Endophthalmitis

Essay

submitted in partial fulfillment

of the Master Degree in Ophthalmology

by

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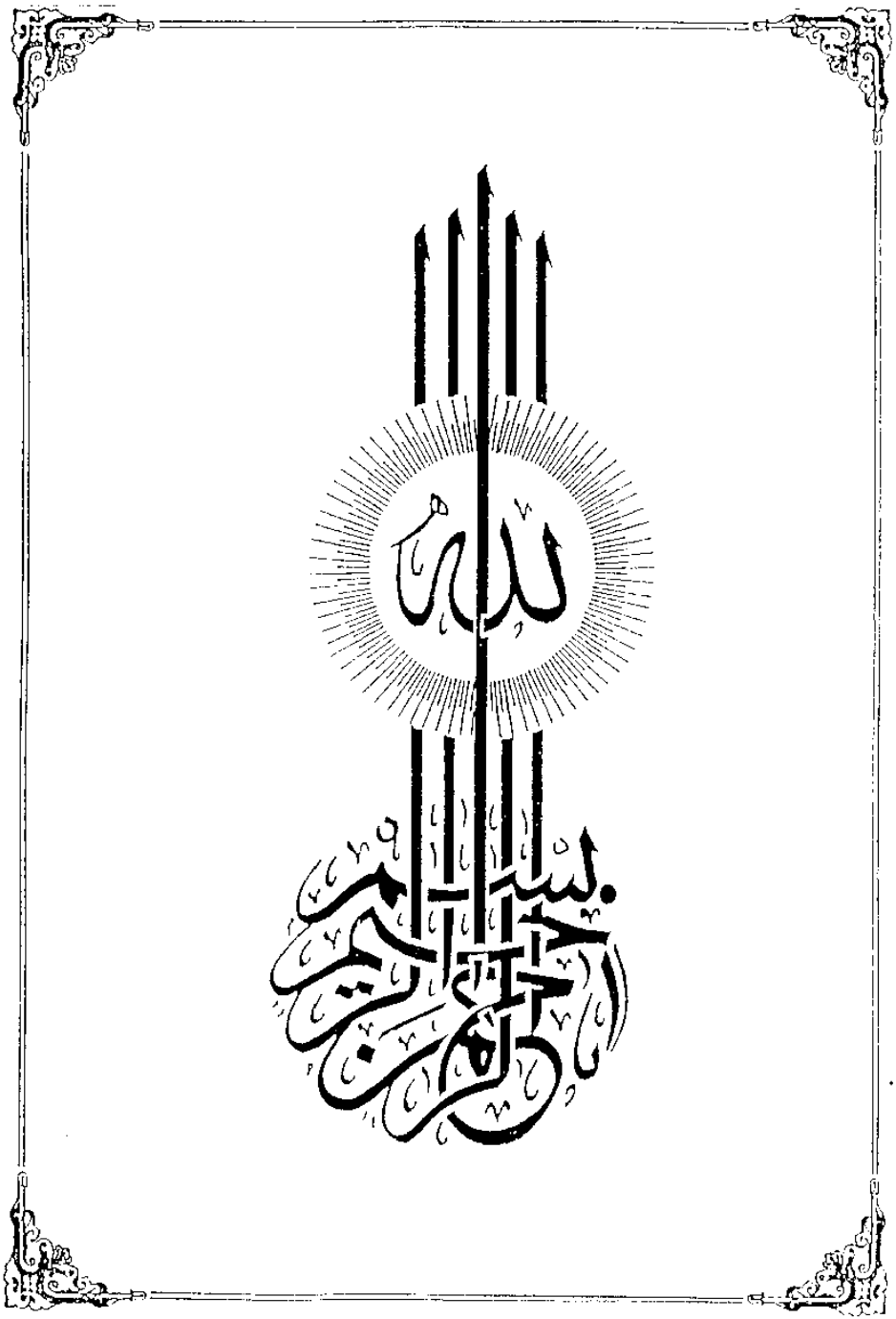
1994

To my Sister

Amal

And

To the Souls of my Parents



Acknowledgements

My sincerest appreciation is extended to the many individuals who have, in one way or another, made this work possible. A particular expression of gratitude and appreciation is made to the following:

Prof. Dr. Mohamed Fathi El Mekkawy for his unfailing support and encouragement, and for his meticulous reading of the manuscript.

Prof. Dr. Sherif Hassan Badr for his continuous help and guidance, his valuable skilled and practical suggestions and stimulating comments, which had its influence on shaping my thinking.

Assistant Prof. Dr. Zeinab Ali El-Naggar for her generous help and assistance in correcting many of the linguistic mistakes of the manuscript.

My heart-felt thanks are extended to *Miss Amal Esmat*, my sister, for her help and support during typing and revising this work.

Finally, and most importantly, I would like to express a special gratitude and love to my wife, *Heba Fathallah*, without whose ever present support and encouragement I would never have completed this essay.

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Abbreviations

AAO	American Academy of Ophthalmology
AB	Antibiotic
mg	milligram
ml	millimeter
IV	Intravenous
ECCE	Extra capsular cataract extraction

Endophthalmitis

Definition

This is a severe form of intra ocular inflammation involving the ocular cavities and their immediate adjacent structures without extension of the inflammatory process beyond the sclera (Nussenblatt, 1985).

The inflammatory response is caused by infected or injured intraocular tissues (Forster, 1985).

It is a suppurative inflammation of the intraocular contents in which not all the layers of the globe are affected and in which the eye does not rupture (Newell, 1992) (fig.1 and fig.2)

Clinical Types:

[1] Infectious Endophthalmitis (Bacterial)
- a. Postoperative
- b. Traumatic
- c. Bleb associated
- d. Endogenous

[2] Fungal Endophthalmitis

[3] Viral Endophthalmitis

Fig.1 - Endophthalmitis. Notice greenish reflex.

Fig.2 - Panophthalmitis. Inevitable fate of neglected cases of endophthalmitis

[1] Bacterial (Infectious) Endophthalmitis

Although there have been substantial advances in the treatment of intra ocular infection, post operative bacterial endophthalmitis remains one of the most dreaded and destructive complications of ophthalmic surgery.

Bacterial Endophthalmitis is not common although the actual incidence is unknown. It has varied from time to time and from place to place, but the complication is estimated to occur at the rate of approximately 7/2000 cases or 0.35% - not exactly rare, considering its seriousness, (Pettit, 1981 [a]).

a. Post Operative Endophthalmitis

Most cases of infectious endophthalmitis develop after intraocular surgery. Since Cataract surgery with placement of intraocular lenses is the most common intraocular procedure performed today, endophthalmitis most frequently occurs after this type of surgery. Apparently, the infecting organisms usually gain access to the eye during surgery, but a recent report of pseudophakic endophthalmitis noted a problem with **the Cataract wound** that was believed to contribute to the development of endophthalmitis in 22% of cases (Driebe, 1986).

Endophthalmitis may develop after seemingly minor intraocular procedures such as capsulotomy, lens repositioning, or radial keratotomy with a small inadvertent perforation or following a scleral suture that inadvertently penetrates the globe.

Secondary causes of endophthalmitis, separate from the original cataract procedure, include infection following cutting or removal of sutures, associated with the traumatic wound dehiscence, after discission of the posterior capsule, and following repositioning of an implant.

Incidence

The true incidence of infectious endophthalmitis is difficult to confirm because most cases are probably unreported, and where series are reported the population at risk is unknown.

Until recently, the reported series often did not have confirmation of an infectious agent obtained from the intra-ocular contents, but instead, the authors often attributed the endophthalmitis to a microbe that may have been cultured from the conjunctiva or lids.

Understandably, clinical studies are difficult to control for the variables that may influence the incidence and the cause of post-operative infections.

An apparent decrease in the incidence of infectious endophthalmitis, however, has been noted in the past 2 decades and has been attributed to improved sterile techniques and asepsis, to more delicate surgical instrumentation, to microscopic wound closure and intraocular manipulation, and to the use of pre-operative and intra-operative prophylactic antibiotics with a broad spectrum against organisms recognized as causative.

Christy and Lall, (1973) operating on a native population in Pakistan, have published the largest series of post-operative endophthalmitis. From a series of 77,093 cataract extractions, they reported 382 cases of endophthalmitis, an incidence of approximately 0.5% (5 infections/1000 operations). They observed and cautioned that success in a few hundred cases does not ensure success in a larger series, and this was born out in their study by three groups of more than 1000 consecutive operations without an apparent infection.

Another large clinical study, reported 22 infections in a series of 20,000 operations (0.11%), and only 9 infections in a second series of 16,000 consecutive operations (0.056%), (Allen and Mangiaracine, 1974).

A similar incidence was reported by Berler, (1982), in which seven patients developed endophthalmitis in a series of 10,032 cataract extractions performed over 11 years in Washington, D.C.

Therefore, on the basis of these large studies and others reporting similar incidence of endophthalmitis, and recognizing that control of variables and culture proved infections was often lacking, an overall incidence of post operative endophthalmitis of 0.05% (1/2000) cases to 0.5% (1/200) cases might be expected.

Clinical Features

Although onset may occasionally be delayed when the infecting organism is of low virulence (fig.3), bacterial endophthalmitis usually begins on the second to fourth day after surgery (fig.4), the following are the clinical features:

- The eye is red, tender and painful and it becomes steadily worse.
- Corneal haze and vitreous clouding develop early, obscuring the fundus reflex.
- The anterior chamber shows heavy flare and many cells, hypopyon, and fibrinous exudate. The increased protein content of the aqueous shows the movements of the cells in the anterior chamber, or they may be arrested completely by a fibrin clot.
- Vision is reduced disproportionately, even to the absence of light perception, and can be destroyed in a few hours (Duane, 1992).
- The eye develops intense ciliary and conjunctival hyperaemia with chemosis and there is swelling of the lids - an important sign in differential diagnosis.

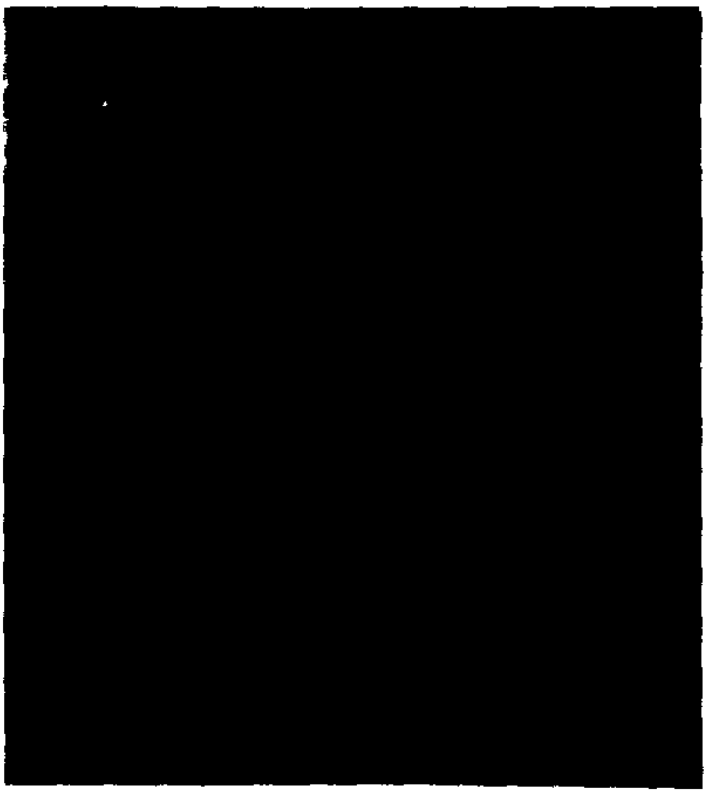

Fig.3 - End satge of Delayed postoperative endophthalmitis occuring 2 months after ECCE.

Fig.4 - Postoperative endophthalmitis occuring 2 days after ECCE

Clinical Presentation

The clinical presentation of endophthalmitis is determined by the clinical category, the relative severity, the infecting organisms, and the duration since the initiation of the infection.

Post operative endophthalmitis typically happens 2 to 4 days after surgery. Pain and reduced vision are the prominent symptoms in most patients.

The eye usually shows evidence of lid edema conjunctival hyperaemia with chemosis and exudate, a hazy cornea with epithelial and stromal edema, anterior chamber reaction with fibrin exudate, and often a hypopyon and vitritis.

Clinical signs may be delayed or become less intense owing to the use of post operative antibiotics and corticosteroid.

When caused by more virulent bacteria the presentation may be explosive.

Endophthalmitis caused by less virulent bacteria such as Staphylococcus Epidermidis or Propionibacterium acnes may not be manifested for a week or more after surgery.

In a review of 28 cases of coagulase-negative staphylococcal endophthalmitis there was an average delay between surgery and acute presentation of about 7 days. (Bode, 1985).

Microbiology of Postoperative Endophthalmitis

Bacteriology

A- Staphylococcus Epidermidis

It is the most common organism isolated from eyes developing endophthalmitis following non trauma related ocular surgery:

- 18/36 eyes - 50% (Puliafito, 1982).
- 11/34 eyes - 34% (Rowsey, 1982).
- 11/29 eyes - 38% (Olson, 1983).
- 40/99 eyes total - 41%

Appearance of penicillin / penicillin derivatives / gentamicin resistant staphylococcus epidermidis is a major concern.

The effect of this organism on the eye can be devastating despite aggressive (intra vitreal antibiotics) treatment (Driebe, 1986).

According to research findings, 9% to 16% of patients with S. Epidermidis endophthalmitis would lose all vision despite appropriate treatment (Forster, 1980 - Diamond, 1981 - Stern, 1989).

Staphylococcus Epidermidis has better prognosis than Staphylococcus aureus or gram-negative organisms.

B- Staphylococcus Aureus

Staphylococcus aureus was cultured (17/111 eyes) [15% of the following three series] from eyes with endophthalmitis following non trauma related intra ocular surgery:

2/28 eyes - 7%- (Puliafito, 1982)

8/54 eyes -15%- (Rowsey, 1982)

7/29 eyes -24%- (Olson, 1983)

Koul et al (1989) stated that the negative vitreous cultures were probably due to inappropriately obtained culture material, sub-optional culture technique and/or lack of variable organisms at the particular site where the culture material was obtained