ENDOPHTHALMITIS VITRECTOMY STUDY (EVS)

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Dr. Krati Gupta

Dr. Saurabh Deshmukh

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Endophthalmitis Vitrectomy Study (EVS)

1. Discuss endophthalmitis-vitrectomy study with respect to aim, design and outcomes. D2012, FAT Oct 2017

- **Purpose**

1. To determine the role of initial pars plana vitrectomy in the management of postoperative bacterial endophthalmitis.
2. To determine the role of intravenous antibiotics in the management of bacterial endophthalmitis.
3. To determine which factors, other than treatment, predict outcome in postoperative bacterial endophthalmitis.

- **Description**
- It was an investigator-initiated, multicenter, randomized clinical trial conducted from 1990 to 1995 in private and university-based retina-vitreous practices.
- A total of 420 patients who had clinical evidence of endophthalmitis within 6 weeks after cataract surgery or secondary intraocular lens implantation were randomized according to a 2 × 2 factorial design to one of two standard treatment strategies for the management of bacterial endophthalmitis.
    1. Eyes received either initial pars plana vitrectomy (VIT) with intravitreal antibiotics (Vancomycin 1 mg and Amikacin 0.4 mg), followed by re-tap and reinjection at 36–60 hours for eyes that did poorly as defined in the study or
    2. Initial anterior chamber and vitreous tap/biopsy (TAP) with injection of intravitreal antibiotics (Vancomycin 1 mg and Amikacin 0.4 mg), followed by vitrectomy and reinjection at 36-60 hours in eyes doing poorly.
    In addition, all eyes were randomized to either treatment or no treatment with intravenous antibiotics (Ceftazidime and Amikacin).

- **Inclusion Criteria**

1. Clinical signs and symptoms of bacterial endophthalmitis in an eye that had cataract surgery or lens implantation within 6 weeks of onset of infection.
2. The involved eye had to have either hypopyon or enough clouding of anterior chamber or vitreous media to obscure clear visualization of second order arterioles
3. The involved eye had to have a cornea and anterior chamber clear enough to visualize some part of the iris, and clear enough to allow the possibility of pars plana vitrectomy
4. The eyes had to have a visual acuity of 20/50 or worse and light perception or better.

- **Exclusion Criteria**

1. Pre-existing eye disease that limited best-corrected visual acuity to 20/100 or worse before development of cataract
2. Any other intraocular surgery before presentation (except for cataract extraction or lens implantation)
3. Any treatment for endophthalmitis before presenting at the study centre
4. Any ocular or systemic condition that would prevent randomization to any of the study groups.

- **Study Measures**
- Study end points were:
    1. Visual acuity, assessed by an Early Treatment Diabetic Retinopathy Study acuity chart.
    2. Clarity of ocular media assessed both clinically and photographically.
- Each patient's initial end point assessment occurred at 3 months, after which procedures to improve vision, such as late vitrectomy for non-clearing ocular media, were an option. The final outcome assessment occurred at 9 months.

- **Results**

1. Immediate Vitrectomy:

- In patients whose initial visual acuity was hand motions or better, there was no difference in visual outcome whether or not an immediate vitrectomy was performed
- In patients with initial light perception-only vision, vitrectomy produced a threefold increase in the frequency of achieving 20/40 or better acuity.

2. Systemic Antibiotics:

- There was no difference in final visual acuity or media clarity with or without the use of systemic antibiotics

3. **Microbiological Results:**

- Compared with the aqueous, undiluted vitreous produced a higher percentage of confirmed positive cultures.
- The overall rate of laboratory-confirmed infection was not statistically significantly higher in the vitrectomy group than in the tap or biopsy group.
- Bacterial growth from the vitrectomy cassette specimen had prognostic significance equivalent to growth from other intraocular sources
- From all sites the most frequently isolated Coagulase-negative staphylococci were Staphylococcus epidermidis (81.9%) and Staphylococcus lugdunensis (5.9%).

4. **RD**

- Retinal detachment occurred in 8.3% of subjects in the EVS.

- **Conclusion**

1. Omission of systemic antibiotic treatment can reduce toxic effects, costs, and length of hospital stay.
2. Routine immediate vitrectomy is not necessary in patients with better than light perception vision at presentation but is of substantial benefit for those who have light perception-only vision.

- **Limitations**

1. EVS study was performed when extra-capsular cataract extraction (ECCE) was the common technique or cataract surgery. The results may not be directly applicable to today's surgeries which are performed via phacoemulsification through mainly clear corneal incisions
2. The EVS recommendations relate to acute-onset endophthalmitis following cataract surgery or secondary intraocular lens implantation and may not be directly applied to other forms of endophthalmitis. For example, bleb associated, traumatic, and endogenous types of endophthalmitis are more likely to be caused by organisms of greater virulence. In such cases, the benefits of vitrectomy may be greater because of the mechanical removal of bacteria and toxins from the eye
3. The systemic antibiotics used in EVS were Amikacin and Ceftazidime. The study made no recommendations regarding treatment with additional antimicrobial agents (e.g. systemic fluoroquinolones) or systemic antimicrobial agents for other types of endophthalmitis (e.g. chronic, bleb associated, traumatic, fungal, and endogenous)
4. Potential study subjects with significant opacification of the anterior chamber or without light perception were excluded from the EVS. Because these eyes with more severe infection or involving more virulent organisms were excluded from the EVS, the effect might have shifted the EVS outcomes to more favorable results.