly
c) topical steroids and or cycloplegics

3. Systemic Antibiotics
a) Vancomycin 1 g i.v. 12 hrly
b) Ceftazidime 1 g i.v. 12 hrly

Endogenous endophthalmitis:Antibiotics:
1. Intravitreal
a) AmphotericinB 0.005 mg/0.1 ml
b) Dexamethasone 0.4 mg/0.1 ml

2. Periocular (subconjunctival)
a) do not use amphotericin B (conjunctival necrosis)
b) Standard postoperative antibiotics
c) Dexamethasone 12 mg

3. Topical (started on 1st postoperative day)
a) topical steroids and cycloplegics
b) topical amphotericin B (poor ocular penetration)

4. Systemic antibiotic (selected in consultation with physician)
a) Fluconazole 100 mg b.i.d. for 2-4 weeks or
b) Itraconazole 200 mg orally b.i.d. for 2-4 weeks or
c) Ketoconazole 100 mg orally b.i.d for 2-4 weeks or
d) Amphotericin B 0.25 to 1.0 mg/kg of body weight i.v over 6 hours as tolerated (only if disseminated disease present)

The Role of Vitrectomy

A. Vitrectomy is often utilized for a variety of reasons:
1. To clear media opacities
2. To obtain a specific biopsy of intraocular infiltrate
3. To remove retinal or subretinal debris
4. To allow better distribution of intravitreal antibiotics.

B. Successful management of endogenous fungal endophthalmitis has been reported with vitrectomy and systemic antifungals alone (no intravitreal medication)

Preparation of intravitreal agents:

A. Vancomycin 1 mg/0.1 ml
1. Begin with a 500 mg vial of vancomycin (this is a powder).
2. Add 10 ml of 0.9 % sodium chloride for injection, USP (no preservatives), or BSS to a 500 mg vial to give a solution with 50 mg/ml.
3.Take 0.2 ml of this solution (10 mg) in a tuberculin syringe and dilute it further with 0.8 ml of saline to give a solution with 10 mg/ml.
4. 0.1 ml of this solution (1 mg) is injected intravitreally.

B. Ceftazidime 2.25 mg in 0.1 ml
1. Begin with a 500 mg vial of ceftazidime (this is a powder)
2. Add 2 ml of sterile solution for injection to give a solution with 250 mg in 1 ml.
3. Take 0.1 ml of this solution (25 mg) in a tuberculin syringe and dilute it further with sterile solution for injection to give a solution with 25 mg/ml.
4. 0.1 ml of this solution (2.25 mg) is injected intravitreally.

C. Amikacin (400 mg in 0.1 ml)
1. Begin with a 100 mg vial of amikacin (this is available as a solution with 100 mg in 2 ml)
2. 0.2 ml of this solution (10 mg) is withdrawn in a tuberculin syringe and diluted further with 2.3 ml of sterile solution to give a solution with 10 mg in 2.5 ml
3. 0.1 ml of this solution (400 mg) is injected intravitreally.

D. Amphotericin (5-10 mg in 0.1 ml)
1. Begin with a 50 mg vial of amphotericin B (this is a powder).
2. Add 5 ml of water for injection to 50 mg powder to get a solution which has 1 mg in 0.1 ml.
3. Take 0.1 ml of this solution (1 mg) and further dilute it to 1 ml to get a solution which has 0.1 mg in 0.1 ml.
4. Take 0.1 ml of this solution (0.1 mg) and dilute it yet again to 1 ml to get a solution that has 0.01 mg(10 mg) in 0.1 ml.
5. Inject 0.1 ml of this solution (10 mg) intravitreally.

...man will occasionally stumble over the truth, but usually manages to pick himself up, walk over or around it, and carry on.
Churchill, Winston S
Quoted in: Irving Klotz, *Bending perception,* a book review, Nature, 1996, Volume 379, p 412 (1).