

Retrospective Analysis and Epidemiological Characterization of Uveitis Cases at A Reference Ophthalmology Hospital

Análise retrospectiva e caracterização epidemiológica dos casos de uveíte de um hospital referência em oftalmologia

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ABSTRACT

Objective: To retrospectively analyze the epidemiological profile of uveitis cases treated in 2024 at a reference Ophthalmology hospital.

Methods: This was a cross-sectional, observational, and retrospective study involving 398 patients attended at the uveitis outpatient clinic from January to December 2024. Sociodemographic characteristics, anatomical classification, etiology, and laterality were evaluated, with descriptive analysis of the data.

Results: Anterior uveitis predominated (43.8%), followed by posterior uveitis (32.2%), panuveitis (20.7%), and intermediate uveitis (3.3%). The majority of patients were female (54.5%), with a mean age of 44.6 years and unilateral involvement (76.1%). The primary etiologies included idiopathic/undetermined causes (39.4%), toxoplasmosis (28.1%), and syphilis (7.3%).

Conclusion: Idiopathic anterior uveitis represents the most common form, underscoring the need to enhance diagnostic protocols and foster interdisciplinary integration to support prevention, early diagnosis, and the formulation of public health policies in Ophthalmology.

RESUMO

Objetivo: Analisar retrospectivamente o perfil epidemiológico dos casos de uveíte atendidos em 2024 em um hospital de referência em Oftalmologia.

Métodos: Estudo transversal, observacional e retrospectivo, incluindo 398 pacientes atendidos no ambulatório de uveíte entre janeiro e dezembro de 2024. Foram avaliadas características sociodemográficas, classificação anatômica, etiologia e lateralidade, com análise descritiva dos dados.

Resultados: Observou-se predominância de uveíte anterior (43,8%), seguida de posterior (32,2%), panuveíte (20,7%) e intermediária (3,3%). A maioria dos pacientes era do sexo feminino (54,5%), com média de idade de 44,6 anos e acometimento unilateral (76,1%). As principais etiologias foram idiopáticas/indeterminadas (39,4%), toxoplasmose (28,1%) e sífilis (7,3%).

Conclusão: A uveíte anterior idiopática é a forma mais frequente, evidenciando a importância do aprimoramento dos protocolos diagnósticos e da integração interdisciplinar para prevenção, diagnóstico precoce e formulação de políticas públicas em Oftalmologia.

INTRODUCTION

Uveitis encompasses a heterogeneous group of intraocular inflammatory disorders frequently associated with substantial visual morbidity and significant functional impairment in individuals of working age.⁽¹⁻⁴⁾ International estimates indicate an annual incidence ranging from 20 to 50 cases per 100,000 inhabitants and a prevalence of 100 to 150 cases per 100,000 inhabitants, varying according to demographic, socioeconomic, and regional epidemiological factors.^(5,6) It remains one of the leading causes of preventable blindness in young adults, accounting for 5% to 20% of blindness cases in developed countries and up to 10% in developing nations, imposing a considerable burden on both affected individuals and healthcare systems.^(1,7,8)

The chronic and often recurrent nature of uveitis requires prolonged specialized follow-up, the use of immunosuppressive therapy, and vigilant monitoring for ophthalmic complications such as cataract, secondary glaucoma, and cystoid macular edema.^(6,9,10) The high treatment costs and the functional limitations resulting from visual impairment or blindness further aggravate the socioeconomic impact of the disease, affecting patients' quality of life and reducing productivity.^(8,10) Etiologically, uveitis may be associated with infectious diseases, systemic autoimmune conditions, or remain idiopathic or undetermined even after comprehensive clinical and laboratory investigation.^(3,4,11-14) Previous studies have shown that up to 40% of cases lack a defined etiology, particularly in settings with limited diagnostic resources.⁽¹⁵⁾

In the current epidemiological landscape, multiple studies have highlighted significant variations in the anatomical and etiological profiles of uveitis across countries, regions, and even among tertiary referral centers within the same locality.^(1,6,14,16-21) This heterogeneity, combined with the frequent complications caused by the disease and disparities in access to specialized care, underscores the importance of continuous epidemiological surveillance and local characterization of uveitis patterns. Such efforts are essential to guide healthcare planning, the development of therapeutic protocols, educational strategies, and future public health policies in ophthalmology.^(1,6,21,22) Early diagnosis, coupled with targeted and multidisciplinary management, plays a crucial role in preventing structural complications and ensuring visual rehabilitation.^(6,11)

Despite advances in imaging, laboratory diagnostics, and immunobiological therapies, up-to-date

epidemiological data remain scarce in several regions of Brazil. This highlights the need and relevance of studies that portray the epidemiological reality of uveitis in national tertiary referral centers and compare local findings with national and international data.^(1,6,14)

Accordingly, this study aimed to retrospectively analyze the epidemiological profile of uveitis cases treated in 2024 at a reference Ophthalmology hospital.

METHODS

This retrospective, observational, cross-sectional study was conducted at Hospital Regional de São José Dr. Homero de Miranda Gomes (HRSJ-HMG), a public tertiary referral center for ophthalmology located in São José, Santa Catarina, Brazil.

All patients evaluated at the Uveitis Clinic of HRSJ-HMG between January and December 2024 were included, provided that the diagnosis had been confirmed by an ophthalmologist and/or Ophthalmology resident. Data were retrospectively retrieved from electronic medical records using the MICROMED® system, ensuring confidentiality and anonymity of personal information. Each patient was considered only once in the study, regardless of the number of visits during the study period.

The sample comprised cases with sufficient clinical information for analysis, including sex, age, age group, place of residence, anatomical classification of uveitis (anterior, intermediate, posterior, or panuveitis), etiology, and laterality (unilateral or bilateral). Medical records lacking essential data, as well as cases of traumatic uveitis or inflammation related to the early postoperative period of intraocular surgery, were excluded in accordance with the criteria adopted in similar studies.^(1-3,16)

All patients underwent a detailed clinical history and comprehensive ophthalmic examination, including assessment of best-corrected visual acuity, ectoscopy, slit-lamp biomicroscopy of the anterior and posterior segments, intraocular pressure measurement using Goldmann applanation tonometry, and indirect ophthalmoscopy. Indirect ophthalmoscopy was performed under adequate pupillary dilation to minimize diagnostic interference from spill-over phenomena. Additional ocular and/or systemic ancillary tests were ordered according to the clinical course and diagnostic hypotheses of each case.

Uveitis classification followed the criteria established by the International Uveitis Study Group and adapted by the Standardization of Uveitis Nomenclature (SUN) Working Group. Active inflammation was defined by the

presence of anterior chamber cells and flare, keratic precipitates (KPs), hypopyon, iris nodules, anterior or posterior synechiae, vitreous cells, snowballs, snowbanks, or inflammatory retinal or choroidal lesions, vasculitis, and/or clinical symptoms such as ocular pain, redness, photophobia, decreased visual acuity, floaters, and ciliary or limbal hyperemia.

Data were entered and organized in Microsoft Excel® and subsequently analyzed using IBM SPSS Statistics®, version 20.0 (IBM Corp., Armonk, NY, USA). Qualitative variables were expressed as absolute and relative frequencies, whereas quantitative variables were presented as mean and standard deviation.

This study complied with the ethical principles outlined in Resolution No. 466/2012 of the Brazilian National Health Council, which encompass autonomy, beneficence, non-maleficence, justice, and equity. The research protocol was approved by the Institutional Review Board under protocol number 93414425.6.0000.0113.

RESULTS

A total of 642 patients were initially identified at the Uveitis Department of HRSJ-HMG, Santa Catarina, between January and December 2024. After applying the predefined exclusion criteria, 398 medical records met the eligibility requirements and were included in the analysis. Of these, 45.5% were male and 54.5% were female. Patient age ranged from 5 to 85 years, with a mean of 44.6 ± 18.0 years. Age distribution revealed that 6.8% were ≤ 16 years, 34.9% were between 17 and 40 years, and 58.3% were older than 40 years.

Regarding geographic distribution, 53.8% of patients resided in the Grande Florianópolis region, 14.8% in Southern Santa Catarina, 13.1% in the Vale do Itajaí, 8.3%

in Western Santa Catarina, 7.8% in the Northern region, and 2.3% in the Mountain region.

According to the anatomical classification, anterior uveitis was the most frequent subtype (43.8%), followed by posterior uveitis (32.2%), panuveitis (20.7%), and intermediate uveitis (3.3%). Anterior uveitis predominated among patients ≤ 16 years (40.7%) and ≥ 40 years (51.3%), whereas posterior uveitis was more common in the 17-40-year age group (41.0%). Concerning laterality, 76.1% of patients presented unilateral and 23.9% had bilateral involvement.

With respect to etiology, idiopathic or undetermined causes accounted for 39.4% of cases, followed by toxoplasmosis (28.1%), syphilis (7.3%), Behçet's disease (3.8%), ankylosing spondylitis (3.5%), and Vogt-Koyanagi-Harada (VKH) syndrome (3.5%). Other identified causes included herpes simplex virus (2.0%), herpes zoster virus (1.8%), psoriatic arthritis (1.5%), and rheumatoid arthritis (1.3%) (Figure 1).

Anterior uveitis

Among anterior uveitis cases, 65.5% occurred in female patients, with a mean age of 48.2 ± 18.3 years. Bilateral involvement was documented in 20.2% of cases. Idiopathic or undetermined causes were the most frequent (59.8%), followed by ankylosing spondylitis (8.0%), juvenile idiopathic arthritis (8.0%), Behçet's disease (4.0%), and herpes zoster (3.4%). Psoriatic arthritis, rheumatoid arthritis, herpes simplex, each accounted for 2.9% of cases, while syphilis represented 2.3% and sacroiliitis 1.7%.

Intermediate uveitis

Intermediate uveitis occurred predominantly in female patients (61.5%), with a mean age of 46.6 ± 20.3

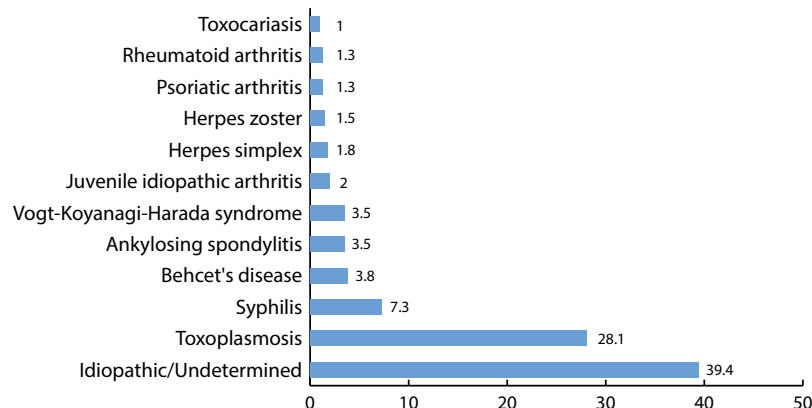


Figure 1. Etiology of the most common forms of uveitis.

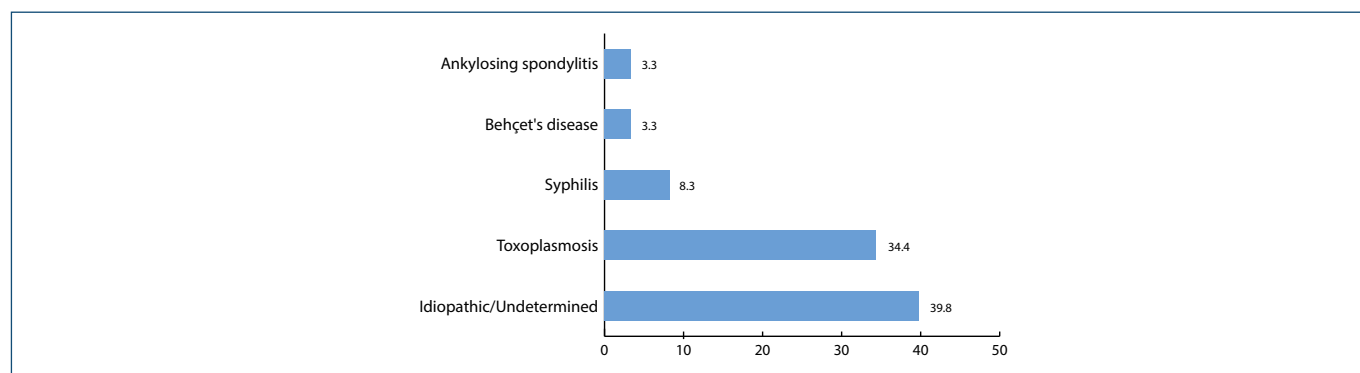


Figure 2. Etiology of the most common forms of uveitis in males.

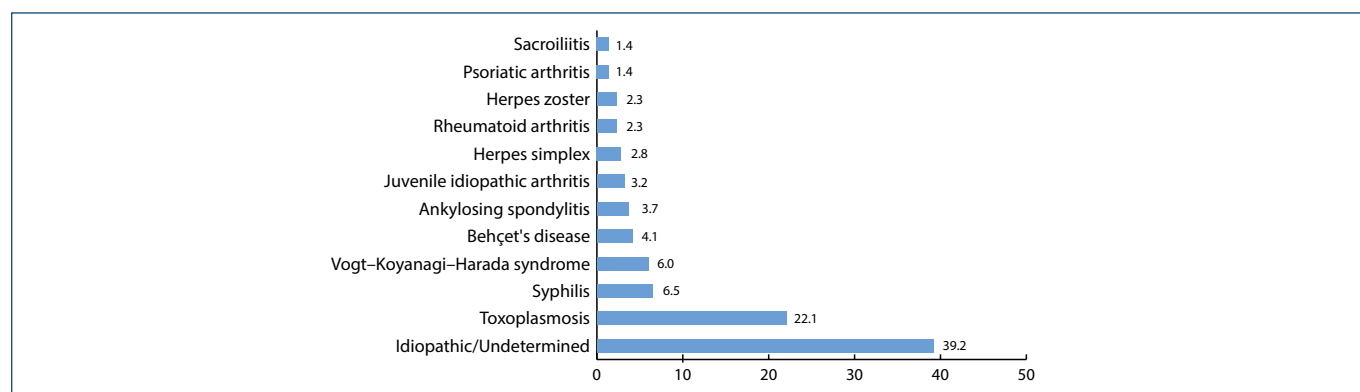


Figure 3. Etiology of the most common forms of uveitis in women.

years. Bilateral disease was observed in 38.5% of cases. Idiopathic or undetermined etiology predominated (76.9%), followed by toxocariasis, Behçet's disease, and syphilis, each representing 7.7% of cases.

Posterior uveitis

Posterior uveitis was slightly more common in males (53.1%), with a mean age of 41.2 ± 16.7 years. Bilateral involvement was identified in 9.4% of cases. Toxoplasmosis was by far the leading cause (87.5%), followed by idiopathic or undetermined etiologies (3.9%). Syphilis accounted for 2.3% of cases, while cytomegalovirus (CMV) retinitis represented 1.6%.

Panuveitis

Panuveitis accounted for 20.7% of all cases, with a mean patient age of 41.7 ± 17.9 years and a predominance of males (57.3%). Bilateral involvement was frequent, occurring in 51.2% of cases. The leading etiologies were idiopathic or undetermined (46.3%), syphilis (25.6%), VKH syndrome (11.0%), and Behçet's disease (4.9%). Toxocariasis, herpes simplex, and sarcoidosis accounted for 2.4% of cases each, whereas *Bartonella* infection, Fuchs heterochromic cyclitis, tuberculosis, and Wegener's granulomatosis represented 1.2% each.

Gender distribution

Among male patients, the mean age was 43.3 ± 17.1 years. Posterior uveitis was the most frequent anatomical subtype (37.8%), followed by anterior uveitis (33.1%) panuveitis (26.0%), and intermediate uveitis (2.8%). Bilateral involvement was documented in 18.2% of cases. The most common etiologies were idiopathic or undetermined (39.8%), toxoplasmosis (35.4%), syphilis (8.3%), Behçet's disease (3.3%), and ankylosing spondylitis (3.3%) (Figure 2).

Female group

In the female group (Figure 3), the mean age was 45.7 ± 18.7 years. Anterior uveitis was the most frequent subtype (52.5%), followed by posterior uveitis (27.6%), panuveitis (16.1%), and intermediate uveitis (3.7%). Bilateral involvement was observed in 28.7% of cases. The main etiologies were idiopathic or undetermined causes (39.2%), toxoplasmosis (22.1%), syphilis (6.5%), and VKH syndrome (6.0%).

Figures 4 to 6 present the etiological distribution of uveitis according to age group. Idiopathic or undetermined causes were more frequent among patients aged ≤ 16 years (40.7%) and >40 years (44.8%). In contrast, toxoplasmosis predominated among those aged 17-40 years, accounting for 35.3% of cases.

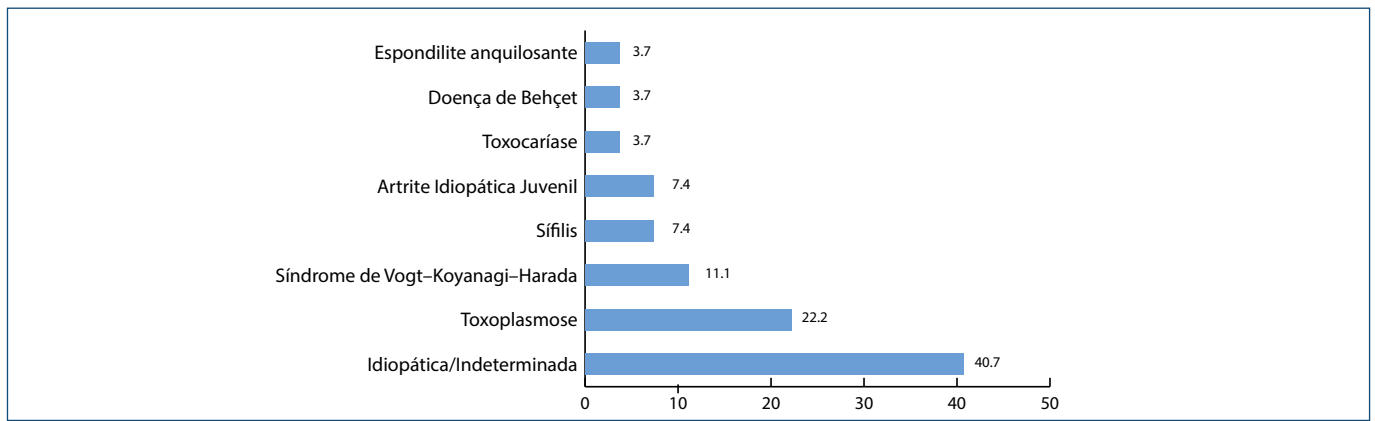


Figure 4. Etiology of uveitis in children under 16 years of age.

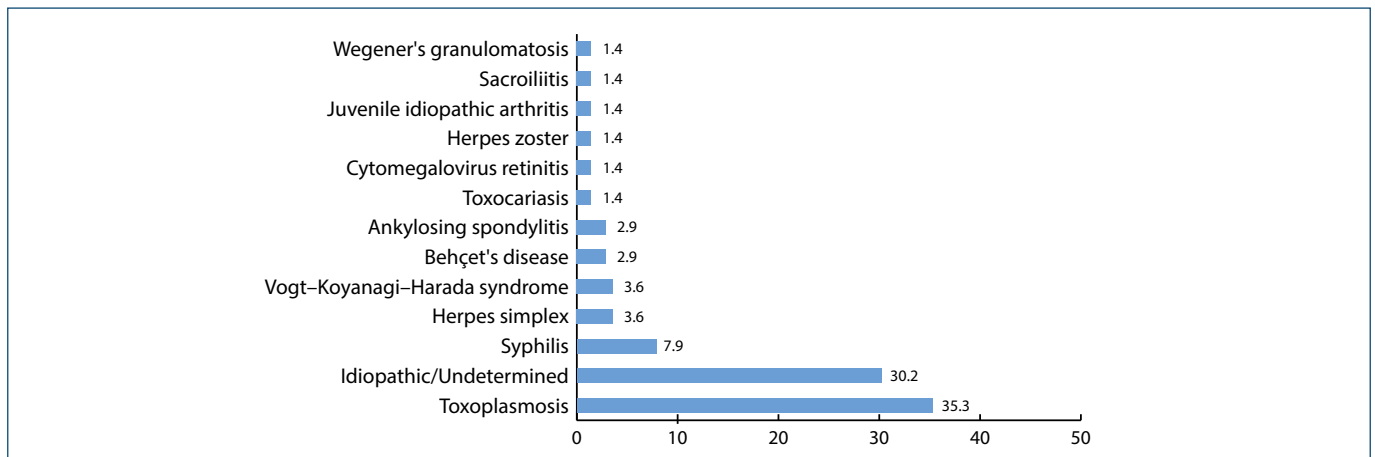


Figure 5. Etiology of uveitis in the 17-40 age group.

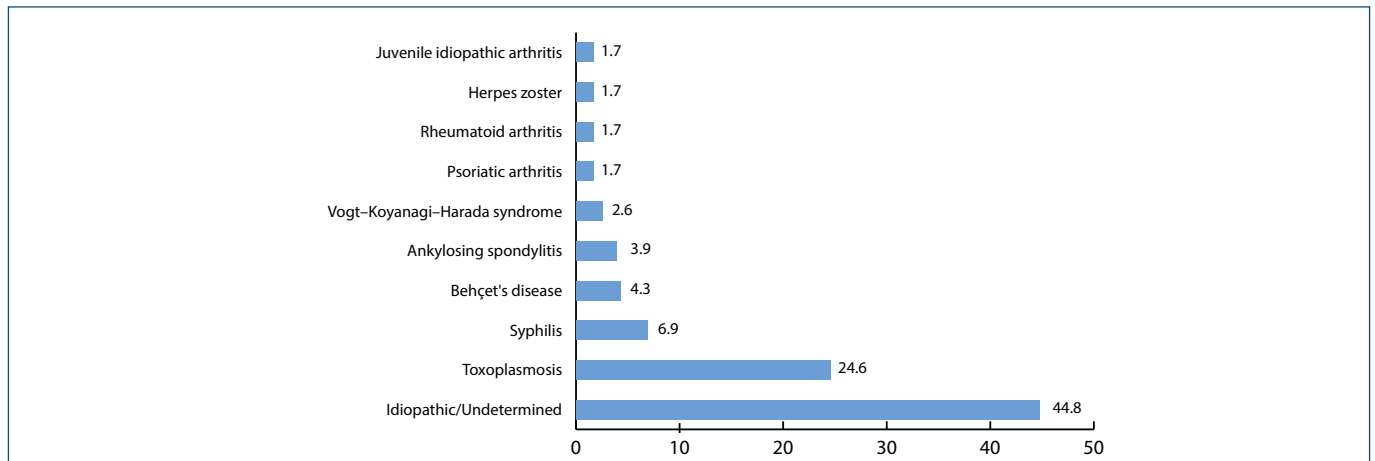


Figure 6. Etiology of uveitis in individuals over 40 years of age.

DISCUSSION

This study characterized the epidemiological profile of uveitis cases managed at a tertiary ophthalmology referral center in Santa Catarina throughout 2024, underscoring the diversity of clinical presentations and etiologies encountered. The findings reinforce well-established

national trends while revealing regional nuances that deserve particular attention.

Anterior uveitis was the most frequent subtype (43.8%), followed by posterior uveitis (32.2%), panuveitis (20.7%), and intermediate uveitis (3.3%). This distribution mirrors most national and international reports,

where anterior uveitis consistently predominates in tertiary centers.^(2,21) Although posterior and panuveitic forms are typically associated with more severe visual outcomes, anterior uveitis remains a major contributor to overall morbidity due to its recurrent nature and risk of chronic complications.

The mean patient age of 44.6 years and the slight female predominance (54.5%) are consistent with previous studies.^(2,15) Anterior uveitis was more common among children and adults over 40 years, whereas posterior uveitis predominated among younger adults aged 17 to 40 years – a pattern also observed by Teixeira et al.⁽¹⁵⁾ and Berkenstock et al.⁽¹⁴⁾

Etiological analysis revealed, once again, a high prevalence of idiopathic or undetermined causes,^(1,11,14,15,21) consistent with earlier reports and highlighting the persistent diagnostic challenges even within specialized settings. This underscores the importance of multidisciplinary and long-term follow-up, as a definitive diagnosis often emerges only after new systemic or ocular manifestations develop over time. Several authors have shown that ocular inflammation – such as uveitis and scleritis – may precede systemic inflammatory disease by months or years.⁽²²⁻²⁸⁾ Continuous, interdisciplinary monitoring is therefore essential for early diagnosis and optimized management. This scenario also emphasizes the need for updated diagnostic algorithms and the integration of novel technologies to enhance accuracy and expedite etiological clarification.

Among defined etiologies, toxoplasmosis (28.1%) remained the leading infectious cause, particularly within posterior uveitis (87.5%), reflecting the classical Brazilian and Latin American epidemiological profile.^(2,14,15,23) This finding highlights the urgent need for preventive measures and early detection strategies, given the high risk of irreversible visual sequelae in inadequately treated cases.⁽²³⁾ Syphilis accounted for 7.3% of all cases and for 25.6% of panuveitis, reaffirming the concerning reemergence of this infection and the importance of active screening in intraocular inflammation.^(20,24,25,29-31) The rising incidence observed in several centers across Brazil and worldwide may reflect both increased transmission in vulnerable populations and improved sensitivity of modern serological testing.⁽²⁵⁾

When stratified by sex, posterior uveitis was more frequent in men (37.8%), whereas anterior uveitis predominated among women (52.5%). These differences likely reflect a combination of biological and immunological factors, as well as sociocultural and epidemiological

influences that affect exposure to infectious agents and the prevalence of autoimmune disorders.^(13,17,31)

Idiopathic or undetermined etiologies were particularly common among anterior and intermediate uveitis (59.8% and 76.9%, respectively), once again illustrating the complexity of diagnostic assessment and the possible contribution of local or genetic factors to intraocular inflammation.^(11,22) Conversely, systemic autoimmune diseases such as ankylosing spondylitis and juvenile idiopathic arthritis remain important causes of anterior uveitis, in agreement with the literature.^(2,7)

Laterality distribution was also consistent with prior reports, with unilateral disease predominating overall (76.1%), except among panuveitis cases, where bilateral involvement was more frequent (51.2%). This finding underscores the potentially severe nature of panuveitis and the importance of prompt, multidisciplinary intervention.^(18,27,32)

The main limitations of this study include its retrospective design, reliance on the accuracy of medical record documentation, and potential selection bias inherent to tertiary centers, which tend to receive more complex and refractory cases. Nonetheless, the robust sample size and detailed analysis of clinical and demographic variables provide meaningful insight into both regional and national patterns of uveitis. Future multicenter studies encompassing different healthcare settings would enable broader comparison and support the development of more comprehensive public health strategies.

In summary, this study reaffirms the heterogeneous clinical and etiological spectrum of uveitis in Brazil, highlighting the predominance of idiopathic or undetermined anterior uveitis, followed by infectious posterior and panuveitic forms. Understanding these patterns is crucial for guiding etiological investigation, therapeutic decision-making, and epidemiological surveillance—reinforcing the pivotal role of coordinated collaboration among ophthalmologists, infectious disease specialists, rheumatologists, and primary care providers in reducing visual morbidity and improving patients' quality of life.

AUTHORS' CONTRIBUTION

Amaral MLC contributed to the conception and design of the study, the analysis and interpretation of the results, and the drafting and critical revision of the manuscript'. Gameiro Filho AR contributed to the analysis and interpretation of the data, as well as the drafting and critical revision of the manuscript. Novello MB and Nunes BP contributed to the critical revision of the manuscript. All

authors approved the final version of the manuscript and are responsible for all aspects of it, including ensuring its accuracy and integrity.

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