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Article

Epidemiology and Clinical Characteristics of Dry Eye Syndrome in Elderly Patients with Age-Related Cataract

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Abstract: This scientific review synthesizes current data from national and international literature on epidemiological rates, shared risk factors, and key pathogenic features of the clinical course of dry eye syndrome in geriatric patients with age-related cataracts. The complex pathogenic relationship between involutional changes in the tissue structures of the anterior segment of the eye, precorneal tear film stability, and the progression of cataractous lens opacity is examined. Particular emphasis is placed on the phenomenon of clinical-anatomical dissonance—the hidden course of xerosis occurring against the backdrop of decreased corneal sensitivity in the elderly population. Based on the literature analysis, the paper establishes the high medico-social importance of preventive interdisciplinary screening and targeted medical optimization of the ocular surface status at the preoperative stage to prevent postoperative refractive errors and iatrogenic complications.

Keywords: *dry eye syndrome, age-related cataract, epidemiology, ocular surface, tear film, elderly age.*

1. Introduction

Heavy-metal The co-existence of age-related cataract and dry eye syndrome constitutes one of the most prevalent interdisciplinary challenges in contemporary geriatric ophthalmology [1]. According to demographic projections by the World Health Organization, the steady increase in the global elderly population is accompanied by a proportional rise in the incidence of combined ocular pathologies [2].

Modern cataract phacoemulsification has evolved into a highly precise refractive intervention, where the ultimate criterion for success is the achievement of maximal and stable visual outcomes [3]. Crucially, the precorneal tear film is recognized as the initial and most vital refractive medium of the eye. Age-associated disruptions in its stability and homeostasis not only degrade the quality of life in elderly patients but also serve as a primary source of higher-order optical aberrations, reduced contrast sensitivity, and significant biometric inaccuracies during the preoperative calculation of premium intraocular lenses [4, 5].

Despite its high medico-social significance, the preoperative diagnosis of destructive changes in the ocular surface among elderly and senile patients is frequently overlooked. This underdiagnosis occurs because complaints regarding cataract-induced visual acuity loss typically overshadow ocular surface symptoms, ultimately leading to the postoperative decompensation of the xerotic process [6].

This review aims to systemize and critically analyze contemporary scientific literature regarding the epidemiological markers and clinical-pathogenetic features of DES in elderly patients presenting with age-related cataracts.

2. Methods

A systematic search of profile scientific publications spanning from 2016 to 2026 was conducted across international and national bibliographic databases, including PubMed/MEDLINE, Cochrane Library, Scopus, Google Scholar, and eLibrary.

Search queries were formulated using the following keywords and their combinations in both English and Russian: *dry eye syndrome*, *senile cataract*, *epidemiology*, *elderly patients*, *ocular surface*, and *phacoemulsification*. The inclusion criteria encompassed controlled clinical trials, cohort and randomized controlled studies, meta-analyses, and comprehensive systematic reviews evaluating ocular surface status in candidates for cataract surgery. Out of 120 unique sources initially screened, 15 key publications formed the foundational basis of this review.

3. Results

An analysis of epidemiological data demonstrates an exponential increase in the prevalence of dry eye syndrome correlated with advancing patient age. In the general population of individuals over 60 years old, the prevalence rate of DES ranges from 15% to 35% [7]. However, this metric is substantially higher within the cohort of patients hospitalized for elective surgical treatment of age-related cataracts.

According to data from the multicenter PHACO study, signs of tear film dysfunction and varying degrees of ocular surface xerosis are recorded in 50% to 75% of phacoemulsification candidates [8]. This high incidence is primarily attributable to the fact that DES frequently presents in a latent (subclinical) form among elderly individuals. Patients commonly attribute their experienced discomfort (such as foreign body sensation or transient blurring) exclusively to cataract development, while practicing surgeons focus predominantly on lens nuclear density and the integrity of the capsular-ligamentous apparatus [9].

Involutional processes within the structures of the anterior segment of the eye in older age groups are complex and multifactorial. With age, physiological atrophy of the lacrimal gland acinar cells occurs, leading to reduced secretion of the aqueous layer of the tear film [10].

Concurrently, pronounced meibomian gland dysfunction develops, occurring in up to 70% of elderly patients. MGD leads to a deficiency in the lipid layer of the tear film, triggering a sharp increase in tear evaporation rate (evaporative DES) [11]. This disruption of tear film stability initiates a cascade of pathogenetic changes: tear hyperosmolarity activates inflammatory mediators, including interleukins text IL-1, text IL-6, tumor necrosis factor-alpha TNF-alpha, and matrix metalloproteinases MMP-9, which subsequently induce apoptosis of conjunctival goblet cells and desquamation of the corneal epithelium [12].

In cataract patients, this degenerative background is frequently exacerbated by the concomitant, long-term topical administration of preserved medications (e.g., hypotensive drops for glaucoma) containing benzalkonium chloride, an agent known to exert direct cytotoxic effects on the ocular surface [1].

The clinical presentation of DES in gerontological patients with age-related cataracts is characterized by a distinct pathomorphological dissonance—a marked discrepancy between a minimal number of subjective complaints and the severity of objective destructive changes in the cornea and conjunctiva [13].

Due to the age-related decline in corneal tactile and pain sensitivity (involutional hypoesthesia of the corneal nerves), elderly patients often fail to report classic symptoms such as severe burning or grittiness. Nevertheless, objective biomicroscopic examination with fluorescein staining regularly verifies the following clinical markers:

A severe reduction in tear break-up time to less than 5–7 seconds;

Multiple areas of punctate keratopathy de-epithelialization within the central optical zone;

Pronounced lid-parallel conjunctival folds

A decrease in Schirmer I test values to critical levels of 3–5 mm [14].

This latent yet clinically severe course of DES poses significant risks for postoperative decompensation following cataract surgery, frequently transforming into persistent corneal syndrome, filamentary keratitis, or non-healing persistent corneal erosions during the early postoperative period [15].

4. Discussion

A synthesis of global literature convincingly demonstrates that dry eye syndrome in elderly cataract patients has transitioned from being a mere concomitant baseline condition to a critical limiting factor in refractive lens surgery.

The widespread clinical oversight of corneal desiccation during the preoperative stage leads to two severe consequences. First, the optical heterogeneity and instability of the tear meniscus distort automated keratometry and corneal topography data. This distortion results in unpredictable postoperative refractive "surprises" and subsequent patient dissatisfaction with premium intraocular lens IOL implantation outcomes [4, 8]. Second, iatrogenic trauma sustained during phacoemulsification—induced by ultrasonic acoustic energy, corneal irrigation stress, and the toxicity of preserved postoperative antibacterial therapies—drastically exacerbates chronic inflammation, transforming subclinical xerosis into a manifest, severe clinical form [6, 12].

Consequently, contemporary authors unanimously advocate for a radical paradigm shift in the clinical protocols for managing elderly cataract patients. Implementing mandatory preoperative screening of the ocular surface (including the tear break-up time test and fluorescein staining) is essential, regardless of whether the patient presents with active subjective complaints. The detection of moderate-to-severe signs of DES decompensation should serve as a direct indication to postpone elective surgery for 7–14 days. This delay allows for preventive, preservative-free tear replacement and reparative therapy to optimize the ocular surface status.

5. Conclusion

Based on the comprehensive literature analysis, the following conclusions can be drawn:

High Epidemiological and Social Burden: Dry eye syndrome is highly prevalent among geriatric patients undergoing elective cataract surgery, affecting 50–75% of candidates. This establishes DES not merely as a comorbidity, but as a primary concern in geriatric ophthalmology.

Clinical-Anatomical Dissonance: Due to involutional corneal hypoesthesia in the elderly, severe objective signs of ocular surface destruction such as punctate keratopathy and critical reduction in tear film stability frequently present with minimal or absent subjective symptoms, leading to a high rate of underdiagnosis.

Impact on Refractive Outcomes: Age-related instability of the precorneal tear film severely compromises preoperative biometry and corneal topography, leading to avoidable postoperative refractive inaccuracies, particularly when premium IOLs are utilized.

Necessity of Preoperative Optimization: To prevent iatrogenic exacerbation of xerosis and ensure optimal functional outcomes after phacoemulsification, mandatory screening of the ocular surface must be integrated into standard preoperative protocols. Patients identified with compromised tear film homeostasis require a targeted 7-to-14-day course of preservative-free artificial tears and metabolic therapy before surgical intervention.

REFERENCES

[1] V. V. Brzheskiy, G. B. Egorova, and E. A. Egorov, *Dry Eye Syndrome and Diseases of the Ocular Surface: Clinic, Diagnosis, Treatment* (in Russian). Moscow, Russia: GEOTAR-Media, 2016, 448 p.

[2] V. N. Trubilin, E. G. Polunina, D. V. Andzhelova *et al.*, "Prevalence of dry eye disease signs in patients scheduled for cataract surgery," *Ophthalmology* (in Russian), vol. 15, no. 3, pp. 284–291, Sep. 2018.

[3] D. Yu. Maychuk, "Features of management of the postoperative period in cataract surgery in patients with tear production disorders," *The Russian Annals of Ophthalmology* (Vestnik Oftalmologii, in Russian), no. 4, pp. 56–62, Jul. 2018.

[4] J. Chuang, K. C. Shih, A. Tse *et al.*, "Ocular surface optimization before cataract surgery," *Current Opinion in Ophthalmology*, vol. 32, no. 1, pp. 21–26, Jan. 2021.

[5] P. Garg, A. Gupta, and J. Vega, "Impact of preoperative dry eye optimization on refractive outcomes of premium intraocular lens implantation," *Journal of Cataract & Refractive Surgery*, vol. 48, no. 5, pp. 534–540, May 2022.

[6] V. N. Trubilin and E. G. Polunina, "Algorithm for preparation of the ocular surface in patients prior to cataract surgery,"

Ophthalmology (in Russian), vol. 16, no. 2, pp. 143–149, Jun. 2019.
[7] F. Stapleton, M. Alves, V. Y. Bunya *et al.*, "TFOS DEWS II Epidemiology Report," *The Ocular Surface*, vol. 15, no. 3, pp. 334–365, Jul. 2017.
[8] P. K. Gupta, O. J. Drinkwater, K. W. VanDusen *et al.*, "Prevalence of ocular surface dysfunction in patients presenting for cataract surgery evaluation," *Journal of Cataract & Refractive Surgery*, vol. 44, no. 9, pp. 1090–1096, Sep. 2018.
[9] S. Yu. Anisimova and S. I. Anisimov, "Evaluation of corneal status in elderly patients before cataract removal," *Clinical Ophthalmology* (in Russian), vol. 20, no. 2, pp. 72–77, Apr. 2020.
[10] A. J. Bron, C. S. de Paiva, S. K. Chauhan *et al.*, "TFOS DEWS II Pathophysiology Report," *The Ocular Surface*, vol. 15, no. 3, pp. 438–510, Jul. 2017.
[11] E. A. Egorov and T. B. Romanova, "Meibomian gland dysfunction in the elderly: approaches to therapy," *RMJ. Clinical Ophthalmology* (in Russian), no. 1, pp. 18–22, Feb. 2021.
[12] J. P. Craig, K. K. Nichols, E. K. Akpek *et al.*, "TFOS DEWS II Definition and Classification Report," *The Ocular Surface*, vol. 15, no. 3, pp. 276–283, Jul. 2017.
[13] J. Vehof, N. Sillevis Smitt-Kamminga, R. Nizetic *et al.*, "Relationship between symptoms and signs of dry eye disease in elderly cataract patients," *British Journal of Ophthalmology*, vol. 103, no. 4, pp. 479–484, Apr. 2019.
[14] E. G. Polunina and I. V. Pimenova, "Diagnostic markers of subclinical forms of xerosis in lens replacement candidates," *The Russian Annals of Ophthalmology* (Vestnik Oftalmologii, in Russian), vol. 138, no. 1, pp. 64–70, Jan. 2022.
[15] A. Movahedan and A. R. Djalilian, "Cataract surgery in the face of severe dry eye: Complications and management strategies," *Current Ophthalmology Reports*, vol. 8, no. 2, pp. 115–122, Jun. 2020.