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Prevalence of Exfoliative Syndrome in Patients Scheduled for Cataract Surgery: A Review of 110 Cases

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Abstract **Case Report**

***Background*:** Capsular pseudoexfoliation syndrome (CEP) is an age-related systemic disorder of unknown etiology defined by the abnormal production and deposition of pseudoexfoliative fibrillar material both in the anterior segment and in several extraocular tissues [1, 2]. CEP is associated with the development of glaucoma, cataract and zonular instability. It is also responsible for specific surgical complications. Hence the interest to evaluate the prevalence of exfoliative syndrome in patients scheduled for cataract surgery and to shed light on its clinical and surgical particularities. ***Patients and methods*:** This is a retrospective, descriptive study involving 110 patients, admitted for cataract surgery, in the adult ophthalmology department, Hospital 20 August in Casablanca, from January 1, 2021 to January 2022. Patients underwent extraction by phacoemulsification or manual extraction with placement of an intraocular implant. ***Results*:** This study included 110 patients. The mean age was 66.67 years with a slight predominance of the female gender at 56% versus 44%. The percentage of PEC increases with age. Mean intraocular pressure was significantly higher in eyes with PES than in those without PES. The presence of PES increases the risk of intraoperative and postoperative complications, regardless of the surgical technique, regarding zonular rupture and vitreous exit. ***Conclusion*:** The exfoliative syndrome remains a frequent pathology in elderly subjects with cataracts, whose prevalence increases significantly over the age of 60. Its presence constitutes an important risk factor for primary open-angle glaucoma and increases the risk of intraoperative complications during cataract surgery, regardless of the technique used. The key points in surgery are the surgeon's experience and good dilatation.

Keywords: Capsular pseudo-exfoliation syndrome, Cataract surgery, Glaucoma, Systemic disease.

INTRODUCTION

Capsular pseudoexfoliation syndrome (CEP) is an age-related systemic disorder of unknown etiology defined by the production and abnormal deposition of pseudoexfoliative fibrillar material in both the anterior segment and several extraocular tissues [1, 2]. It is defined as a generalized age-related degenerative fibrillopathy whose ethiopathogeny is still unknown. CEP is associated with the development of glaucoma, cataract and zonular instability. It leads to changes in all ocular tissues with risks of spontaneous complications: poor dilation, zonular fragility, phacodonesis, lens subluxation, rupture of the hematocellular barrier, endothelial damage. It is also responsible for specific surgical complications: zonular disinsertion, corneo-endothelial decompensation, postoperative inflammation, postoperative tension peak, subluxation of the posterior chamber implant, secondary cataract. Its prevalence increases with age. The diagnosis is clinical with a characteristic cocoon-like appearance of exfoliative material deposited on the lens capsule [7]. Our objective is to determine the prevalence of pseudoexfoliative syndrome (PES) in patients scheduled for senile cataract surgery in the Department of Adult Ophthalmology, Hospital 20 August in Casablanca.

MATERIALS AND METHODES

Retrospective, descriptive study of 110 cases of pseudoexfoliative syndrome (PES) out of 1224 patients scheduled for senile cataract surgery by phacoemulsification or manual extraction with placement of an intraocular implant. These patients were collected in the adult ophthalmology department of the 20 Aout Hospital in Casablanca, over a period of

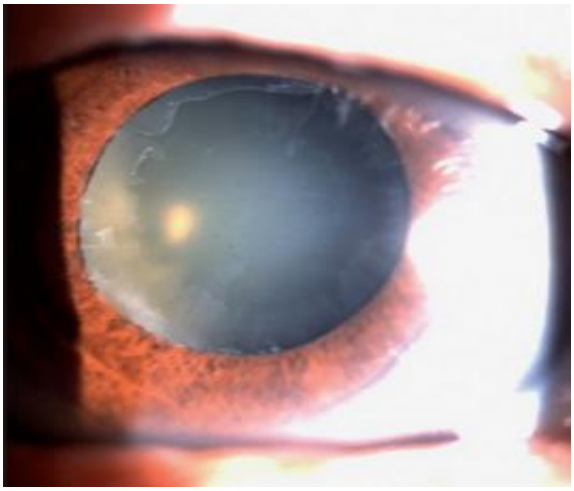
one year, from January 1, 2019 to January 2020. Excluded from the study were post-traumatic cataracts, cataracts secondary to uveitis, cortisone cataracts, silicone cataracts, congenital cataracts, and patients younger than 40 years. The data were collected through a data collection form that covered several points: Patient identity: age and sex. Research of the patient's ophthalmological history: glaucoma or central retinal vein occlusion, research of general pathological history: heart disease, hypertension, diabetes and cerebral vascular accident. Data from the ophthalmological examination: Visual acuity is measured by a test projector at a distance of 5 meters, without and with correction. All patients were examined by slit lamp before and after medicated mydriasis with tropicamide. The diagnosis of EPS was based on the presence of exfoliative material at one of three sites: the pupillary margin, the anterior surface of the lens and the iridocorneal angle by Goldmann three-mirror gonioscopy. In case of pseudophakia and aphakia, the exfoliative material of the adelphic eye is looked for outside the lens. The anatomical-clinical form of the cataract is also noted: nuclear, cortical, corticonuclear, posterior subcapsular, total white or hypermature. Intraocular pressure is measured with a Goldmann applanation tonometer, and the fundus examination is performed, when the state of the media allows it, with a non-contact lens such as VOLK. The surgical techniques used are manual extracapsular extraction (EEC) and phacoemulsification (PHACO) with placement of an intraocular implant in the posterior chamber. Anterior vitrectomy associated with the placement of a posterior iridal fixation implant is performed in case of capsular rupture with vitreous exit. All patients are systematically monitored on days 1, 7, 15, 30 and 60.

RESULTS

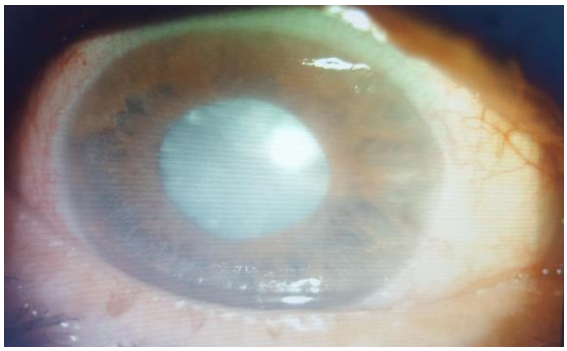
EPS was detected in 110 patients with a prevalence of 8.9% (Picture 1). The average age was 62.43 years, which is high in this type of pathology, with a slight predominance of the female sex at 56% against 44% of the male sex (table I). Thus the prevalence of EPS increases with age ($p<0.001$). There was a statistically significant relationship between EPS and certain diseases: glaucoma ($p=0.0003$), heart disease ($p=0.02$) and stroke ($p=0.007$). The EPS was bilateral in 46.3%. Patients with hypermature cataracts more frequently had EPS ($p<0.001$). Poor iris dilation was found in 43% of cases. The distribution of the different types of cataract observed on clinical examination was: corticonuclear (38%), white (16%) (Picture 2), subcapsular (18%) and nuclear (11%). Lens subluxation (Picture 4) or phacodonesis was observed in 15% of cases. The mean intraocular pressure was high with a mean of 18.2 mmHg. Phacoemulsification was performed in 83.33% of cases and EEC in 16.66% of cases. 1 case (0.9%) of anterior chamber implant was observed while there were only posterior chamber implants in the remaining patients. Irial hooks were used in 2 cases (1.81%); otherwise, injection of viscoelastic product or use of intra-cameral adrenaline was sufficient for the rest of the patients. The presence of PES increases the risk of intra- and postoperative complications : whatever the surgical technique (EEC or PHACO) concerning zonular rupture (Picture 3) and vitreous exit, whereas phacoemulsification does not seem to increase the risk of corneal decompensation postoperatively. The complications observed were statistically independent of the surgical technique used ($p=0.4$).

Table I: Epidemiological, clinical and comorbidities data found in the patients

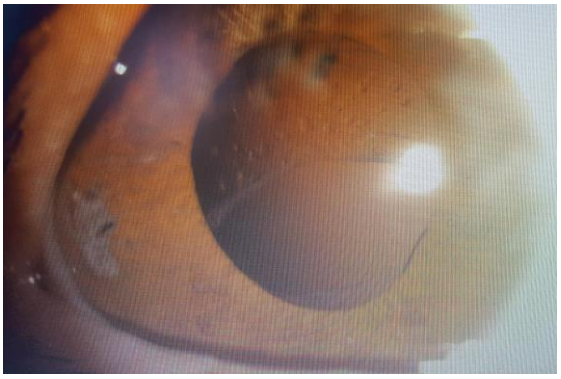
Clinical data	Number	Percentage
Number of patients	110	100%
Female	62	56%
Male	48	44%
Average age	62.43 years old	
Left eye	68	62%
Right eye	42	38%
Unilateral form	67	61%
Bilateral form	43	38%
Average follow-up (days)	50 days	
Associated chronic open angle glaucoma	21	19.09%
Associated intraocular hypertonia	18.2 mmHg	
Hypertension	63	57%
Diabetes	42	38%



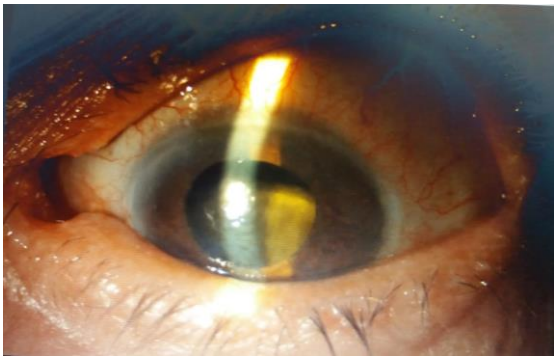
Picture 1: Cocoon appearance of the CEP on the anterior capsule



Picture 2: Total white cataract



Picture 3: Zonular fragility responsible for subluxation of the implant postoperatively



Picture 4: Subluxation of the cataractous lens by zonular fragility

DISCUSSION

CEP is an age-related condition whose prevalence increases significantly over 60 years of age. In our study, the average age of the patients was 62.43 years. The prevalence would be around 30% in a population over 60 years old. In our study, the diagnosis of CEP was clinical, defined by the presence of material on the anterior lens capsule with a slit lamp (Picture 1). Several other less specific clinical signs are found in CEP such as iris transillumination, pigmentary deposition on the iris, pigmentary dispersion after dilatation, pigmentation of the trabeculum and complications such as phacodonesis, lens dislocation or subluxation. In our study, we found a predominance of unilateral form (61%) compared to bilateral form (38%). According to the study by Puska *et al*., [11], this is a bilateral form of damage, but with an asymmetrical presentation and a long delay between the two eyes: 38% of bilateralization at 10 years. In unilateral forms, the eye with clinical CEP has poorer visual acuity, higher IOP, poorer dilation, more cataract and more pigmented trabeculum [1]. Guo *et al*., [3] showed the interest of UBM in case of doubt on the clinical diagnosis of CEP. Indeed, UBM shows a thin anterior and peripheral capsule, a thinner zonule and nodular deposits in the zonule. In our study, the preoperative IOP was high with a mean of 18.2 mmHg, as in the study by Ritch *et al*., [6]. Damji *et al*., [12] reported a 6 to 10 times higher risk of intraocular hypertension in patients with CEP, with a 25% rate of intraocular hypertension, highlighting the major interest of monitoring IOP in the presence of clinical CEP. The association between CEP and chronic open-angle glaucoma has been known for a long time [6]. In our study, 21 cases (19.09%) of association between chronic open angle glaucoma and CEP were noted. These results show that CEP is an independent risk factor for chronic open-angle glaucoma. CEP represents a relative risk of 2 for progression to chronic open-angle glaucoma at 8 years in the presence of intraocular hypertension [4]. In contrast to Damji *et al*., [12] and Merkur *et al*., [13], IOPs at 1 month postoperatively were essentially identical in both groups, with a value of 14 +/- 4 mmHg in the CEP group versus 14 +/- 3 mmHg in the control group. With regard to visual acuity (VA), it is interesting to note that in our study, the preoperative VA was low. These results could be explained by the higher average age, more advanced cataract before surgery and the much more frequent association with chronic open-angle glaucoma. In our study, we noted 43% of cases of poor iris dilation. These results are consistent with those reported in the literature. Poor dilation is indeed one of the clinical signs described in CEP, and represents one of the operative difficulties related to CEP, especially since it is associated with zonular fragility [7]. In our study, the intraoperative complication rate was high, approximately 13.75% of cases. Contrary to the literature; Hyams *et al*., [14] did not find a significant difference between the intraoperative complication rates

of CEP patients and controls (5.8% versus 4%). According to these authors, CEP is not a risk factor for cataract surgery, but only in the absence of phacodonesis or lens subluxation. CEP as a risk factor for cataract surgery is a controversial topic, with some studies showing a difference and others not between the CEP and control groups [14]. The key points in surgery are surgeon experience and good dilation (possibly using iridal hooks). In our study, corticonuclear and posterior subcapsular cataract was the main form of cataract associated with CEP (56%), but in the literature corticonuclear cataract predominates [1], followed by nuclear cataract (16%). Regarding the associated systemic damage, we have noted that the majority of these patients have arterial hypertension. CEP is a systemic involvement; deposition of pseudoexfoliative material has been demonstrated in several extraocular tissues [8]. An association has been found between CEP and arterial hypertension, myocardial infarction, stroke and Alzheimer's disease [15]. While Shrum *et al*., [8] showed no association between CEP and cerebrovascular and cardiovascular mortality, it would appear that there is a higher level of hyperhomocysteinemia in CEP [9].

CONCLUSION

Exfoliative syndrome remains a frequent pathology in elderly subjects with cataracts. This retrospective study presents the clinical and epidemiological characteristics of 110 eyes with CEP and cataract surgery. Its presence constitutes an important risk factor for primary open-angle glaucoma and increases the risk of intraoperative complications during cataract surgery, regardless of the technique used. Therefore, careful examination and comprehensive management of these candidates for cataract surgery is warranted to prevent potential ocular and systemic complications.

Conflict of Interest: No potential conflict of interest selevant to this article was reported.

Patient Consent: Patients provided written informed consent for publication and the use of their images.

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