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ORIGINAL ARTICLE

Frequency of Pseudophakic Glaucoma in a Tertiary Care Hospital of Pakistan

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ABSTRACT

Background: Glaucoma after cataract surgery with intraocular lens inserting is known as pseudophakic glaucoma and its prevalence varies greatly around the world.

Objective: The aim of this study was to find out the Pseudophakic Glaucoma Frequency in a Tertiary Care Hospital.

Methodology: The current study was conducted at the department of ophthalmology Ophthalmology Muhammad college of Medicine Peshawar from April 2022 to November 2022 after taking permission from the ethical board of the hospital. A total of 216 Pseudophakic individuals' with age range of 50–70 who had intraocular lens implantations in the anterior and posterior chambers within a minimum of 6 weeks and a maximum of 5 years after surgery were included in this study. An eye examination was performed. Snellen's chart was used to measure visual acuity. Intraocular pressure (IOP) was measured using applanation tonometry. Angle was measured with gonioscopy's assistance. A thorough fundoscopic examination of the RNFL and disc was conducted. To diagnose glaucoma perimetry and optical coherence tomography was done. When a patient had previously undergone cataract surgery, pseudophakic glaucoma was diagnosed. SPSS version 20 was used for data analysis.

Results: Over all 216 individuals took part in this research. 30 individuals (13.8%) of them were found to have pseudophakic glaucoma. Ten (33.33%) people had phacoemulsification, and twenty (66.0%) had extracapsular cataract extraction. Eight patients (23.33%) had anterior chamber intraocular lenses, while 22 patients (73.33%) had posterior chamber intraocular lenses. After cataract surgery, the average presentation time was 2.7 ± 2.6 years**.** Posterior capsular rupture was the most common cause of pseudophakic glaucoma 17 (56.66%) followed by UGH 3 (10.%) & pupillary block 5 (16.66%) . Retained lens matter 1 (3.33%) and YAG, or laser capsulotomy 2 (6.66.1%) were less frequent**.** The primary cause for pseudophakic glaucoma at the time of surgery was a posterior capsular rupture.

Conclusion: The current study came to the conclusion that anterior chamber intraocular lenses have a stronger connection to pseudophakic glaucoma than sulcus-implanted posterior chamber lenses.

Keywords: Anterior chamber; Pseudophakic glaucoma; Posterior chamber

INTRODUCTION

The second most common cause of blindness globally is glaucoma [1]. It accounts for 12% of myopia worldwide and affects 60 million individuals.[2] The development of glaucoma after cataract surgery with intraocular lens implantation is known as pseudophakic glaucoma. It might appear a few hours or weeks after cataract surgery, or it could appear months later. Although pseudophakia does not directly cause glaucoma, a variety of causes, such as anterior chamber deformation, haemorrhage, inflammatory disorders, pigmentation variation, vitreous in the anterior chamber, & capsulotomy, can cause glaucoma .[3-4] The prevalence of pseudophakic glaucoma varies greatly around the world. Numerous studies have documented that the frequency of pseudophakic glaucoma in patients undergoing complex procedures ranges from 5 to 41%. According to reports, the frequency of chronic pseudophakic glaucoma ranges from 2 to 4% following routine extra capsular cataract surgery as well as 11.3% with secondary anterior chamber implants.[5] A common side effect of cataract surgery is postoperative inflammation. After surgical trauma, the anterior chamber's inflammatory cell outflow causes the trabecular meshwork to become obstructed. Glaucoma is the result of a rise in intraocular pressure (IOP) that follows this. Another possible cause of pseudophakic glaucoma is rupture of the retained lens tissue and posterior capsule. Viscoelastic materials which are used during cataract surgery to preserve the depth of the anterior chamber and shield the corneal endothelium, may cause a brief blockage of the trabecular meshwork and an increase in intraocular pressure after surgery.[6] Incorrectly sized anterior chamber intraocular lenses, as well as posterior chamber intraocular lenses placed by Sulcus, cause uveitis-glaucomahyphema syndrome (UGH).[7] The formation of peripheral anterior synechiae or the vitreous humour in the anterior chamber can also produce pseudophakic pupillary block glaucoma in anterior chamber intraocular lenses. For posterior capsular opacification, YAG laser capsulotomy is linked to a brief increase in intraocular pressure that might develop into a chronic issue.[6] An appropriate history of cataract surgery and a comprehensive examination that includes slit lamp examination, application tonometry, gonioscopy, fundoscopy, perimetry, and OCT (optical coherence tomography) can be used to detect pseudophakic glaucoma.[6] Therefore the current study was conducted to determine the incidence of Pseudophakic Glaucoma in a Tertiary Care Hospital.

METHODOLOGY

The current study was conducted at the department of ophthalmology Ophthalmology Muhammad college of Medicine Peshawar from April 2022 to November 2022 after taking permission from the ethical board of the hospital. A total of 216 Pseudophakic individuals' with age range of 50–70 who had intraocular lens implantations in the anterior and posterior chambers within a minimum of 6 weeks and a maximum of 5 years after surgery were included in this study. Each individual's complete medical history was obtained. An eye examination was performed. Snellen's chart was used to measure visual acuity. To rule out corneal edema, vitreous in the anterior chamber, anterior chamber, or posterior chamber IOL, and the presence of cells or flare in the anterior chamber Slit-lamp analysis was performed. Intraocular pressure (IOP) was measured using applanation tonometry. Angle was measured with gonioscopy's assistance. A thorough fundoscopic examination of the RNFL and disc was conducted. For confirmation of glaucoma perimetry and optical coherence tomography (OCT) were performed. The diagnosis of pseudophakic glaucoma was made when the patient had a history of cataract surgery, intraocular lens implantation (anterior chamber IOL/posterior chamber IOL), intraocular pressure greater than 21 mm Hg in one eye, glaucomatous optic disc (vertical cup to disc ratio 0.7 ± 0.2), retinal nerve fiber layer defect on OCT, or typical

glaucomatous field defects on perimetery. Patients were treated with laser therapy (YAG laser iridotomy or argon laser trabeculoplasty) or medicinal or surgical methods, depending on the cause of glaucoma. Since the postoperative period for inclusion criteria ranged from six weeks to five years, the topical steroids had been discontinued by then, and the recipients were monitored for intraocular pressure (IOP) and responders were eliminated if they needed to be prescribed for postoperative inflammation. SPSS version 20 was used to gather and analyze the data. For categorical factors such as gender, etiology, and pseudophakic glaucoma treatment, frequencies were calculated and means with standard deviations (SD) were calculated.

RESULTS

Over all 216 individuals took part in this research. 30 individuals (13.8%) of them were found to have pseudophakic glaucoma. Sixteen (53.33%) of the individuals were men. The average age was 63 ± 10.4 years. The average intraocular pressure was 30.78 ± 7.5 mm Hg. Ten (33.33%) people had phacoemulsification, and twenty (66.0%) had extracapsular cataract extraction. Eight patients (23.33%) had anterior chamber intraocular lenses, while 22 patients (73.33%) had posterior chamber intraocular lenses. After cataract surgery, the average presentation time was 2.7 ± 2.6 years. (Table 1.) The most common cause of pseudophakic glaucoma was posterior capsular rupture 17 (56.66%) followed by UGH 3 (10. %) & pupillary block 5 (16.66%). Retained lens matter 1 (3.33%) and YAG, or laser capsulotomy 2 (6.66.1%) were less frequent causes as presented in table 2. The primary cause for pseudophakic glaucoma at the time of surgery was a posterior capsular rupture 17 (56.66%). UGH 3 (10. %) and pupillary block 5 (16.66%) occurred next. Retained lens matter 1 (3.33%) and YAG laser capsulotomy 2 (6.66.1%) were less frequent causes.(table 3)

Table 1.Demographic features of the study population

Features	Frequency (%)
Mean age SD	63 ± 10.4 years
Pseudophakic glaucoma	30 (13.8%)
Gender	
Male	16 (53.33%)
Female	13 (46.66%)
Mean and SD intra ocular pressure	30.78 ± 7.5 mm Hg
Mode of Surgery	
Extra capsular cataract surgery	20 (66.%)
Phacoemulsification	10 (33.33%)
Type of Intra Ocular Lens	
Type of Intra Ocular Lens	
anterior chamber intra ocular lens	8 (23.33%)
PC IOL	22 (73.33%)
Mean Duration of surgery	2.7 ± 2.6 years

Table 2: causes of pseudophakic glaucoma

Causes	Frequency (%)
Posterior capsular Rupture + Uveitis	17 (56.66%)
block Pupillary	5 (16.66%)
uveitis-glaucomahyphema Syndrome	3 (10.0%)
YAG laser capsulotomy	2 (6.66.1%)
Retained lens matter	1 (3.33%)
Pigment dispersion	1 (3.33%)
Malignant glaucoma	1 (3.33%

Table 3: Management of Pseudophakic Glaucoma

Medical Treatment	21 (70%)
Trabeculectomy	5 (16.66%)
Peripheral Iridectomy	4 (13.33%)

DISCUSSION

The glaucoma that develops following cataract surgery with intraocular lens implantation is known as pseudophakic glaucoma. For this entity, there might be one mechanism or several mechanisms operating in tandem.[9] Over all 216 individuals took part in this research. 30 individuals (13.8%) of them were found to have pseudophakic glaucoma in a 2007 research for the assessment and treatment of secondary glaucoma, 31 patients (29.2%) had pseudophakic glaucoma, twenty one had posterior chamber intraocular lenses, and ten had anterior chamber intraocular lenses.[10] Since their sample size explicitly included individuals with secondary glaucoma, they had reported a greater frequency. According to the Chennai Glaucoma Study, 9.77% of patients in the countryside and 9.36% of patients in urban areas had aphakic or pseudophakic glaucoma.[11] 14.6% prevalence was observed in another Andhra Pradesh research, which is somewhat comparable to ours.[12] There are reports of a frequency of 0.02–0.04% in South Africa.[13] There were no cases of pseudophakic glaucoma after cataract surgery, according to another Thai research.[14] These figures demonstrate a significant difference in the incidence of pseudophakic glaucoma among affluent countries like India, Pakistan, and others.. This discrepancy could result from the fact that many cataract removal initiatives, such as camp surgeries, have been implemented in our region of the world; yet, the standard and quality of these initiatives remain dubious. In affluent nations, phacoemulsification is the preferred method for removing cataracts since it is linked to fewer problems. Participants in our research had an average age of 63 ± 10.4 SD years.

The mean age of years reported by Arvind et al.[9] is quite comparable to our study. Additionally, they have proposed that growing older may potentially increase the likelihood of developing pseudophakic glaucoma [9]. Our study found that the mean intraocular pressure was 30.78 ± 7.5 mm Hg. In their investigation, Arshinoff et al. found that the mean IOP was twenty two mm Hg.[15] In contrast to phacoemulsification, pseudophakic glaucoma was more common in ECCE patients in our study. The frequency of pseudophakic .In a research by Park et al., glaucoma was found in 2.1–4% of patients following routine extracapsular cataract excision.[16] Additionally, Cinoti has reported a 7.5% rise in glaucoma incidence following ECCE [17]. Patients with mature and hypermature cataracts continue to present in emerging nations; these cases are treated with minor incision cataract surgery or extra capsular cataract surgery. The point that our institute is a tertiary care facility may be the cause of the high incidence of glaucoma in our setting. Referrals are coming in from various primary and secondary centers, especially for the more severe cases. Additionally, trainees occasionally perform surgeries. This has a high rate of surgical complications once more. In our study, 22 patients (73.33%) had posterior chamber intraocular lens implants, whereas 10 patients had anterior chamber intraocular lens implants. patients (25.0%). According to a study by Stark, the incidence of an intraocular pressure increase during anterior chamber intraocular lens implantation was 5.5% higher than that during posterior chamber intraocular lens implantation (1.6%).[18] According to Ang et al., 20% of patients experience an increase in intraocular pressure of 30 mm Hg after posterior capsular rupture during phacoemulsification, even 24 hours after the procedure. For over half of his patients, an anterior vasectomy was necessary. Both open-angle & closed-angle glaucoma can develop in the early or late postoperative phases[19]. When the trabecular meshwork is blocked by vitreous, retained inflammatory cells, & pigment dispersion from extensive intraocular manipulation, open-angle glaucoma may develop.[20] Among patients with pseudophakia, postoperative uveitis and posterior capsule rupture are two common causes of glaucoma. Following cataract surgery, a variety of factors can produce uveitis that results in glaucoma, including pigment dispersion, retained lens debris, retained viscoelastic, hyphema, and vitreous in the anterior chamber after posterior capsule rupture.[3-]Individuals who had glaucoma with posterior capsular rupture were treated with topical beta-blockers as & systemic carbonic anhydrase inhibitors, topical steroids, & nonsteroidal anti-inflammatory drops. Topical beta-blockers & carbonic anhydrase inhibitors are the best choices; meiotic and prostaglandin inhibitors should be ignored..[21] Pupily block glaucoma was observed in five patients (16.66%). They were

treated with beta-blockers, oral carbonic anhydrase inhibitors, & carbonic anhydrase inhibitors. Later, when the corneal edema was evident, pupilloplasty and iridectomy were performed. In this study, three patients (10.%) developed glaucoma as a result of UGH syndrome. Anterior chamber lens implantation (AC IOL) was performed on each of these patients. The most common cause of UGH syndrome, sometimes referred to as Ellingson syndrome, is an anterior or posterior chamber intraocular lens malposition or subluxation. It results in mechanical damage to nearby structures like the cilliary body or iris. This could lead to pigment dispersion, microhyphema, chronic inflammation, and an increase in intraocular pressure. In this group all of the individuals had to have trabeculectomy, and one individual needed to have an AC IOL removed. According to a Chinese study, 9.1% of people experienced UGH syndrome, which required the removal of intraocular lenses.[22] One patient (3.33%) had pigment dispersion-related glaucoma. A case study of 3 participants with pigment dispersion was published by Mierlo et al.[23] Iatrogenic injury results from posterior chamber intraocular lenses that are improperly sulcus implanted. Following the failure of medicinal intervention, these individuals had to have trabeculectomy. One patient (3.5%) in our study who was hypermetrope developed malignant glaucoma. This uncommon condition is often seen following trabeculectomy for narrow-angle glaucoma, but it is infrequently observed following cataract surgery including intraocular lens implantation.[24] Our patient responded effectively to medical therapy, which consisted of cycloplegic, steroid, & pressure-lowering drugs.. For the long-term management of intraocular pressure in pseudophakic glaucoma, carbonic anhydrase inhibitors, either by themselves or in conjunction with beta blockers, proved to be more successful. Additionally, Ermis et al.[25] discovered that carbonic anhydrase inhibitors were more successful in lowering IOP over the long run.

CONCLUSION

The current study concluded that as compared to sulcus-implanted posterior chamber lenses, anterior chamber intraocular lenses are more frequently related with pseudophakic glaucoma. Patients who undergo ECCE have a higher risk of pseudophakic glaucoma than those who have phacoemulsification. The majority of patients with pseudophakic glaucoma reacted well to medication, but others benefited from surgery.

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