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Case Report

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Gonococcal Conjunctivitis: Molecular Diagnosis and Systemic Management in an Adult

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Abstract

Introduction: Gonococcal conjunctivitis is an acute ocular infection caused by *Neisseria gonorrhoeae*, typically transmitted sexually. Although more frequent in neonates, it can affect adults through autoinoculation or direct contact with infected secretions. Early diagnosis is crucial to prevent severe complications, such as corneal perforation and vision loss.

Case presentation: We present the clinical case of a 21-year-old male patient who sought consultation for bilateral ciliary and conjunctival hyperemia and yellowish purulent discharge, showing no improvement after five days of empirical treatment with tobramycin eye drops every four hours. Due to the persistence of symptoms, cultures and PCR were performed, confirming infection by *Neisseria gonorrhoeae*.

Management: Treatment was initiated with a single 1000 mg dose of intravenous ceftriaxone and topical norfloxacin every four hours for 10 days, achieving complete resolution of symptoms and negative follow-up cultures.

Conclusion: Although rare in adults, gonococcal conjunctivitis demands high clinical suspicion when empirical treatment fails. The use of molecular detection techniques allows for rapid diagnostic confirmation, with systemic management serving as the fundamental pillar to prevent permanent visual sequelae and ensure therapeutic success.

Keywords: Gonococcal conjunctivitis; *Neisseria gonorrhoeae*; Ocular infection; STI; Antibiotic treatment

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Introduction

Gonococcal conjunctivitis is an aggressive bacterial infection of the conjunctiva caused by *Neisseria gonorrhoeae*, a Gram-negative sexually transmitted bacterium. In adults, the infection typically results from direct contact with infected genital secretions, accidentally transmitted to the eye [1].

This disease is characterized by hyperacute purulent conjunctivitis, presenting with profuse discharge, ocular pain and eyelid edema. In the absence of prompt and appropriate intervention, it carries a significant risk of rapid progression to keratitis and corneal perforation within as little as 24-48 hours [2-4]. The incidence of gonococcal conjunctivitis in adults is rare, estimated at 0.19 cases per 1,000 patients in ophthalmic emergencies [1]. Its potential severity demands early diagnosis and empirical treatment with systemic ceftriaxone, complemented by topical antibiotics and strict hygiene measures [3-5]. Furthermore, co-infection with *Chlamydia trachomatis* must be considered in all cases [6,7].

Owing to the inherent fragility of *N. gonorrhoeae* under environmental fluctuations, its survival outside the human host is limited, thereby minimizing the risk of transmission *via* contaminated surfaces or objects. In contrast, direct contact with infected secretions markedly increases the likelihood of infection [8-11].

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Under this premise of ophthalmic urgency, the present report describes the management of a patient whose resistance to conventional treatment with tobramycin highlights a critical clinical challenge. The objective is to document how early diagnostic suspicion and PCR confirmation allow for a timely transition to targeted therapy for *N. gonorrhoeae* ocular infection, ensuring complete resolution of the condition and preservation of visual function in a young adult.

Case Presentation

A 21-year-old male patient, with a history of good health and no relevant ocular history, presented to the ophthalmology clinic at the Centro Médico Familiar (CEMEFA) in Saltos del Guairá, Canindeyú Department, Paraguay, in 2023. The clinical condition had a five-day evolution, characterized by bilateral ciliary and conjunctival hyperemia, photophobia, tearing and profuse yellowish-green purulent discharge. The patient had previously received treatment with tobramycin eye drops every 4hrs, without clinical improvement.

Biomicroscopy evaluation revealed chemosis, enlargement and engorgement of the superior and inferior tarsal conjunctival papillae, intense hyperemia and mucopurulent discharge. No corneal ulcers were evidenced.

Due to the lack of response to the initial treatment, samples were obtained for culture and antibiotic susceptibility testing (antibiogram), as well as PCR testing for *Neisseria gonorrhoeae* and *Chlamydia trachomatis*.

The PCR result was positive for *N. gonorrhoeae* and negative for *C. trachomatis* **(Figure 1)**. The inclusion of the test results is conducted in compliance with ethical research and confidentiality principles, as the patient provided informed consent for the publication of the PCR test results **(Figure 2)**.

The **Figure 3** is a reference image illustrating the characteristic clinical appearance of gonococcal conjunctivitis in its acute phase [12]. Characteristic clinical signs such as eyelid edema, periocular erythema and profuse purulent discharge are observed.

ORIGEN: CMF - LABORATORIO CEMEFA (SALTO DEL GUAIRA)
Nº ORDEN: anonymized
PACIENTE: **Anonimyzed**
FECHA: 30/01/24
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PAGINA: 1 de 1

	Resultado	Intervalo de Referencia
INFECCIONES DE TRANSMISION SEXUAL, DETECCION (PCR)		
Muestra:		
Método: Real Time PCR		
Material:		
DETECCION DE CHLAMYDIA TRACHOMATIS:	**No se detecta presencia de ADN de Chlamydia trachomatis en la muestra analizada.**	
DETECCION DE MYCOPLASMA HOMINIS:	**No se detecta presencia de ADN de Mycoplasma hominis en la muestra analizada.**	
DETECCION DE MYCOPLASMA GENITALIUM	**No se detecta presencia de ADN de Mycoplasma genitalium en la muestra analizada.**	
DETECCION DE NEISSERIA GONORRHOEAE	**Se detecta presencia de ADN de Neisseria gonorrhoeae en la muestra analizada.**	
DETECCION DE UREAPLASMA UREALYTICUM:	**No se detecta presencia de ADN de Ureaplasma urealyticum en la muestra analizada.**	
OBSERVACIONES:	**TIPO DE MUESTRA: SECRECIÓN OCULAR**	

* Muestra remitida al Laboratorio

Fin del Informe

Impreso 31/01/2024 17:41 - Envío Automático COR

Puede verificar la autenticidad del resultado a través del siguiente QR

anonimyzed

Un diagnóstico clínico definitivo no debe estar basado solamente en los resultados laboratoriales. Lease el punto (.) como decimal.

SANNIE GARCIA VILLAMAYOR
Bioquímica
Reg. Prof. Nº 4.114

Figure 1: PCR test result. Positive for *Neisseria gonorrhoeae*.

ACUERDO DE CONSENTIMIENTO

Fecha:_____/_____/___

Yo,_____, identificado con CI nº _____, declaro que he revisado cuidadosamente la información proporcionada. He tenido la oportunidad de formular preguntas, las cuales han sido respondidas de manera satisfactoria.

En este acto, otorgo mi **consentimiento voluntario** para la utilización y publicación de los datos de mi caso clínico (incluyendo resultados de PCR) con fines científicos, aceptando las condiciones de anonimato descritas.

Confirmo haber recibido una copia firmada de este formato de consentimiento informado.

Firma del Paciente o Representante Legal

_____

Firma del Investigador Principal

_____

Figure 2: Model of the informed consent form, in Spanish (the patient's native language), to be signed by the participant and the principal investigator responsible for the clinical diagnosis.

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Figure 3: Representative image of a patient with profuse mucopurulent secretions due to gonococcal conjunctivitis.

Intravenous ceftriaxone was administered as a single 1000 mg dose, supplemented with norfloxacin eye drops every 4 hours for a period of 10 days. Forty-eight hours after initiating treatment, a notable improvement in the inflammatory condition was observed, with the progressive disappearance of discharge and restoration of visual acuity. Upon completion of treatment, the culture result was negative and the patient was discharged without sequelae.

Discussion

Gonococcal conjunctivitis in adults is a rare disease, yet it is characterized by rapid progression and a high risk of severe complications. A defining feature is the particular virulence of *Neisseria gonorrhoeae*, which releases proteases that allow it to penetrate intact corneal epithelium [6]. The incubation period ranges from 3-19 days, manifesting as conjunctival hyperemia, profuse purulent discharge, chemosis and eyelid edema. Due to its potentially fulminant course, an immediate presumptive diagnosis is required to prevent irreversible corneal damage [13,14].

In adults, this is a Sexually Transmitted Disease (STD) primarily transmitted through direct or manual contact of the conjunctiva with infected urine or genital secretions, rather than *via* hematogenous spread. In populations with low socioeconomic status, transmission may be associated with inadequate hygienic conditions, being more frequent in patients from rural areas [3,13].

A seasonal pattern has been documented, with a higher incidence of this disease during warm months [2,11]. This seasonality might reflect an interaction between environmental and behavioral factors: High temperatures and humidity could prolong the viability of the bacteria on fomites, while increased social interaction may favor autoinoculation, justifying further complementary studies. The present case supports this trend, as it occurred in January, a month characterized by high temperatures in Paraguay.

In cases of hyperacute conjunctivitis that do not respond to conventional antibiotics, this etiology should be suspected, especially if genitourinary symptoms coexist [1,15]. Definitive diagnosis is based on Gram Staining, culture on Thayer-Martin medium and PCR, the latter establishing itself as an indispensable tool due to its speed and precision [3,6,16]. In this case, early diagnosis *via* PCR was decisive in initiating targeted treatment with intravenous ceftriaxone, avoiding serious ocular complications and achieving complete clinical resolution.

The management of gonococcal conjunctivitis has evolved significantly. While aqueous penicillin, procaine penicillin, ampicillin, cephalosporins and oral norfloxacin were historically used, bacterial resistance has modified these guidelines [1-5]. Currently, the standard treatment for adults generally consists of a single-dose injection of ceftriaxone, a single dose of oral azithromycin or oral doxycycline administered for one week [5-10]. Recommended therapy includes systemic ceftriaxone (1 g IM or IV, single dose) associated with topical antibiotics; in cases of co-infection, concomitant treatment for *Chlamydia trachomatis* is indicated. In patients allergic to penicillin or with specific contraindications for tetracyclines, spectinomycin and erythromycin may be used, respectively [1]. It is noteworthy that topical treatment alone is ineffective for eradicating the infection [17,18].

The use of ceftriaxone, whether as monotherapy or in combination with other antibiotics such as azithromycin, levofloxacin and doxycycline for the treatment of gonococcal conjunctivitis has proven widely effective and has been successfully employed in various regions worldwide [8,10,18-25].

Early detection and sexual health education are fundamental preventive pillars [5-15]. Key strategies for sexual education and post-diagnosis management are summarized in **Table 1**.

Table 1: Preventive measures and clinical guidelines following a *Neisseria gonorrhoeae* infection diagnosis.

Sexual education	Clinical management post-diagnosis
Emphasize the correct and consistent use of condoms (male and female) to prevent gonorrhea transmission	Abstain from sexual intercourse until 7 days after the patient and their partners have completed treatment and symptoms have resolved
Promote frequent handwashing and avoid touching the eyes to prevent spread, especially if there is contact with exudates	In case of infection, implement contact isolation for 24 hours and administer topical ocular treatment

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Educate on the importance of informing and treating all recent sexual partners (within the past 60 days) to interrupt the chain of transmission	Systemic antibiotic treatment. Use of ceftriaxone (1 g IM or IV) as the gold standard to eliminate the bacteria
Educate on abstinence or waiting to have sexual intercourse until gonorrhea treatment is completed and both partners are symptom-free	Regarding treatment for high-risk infants or those showing clinical signs of infection, a physician may prescribe a single-dose injection of cefotaxime or ceftriaxone and hourly irrigation with saline solution
Inform that gonorrhea can cause conjunctivitis in adults and that a lack of sexual education increases the risk of STIs	Perform complete serological testing for other STIs and consider empirical treatment for *Chlamydia trachomatis* according to local guidelines
In the prevention of ophthalmia neonatorum (gonococcal conjunctivitis in newborns), apply ocular prophylaxis (erythromycin/tetracycline ointments) at birth, although this does not prevent *Chlamydia*	Close monitoring of corneal integrity

Conclusion

From a clinical perspective, the gonococcal conjunctivitis in adults must be considered in any patient presenting with hyperacute purulent conjunctivitis resistant to conventional treatment. Early diagnosis *via* PCR and the timely initiation of systemic antibiotic therapy are fundamental to preventing severe corneal complications and preserving vision, given that *Neisseria gonorrhoeae* possesses proteolytic enzymes capable of causing corneal perforation and blindness within a short period. In the case presented, the patient showed a favorable clinical evolution following treatment with systemic ceftriaxone associated with topical norfloxacin. An interdisciplinary approach, along with comprehensive sexual health education strategies, is crucial for reducing both the incidence and transmission of this condition.

Conflict of Interest

The authors declare no conflicts of interest in relation to this case report.

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