VITREOUS COMPLICATIONS OF CATARACT SURGERY

THESIS

Submitted in partial fulfilment of

the Master Degree in

OPHTHALMOLOGY

617.742
M N

2290

By

MOHEB NASSIF MORCOSS
M B., B. Ch.

Supervised by

Prof. Dr. AMIN GAD EL-RAB
Professor of Ophthalmology,
Faculty of Medicine,
Ain Shams University

Cairo
1985

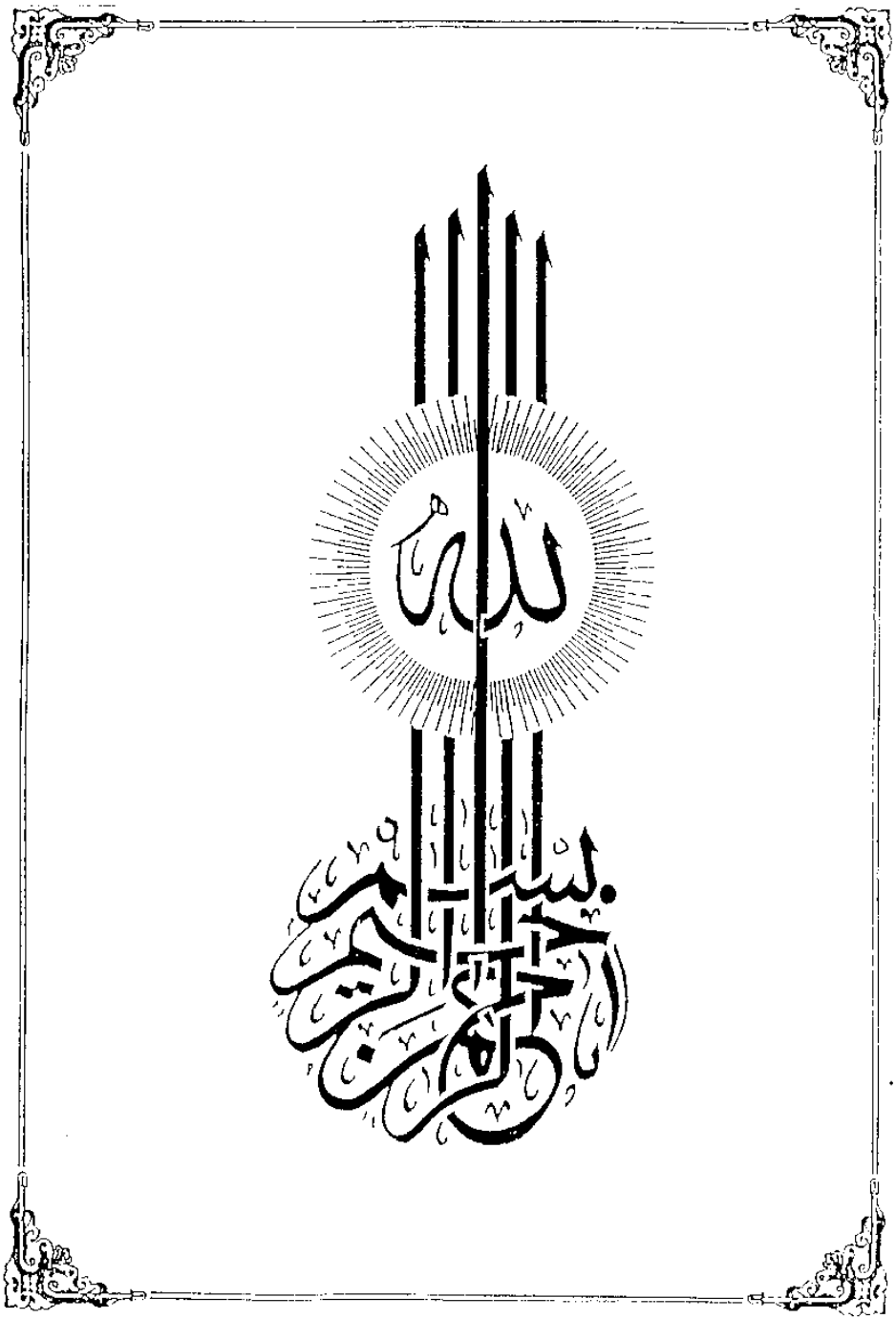
Central Library - Ain Shams University

ACKNOWLEDGEMENT

I wish to express my deep gratitude and sincere appreciation to Prof. Dr. Amin Gad El-Rab, for his kind supervision, great help and continuous encouragement during the preparation of this thesis.

I take this opportunity to extend my heartful thanks to all professors and Staff of Ophthalmic Department, Faculty of Medicine, Ain Shams University, for their assistance and guidance.

Central Library - Ain Shams University



Central Library - Ain Shams University

CONTENTS

Central Library - Ain Shams University

INTRODUCTION

Central Library - Ain Shams University

INTRODUCTION

Cataract extraction is the most frequent intraocular operation; and more than any other operation may become suddenly complicated with serious hazards.

Operative and postoperative vitreous complications are frequently met with following cataract extraction.

It has been known for a long time that there is an intimate relationship between the anterior vitreous face and the lens. Thus surgical removal of the lens will be expected to have some effect on the anterior vitreous face and will cause structural changes in the vitreous body as well .

Loss of vitreous is the most serious immediate disaster which may happen. The risks are considerably reduced by careful attension to important techniqual details of the operation.

Cystoid macular edema associated with rupture of the anterior hyaloid membrane; and vitreous traction at the macula associated with posterior vitreous detachment are sometimes seen in the post operative period following cataract extraction.

Central Library - Ain Shams University

The anterior hyaloid membrane is displaced forwards and may block the pupil and any surgically made iris openings. The aqueous is misdirected posteriorly and accumulates in the retrovitreal space, pushing the vitreous against the iris, leading to aphakic pupillary block and malignant glaucoma.

All these complications are much less with E.C.C.E. than with I.C.C.E. since the posterior capsule will act as an anatomical and physiological barrier protecting the anterior vitreous face.

Central Library - Ain Shams University

ANATOMY AND DEVELOPMENT OF VITREOUS

Central Library - Ain Shams University

ANATOMY AND DEVELOPMENT OF VITREOUS

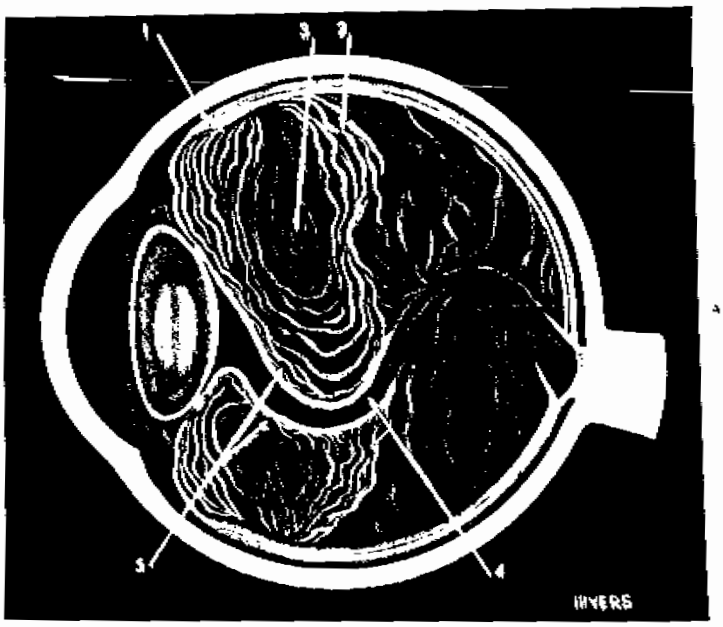
The vitreous is a perfectly transparent, colourless, gelatinous mass, which fills the posterior four-fifths of the globe. It has the form of a sphere flattened frontally and indented anteriorly by a saucer-shaped depression known as the patellar fossa which lodges the lens. At the sides, it supports the ciliary body (covered by the zonule) and the retina. Through its central region runs the hyaloid canal which,in the foetus,lodges the hyaloid artery. (Wolff, 1976).

It comprises about three- fourths of the weight of a normal globe (7 gm) and occupies two-thirds of its volume. It is the largest piece of intercellular material collected from mammals. (Jaffe, 1969).

The vitreous base :

Vitreous is firmly attached to pars plana of the ciliary body in a 2-3 mm wide area adjacent to ora serrata. Even severe injuries do not tear the living vitreous from this situation, and when it does give way, it takes part of the ciliary epithelium with it. (Salzmann, 1912).

Central Library - Ain Shams University



Biomicroscopic zones of the anterior half of the vitreous cavity as viewed without the aid of a contact lens : 1, cortical system ; 2, principal radial system ; 3, zone of sacs and lacunae ; 4 , central system ; 5, system of the plicata. (From Jaffe, N.S.: The vitreous in clinical ophthalmology, St. Louis,1969, The C.V. Mosby Co.).

Central Library - Ain Shams University

Gartner (1971) stated that this attachment consists of complex interdigitations of vitreous fibrils with the reticular fibrillar material of the basement membrane of the non-pigmented ciliary epithelium.

In the region of vitreous base, thick vitreous fibres radiate out in a fan like arrangement into the vitreous cavity, being closely packed and oriented perpendicular to the ora and the posterior portion of pars plana. Just posterior to the base, vitreous fibres run parallel to the retina (Tract of Retzius) , (Jaffe, 1969).

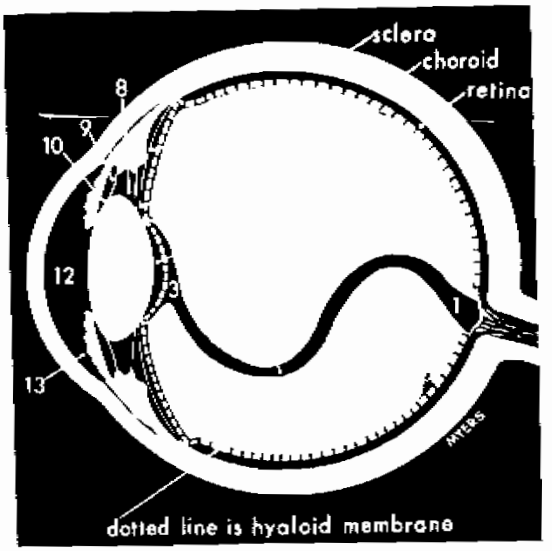
Hyaloid membranes :

Anterior hyaloid membrane :

The existence of an anterior hyaloid membrane coating the anterior vitreous has long been debated. Certainly one can not refer to it as a true membrane in the classical sense. However a cuticular layer does appear to exist, best seen in the aphakic eye under certain conditions .

The limiting layer is simply a condensation of vitreous and not a hyaloid membrane, but it does act as a fragile envelope. A hyaloid membrane must be transparent, homogeneous

Central Library - Ain Shams University



Intraocular spaces. 1, posterior portion of Cloquet's canal ; 2, mid portion, 3, anterior portion of Cloquet's canal ; 4, Secondary vitreous; 5 , Berger's space (shown here as a pathological space rather than an interface) ; 6 , canal of Petit ; 7, hyaloideo orbicular space ; 8, canal of Hannover, 9, iridozonular space ; 10, iridocapsular space, 11, lenticular space ; 12, capsulocorneal space; 13 , iridocorneal space (From Jaffe, N.S.: The vitreous in clinical ophthalmology , St. Louis, 1969 , The C.V. Mosby Co.).

Central Library - Ain Shams University

with sharp contour. But the anterior limiting layer has more the structure of connective tissue and shows a striation due to its constituent fibrillae parallel with the surface (Wolff, 1976).

It is incorrect to think of the anterior hyaloid as a continuous single structure covering the anterior vitreous. The anterior hyaloid membrane which coats the " secondary vitreous " is known as the extralenticular or zonular portion. It runs from ora serrata to a circular insertion 8-9 mm in diameter on the posterior surface of the lens. This insertion is called hyaloideocapsular ligament or " wieger's ligament ". This ring-like line of attachment is called " Egger's line ". Up to this point, the anterior limiting layer is narrow, well defined and has a constant thickness. It is convex forwards.

The portion of the anterior hyaloid membrane within this circle is referred to as the retrolenticular or patellar portion. It covers the anterior portion of the " primary vitreous ". The limiting layer becomes thinner through its fibrils peeling off into the vitreous and

Central Library - Ain Shams University

almost disappears at the middle of the patellar fossa. (Jaffe, 1969 - Wolff , 1976).

The subdivision of the anterior hyaloid membrane into two portions is based on embryological and structural differences. The extra lenticular part being associated with the formation of the secondary vitreous and is structurally thicker and stronger than the retrolenticular part which is allied with the genesis of the primary vitreous.

From its start to its attachement to the lens, the anterior limiting layer is in contact with and, in fact, adherent to, the most posterior (the orbiculoposterior capsular) fibres of the zonule.

Wieger's ligament encloses between the posterior lens capsule and the anterior face of vitreous a potential space known as capillary retrolental space of Berger. In normal eye this space is not visible with the slit lamp. In certain pathologic conditions, however, it may contain blood or inflammatory cells (Busacca, Goldmann, and Schiff-Wertheimer, 1957).

Central Library - Ain Shams University

Posterior hyaloid membrane :

The limiting layer is present everywhere except just infront of the origin of vitreous (Zonular cleft of Salzmann) and at the area of Martegiani just infront of the disc.

The posterior limiting layer extends posteriorly from the base of vitreous to the optic disc, where it is firmly attached to the internal limiting membrane of the retina. It is itself not a true membrane being rather a condensation of collagen fibres attached at places to basement membrane of the cells of Muller (Wolff, 1976).

Posterior to the ora serrata, vitreous fibrils are arranged parallel to the retina and join the basement membrane but do not pass between the cells. More posteriorly ,the vitreous is less intimately attached to the internal limiting membrane of the retina.

There is tenuous attachment of the vitreous to the retina except at the vitreous base and for a ring attachment around the optic disc (Posterior base of Gartner), and slightly around the macula, about 3-4 mm in diameter which is firmer

Central Library - Ain Shams University