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RED EYE SYNDROME: CLINICAL ASPECTS AND DIFFERENTIAL DIAGNOSIS

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Abstract: Introduction: Red eye is a clinical manifestation that can list a series of differential diagnoses. This clinical sign represents one of the most frequent complaints in ophthalmology emergencies and is relatively recurrent in outpatient clinics of internal medicine and family health. Despite so many possibilities, most of the diseases that occur with red eye have a self-limited natural history and a benign prognosis. On the other hand, a small portion can be associated with systemic diseases and, regardless or not, signify serious eye disease. Therefore, the current study aims to compend the clinical aspects and differential diagnoses of this syndrome that can impact the patient's life through a more accurate initial diagnosis. **Methodology: This is a narrative review in which** Scielo, PubMed, Lilacs, UpToDate and Google Scholar databases were used to obtain articles. The selection of articles did not use explicit and systematic criteria for the search and critical analysis of the literature, especially due to the lack of description of the topic. **Results:** Among the main ophthalmological diseases that occur with red eye syndrome, conjunctivitis (infectious and non-infectious), acute anterior uveitis, acute glaucoma, corneal ulcer, corneal foreign body, subconjunctival hemorrhage and others stand out. Therefore, the main differences between these diagnoses were discussed. **Conclusions:** The manifestation of red eye can represent a number of differential diagnoses, ranging from systemic diseases to ophthalmological conditions with a poor prognosis if left untreated. In the SUS, access to the ophthalmology service is hampered by poor accessibility, especially in poorer regions. In this sense, it is essential that the general practitioner be able to identify clinical and differential aspects in the first approach, mainly to institute early treatment and make a timely referral, when necessary.

Keywords: Red Eye. Differential diagnoses. Clinical condition.

INTRODUCTION

Red eye is a clinical manifestation that can list a series of differential diagnoses. In a syndromic context, it may be associated with fever, prostration, lymphadenomegaly, eye pain, reduced visual acuity, diffuse or localized hyperemia, ocular discharge, among others.

This clinical sign represents one of the most frequent complaints in ophthalmology emergencies and is relatively recurrent in outpatient clinics of internal medicine and family health. Its etiology is diverse and may even be multifactorial, related to traumatic causes or not. Despite so many possibilities, most of the diseases that occur with red eye have a self-limited natural history and a benign prognosis. On the other hand, a small portion can be associated with systemic diseases and, regardless or not, signify serious eye disease. Among the main ophthalmological diseases that occur with red eye syndrome, conjunctivitis (infectious and non-infectious), acute anterior uveitis, acute glaucoma, corneal ulcer, corneal foreign body, subconjunctival hemorrhage and others stand out.

In the context of the Unified Health System, care by specialists is usually difficult, especially in ophthalmology and in areas with less participation by the Government. According to a survey carried out by Datafolha and commissioned by the Federal Council of Medicine (CFM), there is an estimate of 6 months to 2 years for care related to ophthalmological evaluation in the SUS. Another CFM survey points out that, among the greatest demands for elective surgeries in the SUS, is cataract – a disease responsible for 51% of cases of blindness in the world. In scenarios like this, the promotion of quality health carried out by primary care must be insightful. This is a fundamental role in the reception and screening of different patients, whose manifestation of red eye must have an accurate differential diagnosis with proper referral if necessary.

Therefore, the current study aims to compend the clinical aspects and differential diagnoses of this syndrome that can impact the patient's life through a more accurate initial diagnosis.

METHODOLOGY

This is a narrative review that aims to establish clinical aspects and differential diagnoses of Red Eye Syndrome. Scielo, PubMed, Lilacs, UpToDate and Google Scholar databases were used to obtain articles. The keywords were defined by the Health Sciences Descriptors (DeCS) in "Red Eye", "Differential diagnosis" and "Clinical picture". The selection of articles did not use explicit and systematic criteria for the search and critical analysis of the literature, especially due to the lack of description of the topic. However, articles whose approach did not contribute to the research objectives were excluded. On the other hand, there was no exclusion of material based on original language criteria or year of publication.

RESULTS

EYE ATTACHMENTS

1. Blepharitis

It is an eyelid inflammation, acute or chronic, usually associated with conjunctival inflammation (red eye). It can be caused by various infectious agents, allergic changes or dermatological diseases. When the cause is a bacterial infection, the main germs are staph.

Among the differential aspects, inflammation, peeling of the eyelid margin, protruding sebaceous glands and eyelid discomfort stand out (figures 1 and 2).

Treatment includes cleaning the eyelids with appropriate soap, eye ointments, topical

steroids, and tear film substitutes if associated with dry eye.

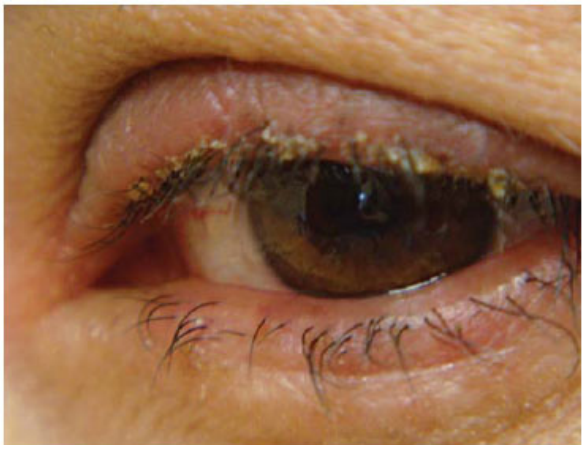


Figure 1. Blepharitis with the presence of meliceric crusts attached to the eyelashes and trichomegaly.

Source: Brazilian Annals of Dermatology, 2010.

Staphylococcal anterior blepharitis.

Source: Andrea Peltier.

2. Acute dacryocystitis

It is an inflammation of the lacrimal sac, usually associated with obstruction of the lacrimal-nasal duct. It evolves with hyperemia, pain, swelling, erythema, in addition to mucopurulent secretion under pressure on the lacrimal sac (figure 3).

Treatment requires the use of antibiotics, topical or systemic non-steroidal anti-inflammatory drugs, warm compresses and local massage. Recurrence cases must be referred to surgery.

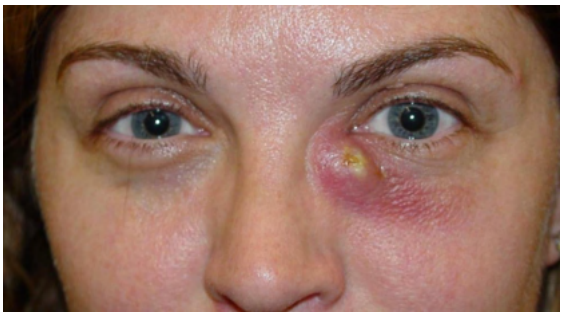


Figure 3. Abscess that formed and ruptured through the skin, creating a fistula.

Source: Dr. James Garrity.

3. Preseptal or orbital cellulitis

It represents an infection of soft tissues related to preseptal tissues or posterior to the orbital septum. This condition is serious and must be promptly referred. In the second case, there is even greater concern about complications that can lead to greater morbidity and mortality, such as subperiosteal abscess, brain abscess, cavernous sinus thrombophlebitis and loss of visual acuity.

In preseptal cellulitis, eyelid edema, pain in the eye area and unilateral erythema are expected in most cases (figure 4).

Figure 4. Preseptal cellulitis.

Source: Kanski: Clinical Ophthalmology, 8th ed. P. 158.

In the orbit, there is also eyelid edema, but with deeper eye pain, ophthalmoparesis with diplopia, pain associated with eye movement, chemosis, ocular proptosis and low visual acuity, in addition to general symptoms in both cases – fever, prostration, inappetence (figure 5).

Figure 5. Post-septal cellulitis. note dystopia and ocular chemosis associated with intra-conal involvement on tomography.

Source: Kanski: Clinical Ophthalmology, 8th ed. P. 160.

The treatment is carried out through antibiotic therapy, requiring hospitalization and performing high-complexity tests in most cases.

4. Hordeolum/Chalazion

It manifests as inflammation of the sebaceous glands of the eyelid caused by some canalicular obstruction (figure 6). It resembles blepharitis, but forms a well-delimited nodular lesion in the eyelid region and is more common in adolescents.

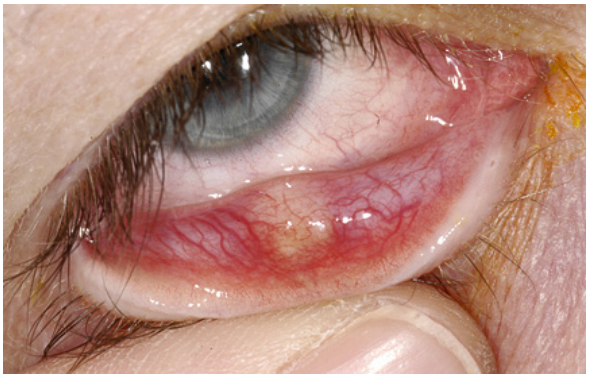


Figure 6. Hordeolum in the lower eyelid.

Source: Ghost and Ghost (2020).

The treatment is similar to that of blepharitis, and there may be a need for referral for evaluation with a specialist and/or a surgical approach in recurrent and chronic cases.

CONJUNCTIVA

1. Acute conjunctivitis

Conjunctivitis is inflammation of the conjunctiva and represents the main cause of red eye that requires medical treatment.

The clinical picture is characterized by discharge (86%), red eye or conjunctival hyperemia (61%), tearing (45%), ocular itching (44%), burning (40%), photophobia (22%), eye pain and eyelid edema (15%), conjunctival edema (6%), low visual acuity (5%) and preauricular ganglion infarction (1%), ocular foreign body sensation and visual blurring, which improves with blinking.

It can have an acute (< 4 months) or chronic (> 4 months) duration and an infectious or non-infectious etiology (allergic, toxic, irritative).

Bacterial conjunctivitis is mainly caused by staphylococci and usually manifests bilaterally with a vague sensation of a foreign body (like sand), mucopurulent secretions, and diffuse conjunctival hyperemia (figure 7). Diagnosis in most cases is clinical and treatment consists of topical use of broad-spectrum antimicrobials, usually with a third- or fourth-generation quinolone, applied four times a day for 7 to 10 days. Refer in the absence of improvement, neonates and hyperacute onset with excessively profuse secretion and pre -auricular adenopathy.

Figure 7. Red eye with accumulation of palpebral purulent secretion.

Source: Bruno Vieira, 2023.

Viral conjunctivitis is mainly caused by adenovirus and usually presents with conjunctival hyperemia, eyelid edema, lymphadenopathy pre -auricular, watery or mucoid secretion, foreign body sensation, photophobia and discrete visual blurring (figure 8). It can be associated with a previous respiratory infection or after exposure to a person with flu-like symptoms. Treatment is symptomatic as it is a self-limiting viral disease. Cold compresses and lubricants can help. Refer to the risk of reaching the cornea and causing other complications.

Figure 8. Appearance of a red eye caused by the dilatation of blood vessels in the conjunctiva.

Source: Emergency Department of Hospital São Geraldo/HC-UFMG.

Allergic conjunctivitis manifests in patients with a history of atopy, usually from contact with animals or insect bites, and has the same clinical spectrum as other conjunctivitis. The secretion is usually viscous, but the main differential occurs through intense itching and papillae in the tarsal conjunctiva (figure 9). Treatment consists of removing the allergenic factor. Topical and systemic antihistamines can be used to reduce pruritus, as well as non-steroidal anti-inflammatory drugs. Refer in cases of absence of improvement.

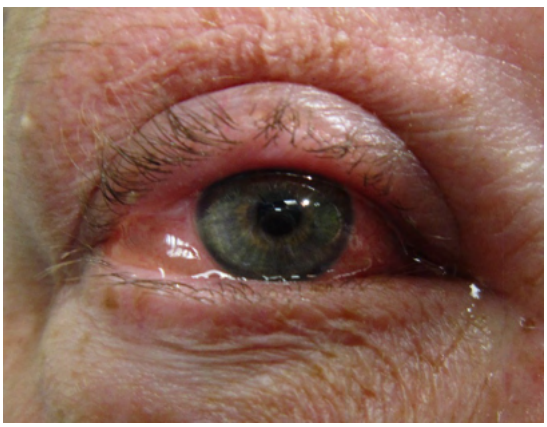


Figure 9. Red eye with watery discharge.

Source: Bruno Vieira, 2023.

2. Subconjunctival hemorrhage

Subconjunctival blood collection secondary to vessel rupture. It manifests as bright hyperemia, towel-like hemorrhage, and absence of secretion or pain (figure 10). Visual acuity is usually maintained.

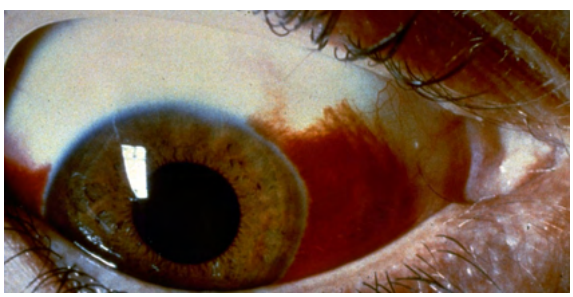


Figure 10. Subconjunctival towelette hemorrhage.

Source: https://www.aao.org/biography/eac93724-3619-4834-8f38-50520c476300, 2022.

The main etiology is idiopathic, but it is also related to hypertensive states, trauma,

use of anticoagulants or antiplatelet agents, coagulopathies, sudden physical exertion, among others.

Therefore, there is no need for specific therapy. It can be lubricated in case of discomfort or eye irritation. Hemorrhage resorption occurs spontaneously in about 2 weeks.

3. Pinguecula

It is an elastic degeneration of the conjunctiva adjacent to the limbus, but not reaching the cornea (figure 11).

Figure 11. Conjunctival nodulation without extension to the cornea.

Source: Dr. P. Marazzi.

It is usually asymptomatic and does not need specific treatment. When inflamed, it can manifest with hyperemia, foreign body sensation and excessive tearing, with lubrication and topical non-steroidal anti-inflammatory drugs as a symptomatic option.

Therefore, cases in which eye inflammation/irritation that is not relieved with medical treatment, change in visual acuity or aesthetic need must be referred.

CORNEA

1. Pterygeus

It is a triangle-shaped fibrovascular proliferation that extends from the interpalpebral conjunctiva to the cornea (figure 12). It presents the same segment of the pinguecula described above.

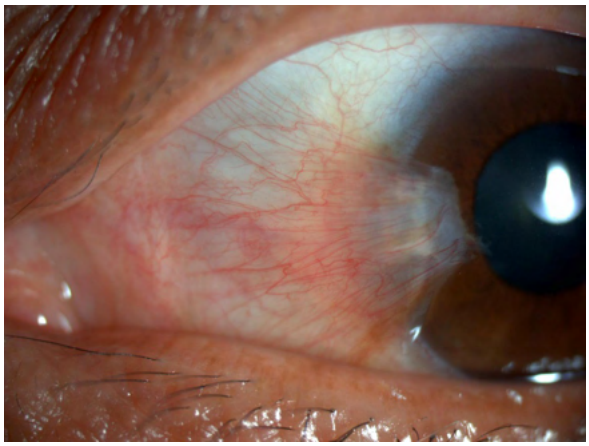


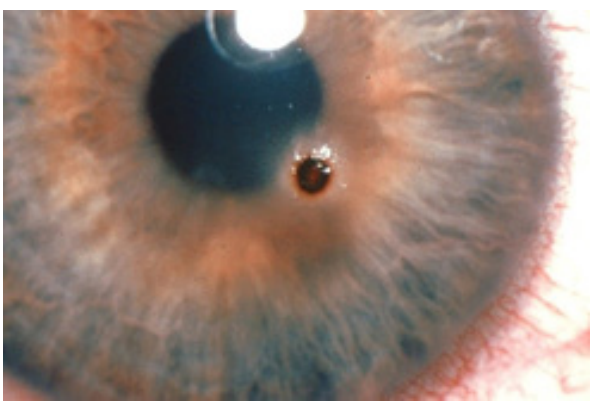
Figure 12. Benign conjunctival lesion extending to the cornea.

Source: Paul Whitten.

2. Strange body

Manifests pain, photophobia and foreign body sensation. It can be identified upon inspection (figure 13 and 14). In some cases, it evolves with reduced visual acuity.

The patient must be instructed not to rub the eyes. For surface foreign bodies, irrigation or removal can be done with a damp cotton swab or a small needle. Deeper cases need evaluation and treatment with an ophthalmologist. Forward, therefore, in a failed removal attempt and in case of a central rust ring.



Source 13. Corneal foreign body.

Source: SanarMed, 2021.

Figure 14. Subtarsal foreign body.

Source: SanarMed 2021.

3. Ulcer

Corneal injury that reaches the stroma. They manifest corneal opacity, ciliary hyperemia, eye pain, photophobia, tearing, foreign body sensation, reduced visual acuity and blurred vision. Patients must be referred for evaluation by an ophthalmologist, especially contact lens wearers.

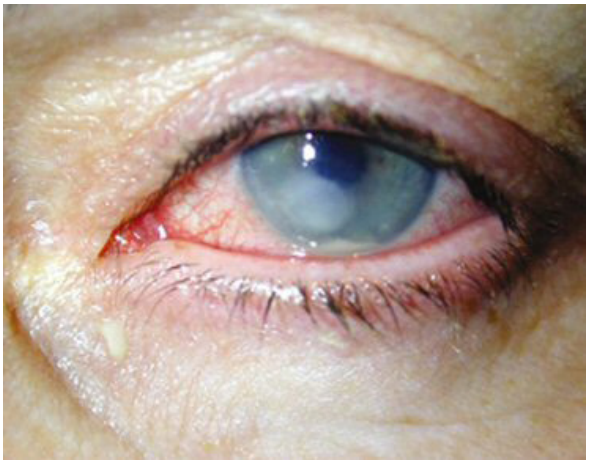


Figure 15. Corneal ulcer.

Source: About corneal ulcer.

MISCELLANY

1. Episcleritis

Inflammatory process of the episclera of idiopathic, autoimmune or infectious origin. It manifests as sectoral or diffuse hyperemia, ocular discomfort and absence of exudate (figure 16). It can be treated with eye lubricant and oral anti-inflammatories. Refer in refractory cases or evolution to scleritis.

Figure 16. Nodular anterior scleritis.

Source: Arquivos Brasileiros de Oftalmologia, 2002.

2. Uveitis

It is characterized by inflammation of the iris, ciliary body and/or choroidal process, usually affecting young people. It is classified anatomically (anterior, intermediate, posterior, panuveitis), clinical (acute, recurrent or chronic) and etiological (infectious or non-infectious autoimmune, neoplastic or idiopathic). The main cause is idiopathic.

Symptoms include pain, photophobia and blurring of vision in the affected eye (figure 17). Assessment of the pupillary reflex may be useful in differentiating from acute glaucoma, whereas in iritis the pupil is usually miotic, in glaucoma it is fixed and dilated or in half mydriasis. Conjunctivitis does not affect the pupillary reflex.

Treatment consists of the use of mydriatics to prevent the formation of posterior synechiae and the use of topical steroids. Always reference.

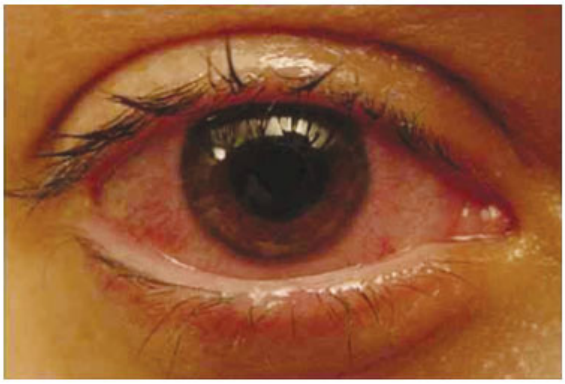


Figure 17. Anterior uveitis in a patient with ankylosing spondylitis.

Source: Brazilian Journal of Rheumatology, 2012.

3. Acute glaucoma

It is defined as an increase in intraocular pressure, associated with two other symptoms: funduscopic (pathological excavation of the optic nerve) and campimetric (visual field) changes.

The crisis is usually of rapid onset, with severe pain, hyperemia, marked reduction of visual acuity in the affected eye, nausea and vomiting. On physical examination, it is clear that the affected eye is more tense than the contralateral eye and the pupil is dilated and unresponsive to light (figure 18).

Always reference. Pharmacological treatment is done with drugs that act to reduce aqueous humor secretion, such as β-blockers, α-2 agonists and carbonic anhydrase inhibitors. When these drugs are not available, the use of hyperosmotic agents, such as mannitol and glycerol, which have the ability to drain the aqueous humor, is initiated.

4. Endophthalmitis

Intraocular infection usually caused by penetrating eye trauma or previous surgical approach. It manifests as severe pain and reduced visual acuity (figure 19). It is a medical emergency because the prognosis of vision is directly related to the time between onset and treatment.

Initial treatment is with broad-spectrum intravitreal antibiotics, most commonly vancomycin and ceftazidime. Patients with endogenous endophthalmitis must receive both intravitreal and intravenous antimicrobials. Therapy is modified based on culture and sensitivity results. In severe cases, possible vitrectomy and intraocular corticosteroids.

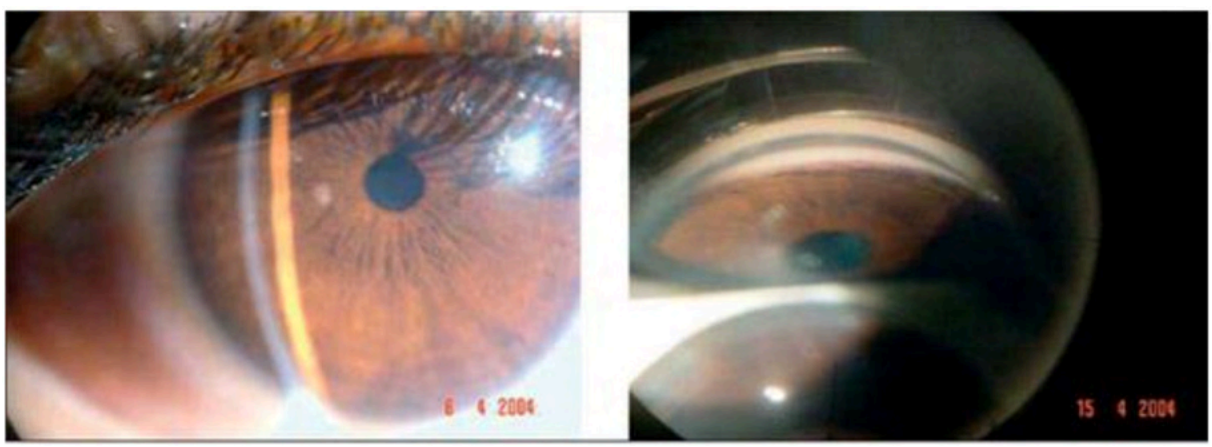


Figure 18. Deeper anterior chamber in left image, after topiramate discontinuation. Right goniophotography showing open angle and pigmentation in the trabecular meshwork after resolution of the clinical picture.

Source: Arquivos Brasileiros de Oftalmologia, 2007.

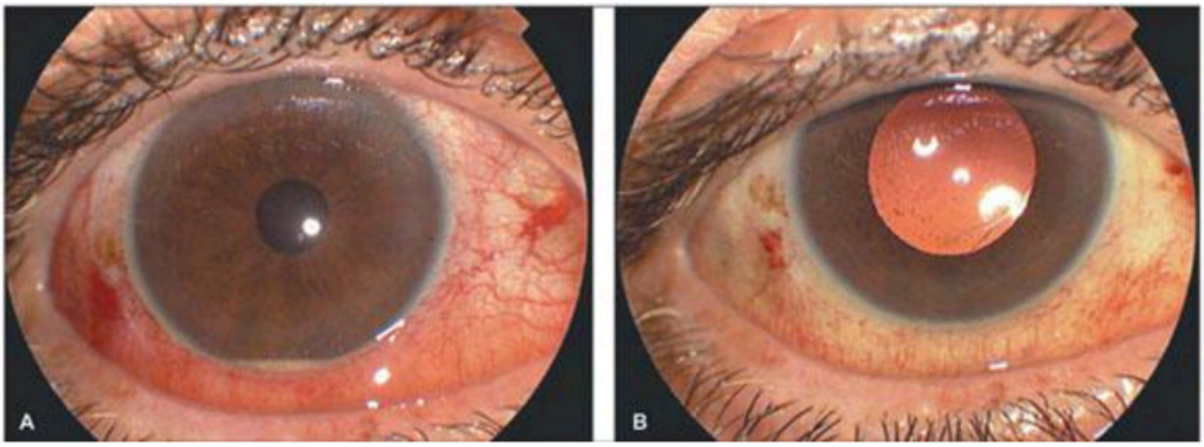


Figure 19. Moderate hyperemia, chemosis, small subconjunctival hemorrhage temporally in the bulbar conjunctiva and small hypopyon on the left image. On the right, clinical appearance of the same eye after the start of treatment, showing mild bulbar hyperemia, reduction of the inflammatory process and absence of hypopyon.

Source: Arquivos Brasileiros de Oftalmologia, 2006.

Diagnostics	Differential clinical aspects
blepharitis	Inflammation, peeling of the eyelid edge, protruding sebaceous glands and eyelid discomfort.
acute dacryocystitis	Hyperemia, pain, swelling, erythema, in addition to mucopurulent secretion under pressure on the lacrimal sac.
Preseptal or orbital cellulitis	Pre -septal: eyelid edema, eye pain and erythema, unilateral. Orbital: eyelid swelling but with deeper eye pain, ophthalmoparesis with diplopia, pain associated with eye movement, chemosis, ocular proptosis, and poor visual acuity.
Hord /Chalazion	It resembles blepharitis, but forms a well-delimited nodular lesion in the eyelid region.
acute conjunctivitis	Secretion (86%), red eye or conjunctival hyperemia (61%), tearing (45%), eye itching (44%), burning (40%), photophobia (22%), eye pain and eyelid swelling (15%), conjunctival edema (6%), low visual acuity (5%) and preauricular ganglion infarction (1%), ocular foreign body sensation and visual blurring, which improves with blinking.
subconjunctival hemorrhage	Bright hyperemia, towel-like hemorrhage and absence of discharge or pain.
pinguecula	Usually asymptomatic. When inflamed, it can manifest with hyperemia, foreign body sensation and excessive tearing.
pterygeus	It presents the same segment of the pinguecula described above, but with extension to the cornea.
Strange body	Can be identified to inspection.
Ulcer	Corneal opacity, ciliary hyperemia, eye pain, photophobia, tearing, foreign body sensation, reduced visual acuity, and blurred vision.
episcleritis	Sectoral or diffuse hyperemia, ocular discomfort and absence of exudate.
uveitis	Symptoms include pain, photophobia and blurring of vision in the affected eye. Assessment of the pupillary reflex may be useful in differentiating from acute glaucoma, whereas in iritis the pupil is usually miotic, in glaucoma it is fixed and dilated or in half mydriasis. Conjunctivitis does not affect the pupillary reflex.
acute glaucoma	Fundoscopy (pathological excavation of the optic nerve) and campimetric (visual field) alterations. On physical examination, the affected eye is clearly more tense than the contralateral eye and the pupil is dilated and unresponsive to light.
endophthalmitis	It presents with intense pain and reduced visual acuity with a history of trauma or previous surgical approach, usually.

Table 1. Differential clinical aspects of Red Eye Syndrome.

CONCLUSIONS

The manifestation of red eye can represent a number of differential diagnoses, ranging from systemic diseases to ophthalmological conditions with a poor prognosis if left untreated. In the SUS, access to the ophthalmology service is hampered by poor accessibility, especially in poorer regions. In this sense, it is essential that the general practitioner is able to identify clinical and differential aspects (Table 1) in the first approach, mainly to institute early treatment and make a timely referral, when necessary.

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