



Review Article

Phacolytic Glaucoma

Authors

S.Venkatesh¹, R. Dhivya²

¹Chief Medical Officer, Vasana Eye Care Hospital, Chromepet, Chennai 44

²Glaucoma Consultant, Vasana Eye Hospital, Chromepet, Chennai 44

Abstract

Phacolytic glaucoma is preventable and curable disease with good visual outcome. Cataractous lens with intact capsule develops Phacolytic glaucoma. Phacolytic glaucoma is reported rarely in developed countries due to early intervention. Two forms of phacolytic glaucoma was described: [1] an acute presentation caused by rapid leakage of lens proteins occluding the trabecular meshwork and [2] gradual presentation with macrophages from immunologic response to lens proteins in the anterior chamber clogging trabecular meshwork. Patients with phacolytic glaucoma presents with unilateral acute onset pain, decreased vision of long duration, lacrimation and photophobia. On Examination the affected eye will have conjunctival injection, stromal and epithelial corneal edema, elevated intra ocular pressure, anterior chamber reaction, pseudohypopyon, particles on the lens capsule and anterior capsule wrinkling. Medical management was tried for forty eight hours before surgery. The objective of medical management was to control intra ocular pressure, inflammation and preparation to operate on a quiet eye. Surgical removal of lens by ICCE / ECCE with or without IOL is the definite treatment. Intraoperative complication rate was higher in phacolytic glaucoma. . Postoperative corneal edema persisted for more than a week. Good visual acuity achieved, in cases presented within < 5 days [56% > 6/12] was more than the cases presented between 6- 10 days [10 % > 6/12], whereas poor visual acuity of < 6/60 was more in cases presented beyond 10 days.

Introduction

The crystalline lens is a transparent, biconvex intraocular structure contributing to +15 to +20 dioptres of refractive power. It lies in patellar fossa suspended radially at its equator by zonular fibres to the ciliary body.

Phacolytic glaucoma is an acute onset of secondary open angle glaucoma due to leaking mature or hypermature cataract. It is completely cured by cataract extraction. ^[1, 2, 3]It is one of the lens induced glaucomas. As there is increase in

the awareness and availability of cataract surgery, the incidence of phacolytic glaucoma is on the decrease^[4]

Joseph sowka et al described as phacolysis involves the breakdown of a hypermature cataract, causing an antigenic reaction to the lens proteins released into anterior chamber with subsequent inflammation.^[5]

Among various other forms of lens induced glaucomas, phacolytic glaucoma is the one which occurs in cataractous lens with intact capsule.

Glaucoma occurs as a result of direct obstruction of trabecular meshwork by high molecular weight lens proteins released from microscopic defects in the lens capsule that is intact clinically. [6, 7, 8]

Pathogenesis

Two forms of phacolytic glaucoma was proposed: [1] an acute presentation due to rapid leakage of lens proteins that occlude the trabecular meshwork and [2] a gradual presentation with macrophages resulting from immunologic response to lens proteins in the anterior chamber. [7] Both the types of immune response, cellular and humoral has been implicated in the process of phacolytic glaucoma [4]

Electron microscopic evaluation of anterior lens capsule revealed that the inner two thirds of the anterior capsule had several vertical dehiscences [9] Epstein demonstrated in his experiment that leakage of soluble lens proteins can cause a severe obstruction to the outflow pathway. His experimental study also showed that, in an enucleated eye, the obstruction of the outflow pathways by proteins cannot be relieved by vigorous anterior chamber irrigation or prolonged perfusion with mock aqueous humor. [10] But clinically, in phacolytic glaucoma of a shorter duration, the glaucoma resolve following lens extraction alone. Also possible mechanism proposed is that very prolonged phacolytic glaucoma over weeks or months may lead to irreversible trabecular meshwork damage. However there is no support to this hypothesis is available and the ultimate effect of the phacolytic process on the trabecular meshwork are unknown. The major influencers of phacolytic glaucoma are high exposure to the sun and age as this is a rare in individuals under the age of 35. [11]

Prostaglandins, the inflammatory mediators were likely to accumulate in intra capsular cataract extraction eyes than in extra capsular cataract extraction eyes. [12]

Epidemiology

Phacolytic glaucoma is rarely reported in developed countries due to early access to health care. It is more frequent in under developed countries. No racial/sexual predilection exists. Phacolytic glaucoma typically occurs in older adults. [13]

Rijal and karki in their study found that after taking history of patients with lens induced glaucoma, all cases have poor socioeconomic condition due to which negligence towards symptoms and disease reporting to health care providers after longer duration of symptoms. [14]

Clinical Presentation

In patient history, trauma, previous intraocular surgery and the duration of symptoms should be elicited.

Fellow eye had good vision in majority of the patients as a result of which they neglected the affected eye till they developed lens induced glaucoma leading to pain at the time of presentation. The fellow eye is pseudophakic [58%] in most of cases with satisfactory vision. [15] Patients typically presents with unilateral acute onset pain, decreased vision of long duration, lacrimation and photophobia. Decreased vision could be secondary to the advanced cataract .An acute reduction in vision is the result of corneal edema associated with the glaucoma. [16]

Slit lamp examination reveal injection of conjunctiva, stromal and epithelial corneal edema, elevated IOP, anterior chamber reaction, pseudohypopyon, particles on the lens capsule and anterior capsule wrinkling. Anterior capsule wrinkling is secondary to volume loss and release of cortical lens material. The inflammation does not typically form synechiae and rarely demonstrates keratic precipitates. A delayed presentation of will result in disc damage and poorer visual prognosis. [17]

CLINICAL EXAMINATION

- CONJUNCTIVAL INJECTION
- CORNEAL EDEMA
- ANTERIOR CHAMBER REACTION
- PSEUDOHYPOPYON MAY BE PRESENT
- PARTICLES ON LENS CAPSULE
- ANTERIOR LENS CAPSULAR WRINKLING

clinical evaluation

A complete ophthalmic examination should be done. The eye should be inflamed, cornea edematous, massive inflammation / pseudo hypopyon in anterior chamber. IOP should be elevated as measured by applanation tonometry. Gonioscopy done to look for open angles and to rule out angle closure and neovascularisation of angle. Posterior pole is examined by B scan

ultrasonography to rule out vitreous haemorrhage [ghost cell glaucoma] or vitritis [infectious or panuveitis].

Ravi Thomas et al stated that vitreous opacification is common if symptoms of phacolytic glaucoma persists for more than 7 days. The opacities resolved spontaneously over a period of twelve weeks and interfered with visual acuity only in the immediate postoperative period. [18] The vitreous opacities could be the result of an enhanced inflammatory response.

Differential Diagnosis

- Infectious endophthalmitis
- Glaucoma secondary to intraocular tumour
- Acute angle closure glaucoma

Neovascular glaucoma

	PHACOMORPHIC GLAUCOMA	PHACOANAPHYLACTIC GLAUCOMA	PHACOLYTIC GLAUCOMA	UVEITIC GLAUCOMA
CORNEA	NO KPS	KPS MAY BE PRESENT	NO KPS	KPS PRESENT
ANTERIOR CHAMBER	SHALLOW	DEEP	DEEP	DEEP
IRIS	NO SYNECHIAE	NO SYNECHIAE	NO SYNECHIAE	SYNECHIAE
LENS	CATARACTOUS	CATARACTOUS	CATARACTOUS	CLEAR
LENS CAPSULE	INTACT	RUPTURED	INTACT	RUPTURED
GONIOSCOPY	CLOSED	OPEN	OPEN	OPEN/CLOSED
IOP	HIGH	HIGH	HIGH	HIGH

Complications

Potential complications of phacolytic glaucoma include the following:

1. Permanent loss of vision from uncontrolled glaucoma and / or persistent corneal edema
Uemura et al presented a case with phacolytic glaucoma associated with retinal perivasculitis which concurred with leakage of hypermature cataractous lens material and subsided with its complete absorption. [19]
2. Surgical complications like suprachoroidal haemorrhage, capsular rupture with loss of lens fragments into posterior segment, corneal injury and vitreous prolapse. [20] can occur.

Prevention

Removal of mature or hyper mature cataract may be preventive.

Management

Phacolytic glaucoma is an ocular emergency.

Medical: Used temporarily to control IOP and inflammation. Hyperosmotics, aqueous suppressants, anti inflammatory drugs and cycloplegics. Due to their possible pro inflammatory side effects, cholinergics such as pilocarpine and prostaglandin analogues should be avoided. [21] At least 48 hrs of such treatment was tried before surgery. The objective was to control IOP and operate on a quiet eye

Surgical: Definite treatment. Removal of lens by ECCE with or without IOL. Traditionally, Intra capsular cataract extraction has been the treatment of choice for phacolytic glaucoma to avoid the dire consequences of extra capsular cataract extraction including phacoanaphylaxis. However, such possible consequences of ECCE have not been adequately supported by clinical observations.^[23] There is no significant difference in final visual acuity between those patients who did receive an IOL and those who did not. Primary placement of posterior chamber IOL is safe and effective.^[22]

Extra capsular cataract surgery is safe, effective and quick. Additionally, implantation of a posterior chamber intra ocular lens is a safe and efficacious procedure in restoring visual function in phacolytic glaucoma patients.

Rengaraj venkatesh et al study shows that manual small incision cataract surgery with trypan blue staining of the anterior capsule is a safe and effective method of cataract extraction for patients with phacolytic glaucoma^[24]

Phacoemulsification can be difficult in phacolytic glaucoma because the nuclei are very dense and hard and the capsule and zonules are often compromised, giving little support. In contrast, manual small incision cataract surgery places less stress on the zonules, does not require expensive equipment like phacoemulsification and the anterior chamber is more stable due to the shelving scleral wound.^[24]

Small incision cataract surgery is not only much faster and far less expensive than phacoemulsification for mature cataracts, but it may well be a better and safer technique

The cataract extraction surgery involves four major steps which includes: local anaesthetic, clearing of eye, intraocular lens insertion and contact lens to protect the eye which dissolves releasing antibiotics.

If phacolytic glaucoma is of > 7 days duration, a combined trabeculectomy may be needed to prevent postoperative IOP spikes. The

complications caused by the addition of trabeculectomy is few and were successfully managed conservatively. It reduces the post operative ocular hypertension and the need for glaucoma medications in patients with preoperative uncontrolled hypertension.

Inclusion of a trabeculectomy reduces the cost of postoperative medications needed, a significant advantage in a developing country. Cataract surgery itself has been shown to initially reduce intra ocular pressure with a gradual long term rise in intra ocular pressure postoperatively. Thus, the addition of a trabeculectomy may also be safer in a situation like ours, where more than 90% of patients are likely to be lost to follow up after 6 months.^[25]

In eyes with hypermature cataract, one must be careful as the zonules are very weak, capsule is fragile, milky cortex and view is difficult. Vision limited to light perception is not a contraindication to performing cataract surgery.

The potential intraoperative complication of the surgery include nucleus drop into the vitreous cavity, which requires pars plana vitrectomy.^[26]

Surgical Technique Modification in Small Incision Cataract Surgery

After making partial thickness sclerolimbic incision superiorly, paracentesis is done 45 degrees away from the incision site. Paracentesis is done to decompress the eye.

Following paracentesis, the anterior chamber fluid can be withdrawn for analysis. Balanced salt solution is injected through cannula to wash out residual particulate matter and then healon or viscoelastic is injected.

During capsulotomy with 26 gauge cystitome or vannas, the milky cortex should be aspirated as much as possible till the nucleus is visible.

The capsulotomy technique can be partial V shaped. Place the viscoelastic under the nucleus to float it and sever the adhesions between the nucleus and the capsule. Nucleus portion of the lens can then be removed with irrigating vectis.

Inspect the capsular bag. if intact, place the posterior chamber IOL into the bag.

Postoperatively, the patient should be managed with topical steroid and / or aqueous suppressant & hyperosmotics. IOP is usually controlled without anti glaucoma medication after cataract removal. A detailed glaucoma evaluation should be done to assess the extent of glaucomatous damage.

Prognosis

Phacolytic glaucoma carries a favourable long term prognosis if treated early. It depends on duration of elevated IOP, PAS and optic nerve damage. Patients with phacolytic glaucoma may have a worse prognosis than patients with phacomorphic glaucoma^[20]

Good visual acuity achieved - in cases presented within < 5 days [56% > 6/12] was more than the cases presented between 6- 10 days [10 % > 6/12], whereas poor visual acuity of < 6/60 was more in cases presented beyond 10 days. ^[15]

Permanent vision loss can occur due to glaucomatous optic neuropathy or persistent corneal edema.

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