Secondary cataract following Nd:YAG laser due to dense inflammatory membrane in a young patient with HLA-B27-associated spondyloarthritis

Catarata secundária após *laser* Nd:YAG por membrana inflamatória densa em paciente jovem com espondiloartrite associada ao HLA-B27

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ABSTRACT

The objective of this study was to report an unusual iatrogenic case of secondary cataract formation following Nd:YAG laser membranotomy treatment due to a dense inflammatory membrane in a young patient with HLA-B27–associated spondyloarthritis. Case Report: A 35-year-old woman with a known history of HLA-B27–positive ankylosing spondylitis presented with pain and redness in the right eye. Ophthalmological examination revealed a dense central inflammatory membrane with severely reduced visual acuity. Anterior segment optical coherence tomography (AS-OCT) demonstrated crystalline material obstructing the trabecular meshwork. The patient underwent phacorefractive surgery with intraocular lens implantation, achieving significant visual improvement. **Conclusion:** Inflammatory ocular conditions associated with HLA-B27 may lead to unusual secondary iatrogenesis cataract formation after Nd:YAG laser treatment. Early recognition and appropriate surgical management can result in excellent visual outcomes.

RESUMO

O objetivo deste estudo foi relatar um caso incomum de formação iatrogênica secundária de catarata após tratamento com membranotomia a *laser* Nd:YAG devido a uma membrana inflamatória densa em paciente jovem com espondiloartrite associada ao HLA-B27. Trata-se de uma mulher de 35 anos, com histórico de espondilite anquilosante HLA-B27 positiva, que apresentou dor e vermelhidão no olho direito. O exame oftalmológico revelou membrana inflamatória central densa com acuidade visual severamente reduzida. A tomografia de coerência óptica do segmento anterior demonstrou material cristalino obstruindo a malha trabecular. A paciente foi submetida à cirurgia facoemulsificante com implante de lente intraocular, obtendo melhora visual significativa. Condições inflamatórias oculares associadas ao HLA-B27 podem levar à formação atípica de catarata iatrogênica secundária após tratamento com *laser* Nd:YAG. O reconhecimento precoce e o manejo cirúrgico adequado podem resultar em excelentes resultados visuais.

INTRODUCTION

The anterior uveitis is the most frequently encountered form of intraocular inflammation and represents a major cause of visual impairment worldwide. Epidemiological studies from different geographic regions consistently show that anterior uveitis accounts for approximately half to nearly all uveitis cases, underscoring its global clinical relevance. Its high prevalence, combined with the potential for recurrent episodes and long-term complications, makes it a significant public health concern.[1-3]

One of the most well-established associations in anterior uveitis is with the human leukocyte antigen B27 (HLA-B27). This genetic marker is strongly linked to acute, recurrent, and often severe inflammatory episodes of the anterior segment. International reports indicate that nearly one-fifth to one-third of patients with anterior uveitis test positive for HLA-B27, although the frequency varies according to ethnic background and geographic location. In Caucasian populations, HLA-B27 prevalence ranges from 8% to 10%, while studies involving Mexican populations suggest a lower prevalence, estimated at approximately 4%, reflecting genetic diversity across regions.[1-3]

HLA-B27-associated anterior uveitis most commonly affects young and middle-aged adults, typically presenting between the second and fourth decades of life. Clinical onset is usually sudden, characterized by unilateral ocular pain, redness, photophobia, and reduced visual acuity. Compared with other etiologies, this subtype tends to demonstrate a more intense inflammatory response and a higher likelihood of recurrence. These characteristics increase the risk of cumulative structural damage to the anterior segment over time.[4-5]

The complications arising from anterior uveitis are diverse and may significantly compromise visual prognosis. Common sequelae include posterior synechiae, secondary glaucoma, cystoid macular edema, and cataract formation due to membranotomy. In patients with HLA-B27-related uveitis, ocular complications have been described in up to nearly half of affected eyes, with cataract development reported in approximately one-fifth of cases. Such complications are often the result of repeated inflammatory insults, disruption of the blood–aqueous barrier, and prolonged exposure to inflammatory mediators or corticosteroid therapy.[4-5]

Secondary iatrogenic cataract formation in inflammatory conditions may present with atypical features. Dense inflammatory or fibrinous membranes within the anterior chamber can obstruct the visual axis and interfere with aqueous outflow, leading to complex clinical scenarios. In exceptional cases, these membranes may persist or worsen after Nd:YAG membranotomy laser procedures, due to intense and dense inflammatory membranes, contributing to further lens-related opacification and trabecular meshwork obstruction. The coexistence of HLA-B27-associated systemic disease and severe anterior segment inflammation may predispose patients to such unusual presentations. Recognition of these mechanisms is essential for timely diagnosis and appropriate surgical intervention, aiming to restore visual function and prevent irreversible damage.[4-5]

CASE REPORT

A 35-year-old female with a previously diagnosed HLA-B27–positive ankylosing spondylitis presented with acute pain, redness, and marked visual loss in the right eye. There was no history of ocular trauma. Best-corrected visual acuity in the affected eye was limited to hand motion at 50 cm; intraocular pressure of right eye was 25 mmHg and 15 in the left eye. Slit-lamp examination revealed conjunctival hyperemia and a dense central inflammatory membrane obstructing the visual axis. Gonioscopic examination was not possible in the right eye, due to the high density of the inflammatory membrane and the patient's pain. However, in the contralateral eye, a Grade III Shaffer was found, without anatomical alterations. The SUN Grading Scheme for Anterior Chamber Flare was used, where a grade of +4 was found, described as Intense (fibrin/plastic aqueous) (Figure 1).

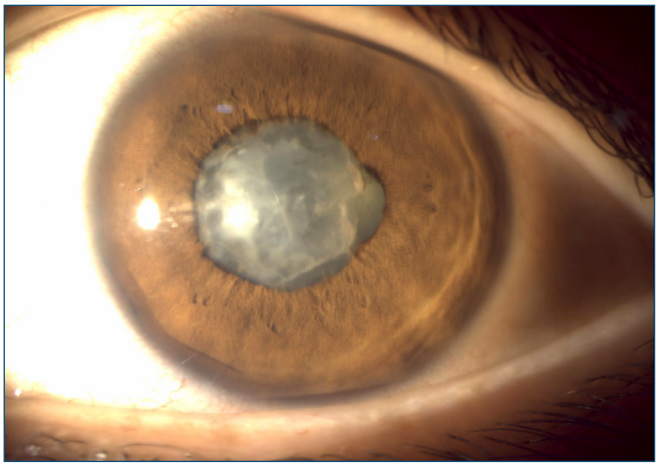


Figure 1. Anterior segment optical coherence tomography demonstrated dense crystalline material occupying the anterior segment and obstructing the trabecular meshwork.

These findings were consistent with secondary cataract formation associated with inflammatory debris following Nd:YAG laser treatment of membranotomy, with

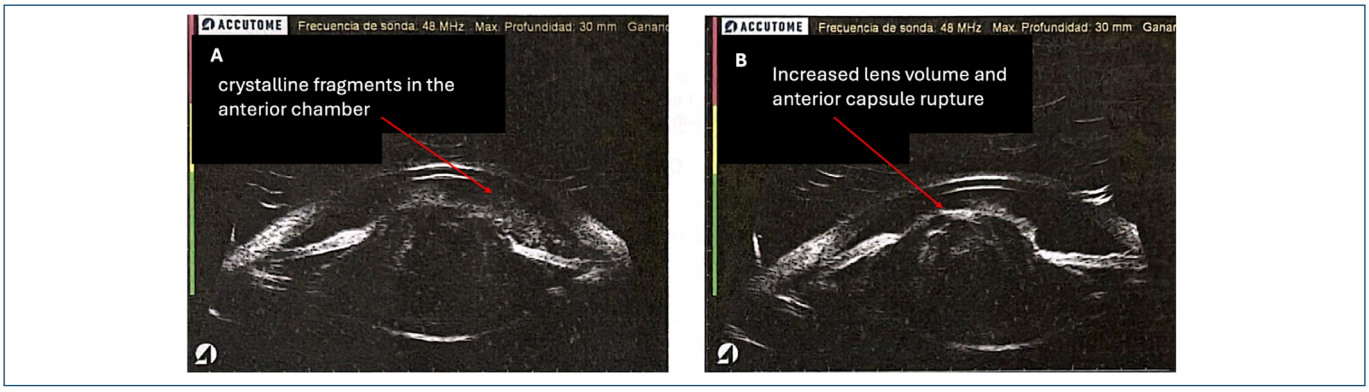


Figure 2. Anterior segment optical coherence tomography. (A) We appreciate crystalline fragments in the anterior chamber. (B) We observed the increased lens volume and the anterior capsule rupture.

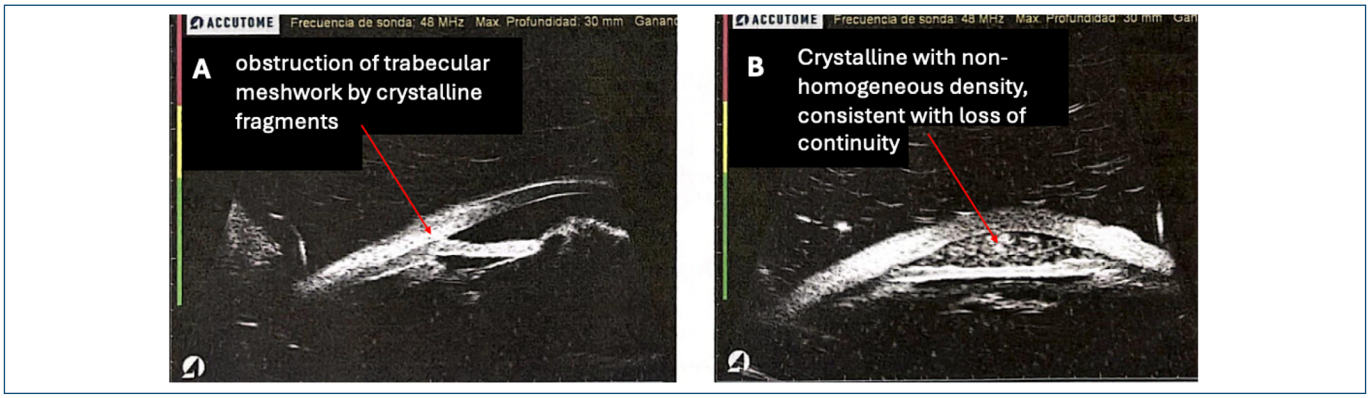


Figure 3. Anterior segment optical coherence tomography. (A) The obstruction of the trabecular meshwork by the crystalline fragments. (B) The crystalline with non-homogeneous density, consistent with loss of continuity.

exposure of crystalline fragments in the anterior chamber (Figures 2 and 3).

Prior medical treatment, the patient was using 50 mg prednisone tablets orally every 24 hours, as well as TP drops (tropicamide 8 mg/mL and phenylephrine 5 mg/mL) every 12 hours and prednisone drops every 4 hours in the affected eye.

Given the severity of visual impairment and anatomical findings, the patient underwent phacorefractive surgery with intraocular lens implantation. The procedure was uneventful.

The follow-up was carried out without any complications, using antibiotic drops for 1 week, non-steroidal anti-inflammatory drugs (NSAID) drops for two weeks, and steroid drops in decreasing doses until finally being discharged at 6 months. Ocular inflammation resolved with appropriate postoperative management. Postoperatively, the patient experienced significant visual improvement, achieving a best-corrected visual acuity of 20/25.

DISCUSSION

Ocular involvement in HLA-B27-associated spondyloarthritis is common, most frequently presenting as acute anterior uveitis. Chronic or recurrent inflammation can disrupt the blood–aqueous barrier, promoting the accumulation of inflammatory cells and crystalline material within the anterior segment.[6]

Secondary cataract formation following Nd:YAG laser treatment due to dense inflammatory membranes is rare, especially in young patients. In this case, AS-OCT played a crucial role in identifying the obstruction of the trabecular meshwork by crystalline material, supporting both diagnosis and surgical planning.[7-8]

Surgical intervention with phacorefractive extraction and intraocular lens implantation proved to be an effective treatment, resulting in excellent visual recovery. This case highlights the importance of careful postoperative monitoring in patients with systemic inflammatory diseases and emphasizes the role of advanced imaging techniques in complex anterior segment pathology.[9-11]

Furthermore, there is little evidence of reported cases of cataract following Nd:YAG laser application, due to it being a serious, under-documented complication associated with iatrogenesis. Documenting the possibility of this occurrence is necessary for physicians in training, as well as a reminder to veteran ophthalmologist

regarding dense inflammatory membranes in young phakic patients.[9-11]

In conclusion, inflammatory ocular conditions associated with HLA-B27 may lead to unusual secondary iatrogenesis cataract formation after Nd:YAG laser treatment. Early recognition and appropriate surgical management can result in excellent visual outcomes.

AUTHORS' CONTRIBUTION

Dr. Roberto Varela Gress designed and interpreted the manuscript. Dr. Arturo Iván Pérez Pacheco prepared, analyzed, and interpreted the manuscript. Dr. Inés Ortega Cervantes prepared, analyzed, and interpreted the manuscript.

REFERENCES

1. Kopplin LJ, Mount G, Suhler EB. Review for Disease of the Year: Epidemiology of HLA-B27 Associated Ocular Disorders. Ocul Immunol Inflamm. 2016 ;24(4):470-5.
2. Al-Ani HH, Sims JL, Niederer RL. Long term complications and vision loss in HLA-B27 uveitis. Eye (Lond). 2023;37(8):1673-7.
3. Yusef YN, Gamidov AA, Medvedeva EP, Surnina ZV, Aslamazova AE. [Laser-induced damage to the cornea after YAG laser surgery of anterior segment structures]. Vestn Oftalmol. 2022;138(5. Vyp. 2):266-72. Russian.
4. Gamidov AA, Yusef YN, Medvedeva EP, Surnina ZV, Baum OI. [Comparative assessment of the state of the cornea after YAG-laser interventions on anterior segment structures]. Vestn Oftalmol. 2024;140(4):17-25. Russian.
5. Öztürk C, Cevher S, Duran M, Üçer MB, Töngüş O. Anterior segment changes following Nd: YAG laser posterior capsulotomy: a quantitative ultrasound biomicroscopy study. Lasers Med Sci. 2025;40(1):302.
6. Brézin AP, Labbe A, Schweitzer C, Lignereux F, Rozot P, Goguillot M, Bugnard F, Dot C. Incidence of Nd:YAG laser capsulotomy following cataract surgery: a population-based nation-wide study - FreYAG1 study. BMC Ophthalmol. 2023;23(1):417.
7. Borkenstein AF, Kormilina TK, Fitzek H, Rattenberger J, Kothleitner G, Charry FEM, et al. Incorrectly focused neodymium:yttrium–aluminum-garnet (nd:yag) laser beam leads to massive destructive effects in small-aperture (Pinhole) intraocular lenses. Ophthalmol Ther. 2024;13(10):2745–58.
8. Chang DST, Jiang Y, Kim JA, Huang S, Munoz B, Aung T, et al. Cataract progression after Nd:YAG laser iridotomy in primary angle-closure suspect eyes. Br J Ophthalmol. 2022;107(9):1264-8.
9. Borkenstein AF, Borkenstein EM. Neodymium-Doped Yttrium Aluminum Garnet (Nd:YAG) Laser-Induced Damage to Intraocular Lenses: A Systematic Review of Mechanisms, Clinical Consequences, and Preventive Strategies. Cureus. 2025 Aug 24;17(8):e90903.
10. Teshigawara T, Meguro A, Mizuki N. Nd:YAG Laser Accidentally Hitting the Corneal Layers During Treatment of Posterior Capsule Opacification After Cataract Surgery and Its Postoperative Process. Int Med Case Rep J. 2020;13:449-53.
11. Liu X, Yang J, Zhen Y, Zhai X, Zhang X, Xu Y, et al. Rapid contraction of the anterior capsule after phacoemulsification in uveitis: A case report. Medicine. 2025;104(28):e43129.