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Review Article

The Red Eye—More Than Meets the Eye

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ABSTRACT

The red eye is one of the most common eye presentations to health care centres. The red-eye can be divided into painless and painful. The painless red eye includes bacterial, viral, allergic conjunctivitis, dry eyes, episcleritis and subconjunctival haemorrhage. Meanwhile, the painful red eye can be more challenging, as some involve ophthalmic emergencies which are acute angle-closure attack, acute anterior uveitis, scleritis, orbital cellulitis, severe keratitis and severe thyroid eye disease (TED). Some red eye cases are simple and can be managed as an outpatient. Unresolved and complicated red-eye cases require ophthalmologist referral and further investigations on time. Painful red eye may be more than meets the eye, requiring referral to the ophthalmologists.

Key Words: Painful, Painless, Red eye, Systematic Approach, Emergency

INTRODUCTION

The red-eye is one of the most common eye presentations to the general practitioners (GPs) and polyclinics, and occasionally to the Accident and Emergency (A&E) department. However, some red-eye symptom requires urgent treatment and further investigations, depending on the presenting history. Hence, history taking in such cases are of paramount importance. Sometimes the red-eye may just be the tip of the iceberg, associated with more sinister systemic conditions.[1,2]

In this Continuing Medical Education (CME) article, we shall be emphasizing on the more important and common diseases not to be missed as well as its management. It is envisaged that after reading this article, the audience will be more confident in managing common red-eye cases, knowing and identifying the ocular emergencies that require urgent referrals to the ophthalmologists. Some red eye may have underlying associated systemic problems which demand further investigations and possibly joint management with the relevant specialties.[3-5]

The Red Eye

The red eye can be broadly divided into painless and painful/uncomfortable (**Figure 1**). Painless is generally less worrying compared to painful red eye. Hence, the history taking is very important in the management of the red eye. We need to ascertain if the pain is sharp or dull. Sharp pain is suggestive of pathologies affecting the eye surface whereas dull pain advocates pathologies deeper in the eye. Next, we need to ask the patient for any history of blurry vision, the colour and texture of the eye discharge (if any), the onset and duration. The contact lens wear, systemic conditions like hypertension, diabetes, flu, autoimmune diseases, and also personal history such as smoking, occupation and patients' environment are crucial.[2-5] The common differentials diagnosis for painless red eye includes bacterial, viral, allergic conjunctivitis, dry eyes, episcleritis and subconjunctival haemorrhage.

The approach to the painful red eye can be more challenging, as some involve ophthalmic emergencies. The ophthalmic emergencies that should not be missed include acute angle-closure attack (previously known as acute angle-closure glaucoma), acute anterior uveitis (iritis), scleritis, orbital cellulitis, severe keratitis and severe thyroid eye disease (TED). For acute angle-closure attack, it is usually sudden, dull painful red eye, accompanied with headaches, nausea and occasional vomiting, blurry vision and seeing haloes of light through the affected eye. Clinically, observation can reveal hazy cornea and mid-dilated oval-shaped pupil that poorly

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responsive to light.[2-7] The risk factors include being hypermetropia and Asian origin. This case would require urgent management.

The ocular pain for acute anterior uveitis (AAU) is also dull, blurry vision, photophobia and may occasionally be accompanied by headaches. Clinically, the cornea is usually clear and the pupils usually maintain its shape. Although most cases of AAU are idiopathic, a systemic history is important, as AAU can be associated with autoimmune diseases like the vasculitides, HLA B-27 arthropathies and inflammatory bowel diseases.[2,4,5] Scleritis can be extreme pain and the patient usually does not get a good night's sleep. Other symptoms include blurry vision and headache. Clinically the sclera will be reddish injected. In severe cases, the scleral may even melt and thin out, exposing the deeper darker uveal tissue structure.

Severe keratitis or commonly known as corneal ulcer usually presents with sharp pain. The sharp pain of keratitis indicates that the more superficial structures of the eye are involved. Poor hygiene of contact lens wear contributed to keratitis.[11] The pain score can usually act as a guide to indicate the severity of the condition. An exception is applied in contact lens wear-related acanthamoeba keratitis. The symptom can be more severe than the clinical signs would suggest. On inspection, the cornea may have ulcerated with white infiltrates and the vision is usually reduced, especially when the keratitis involved the visual axis. A history of eye trauma or contact lens wear may be implicated in such cases. Orbital cellulitis is a medical emergency which should not be missed, as this can be potentially fatal. Fortunately, it is not common, but should always be in the differentials of patients presenting with dull painful red eye, pyrexic, generally unwell, limitation of eye movement, blurry vision, diplopia and proptosis, which is usually unilateral. Systemic history may include sinusitis. Such cases must be referred urgently to the nearest A&E department in a hospital with support from the Ophthalmologists and Ear, Nose & Throat (ENT) specialists.[7]

Severe thyroid eye disease may also present with a dull painful red eye, limitation of eye movement, proptosis, reduced vision, colour desaturation and diplopia. Unlike orbital cellulitis, TED is usually bilateral, although may not be symmetrically affected.

Pitfalls to avoid for Red Eye

There are cases which may initially look simple but sometimes this not prove to be the case and would require further clinical considerations. One such case is the prolonged red-eye with purulent discharge. The initial clinical picture would be that of bacterial conjunctivitis, which usually runs its course over 1-3 weeks depending on severity. If such cases are prolonged beyond the usually expected sequelae, the diagnosis will need to be revised. Another possible diagnosis to be considered is chlamydia conjunctivitis, with pre-auricular lymphadenopathy.[9,10] Another such case is the prolonged or recurrent red-eye with discomfort and no discharge. The initial clinical picture would be dry eyes. However, a prolonged case with this clinical picture should have clinical diagnosis reconsidered. The differential diagnosis includes mild TED, which will require initial appropriate investigations.[1] The rarer but life-threatening condition which needs to be kept in mind is sebaceous cell carcinoma, highly malignant, most commonly occurring in the eyelids. A biopsy by the ophthalmologist of the affected eyelid will confirm the diagnosis and prompt referral to the oncology team will be required.[2]

Management of Red Eye

In this section, we shall discuss the management of the common red eye conditions. We will also briefly mention the management of ocular emergencies. The readers should be aware of the management so that better advice during counselling can be given to the patient about their future care under the ophthalmologists.

Management of the painless red eye

Bacterial and viral conjunctivitis

Bacterial and viral conjunctivitis are contagious cases which can be managed as out-patient. Patient education on the eyelid and personal hygiene are of great importance to reduce the risk of spread to others. Patients can be advised that usually, such conjunctivitis cases will run their course over 1-3 weeks depending on severity. Bacterial conjunctivitis can be treated with ocular topical antibiotics like Chloramphenicol or more potent bactericidal antibiotics like the fluoroquinolones, examples including Levofloxacin and Moxifloxacin. These antibiotic drops can expedite recovery. The management of viral conjunctivitis consists of eyelid hygiene as the mainstay of management, as there are currently no effective medications for this condition. Chlamydial conjunctivitis can be treated with ocular topical antibiotics such as fluoroquinolones, but due to other concurrent systemic involvement, a referral to the relevant specialist (sexually transmitted disease) for systemic management and contact tracing is necessary.[2,5,10]

Dry eye

Dry eyes can be conveniently managed as out-patient with eye lubricants. Unfortunately, some patients are allergic to certain preservatives and that preservatives can in the long-term cause ocular surface damage and hence the preservative-free is preferred.[11,12] There are many different types of eye lubricants in the market, some are for milder and others for more severe dry eyes. Carbomer, methylcellulose

and hypromellose compounds of varying concentrations are examples of eye lubricants. For very severe dry eyes, eye ointment, an example of which is the simple eye ointment that consists of paraffin and lanolin compounds can be considered, as it is thicker and last longer to lubricate the eyes. Mild TED can also be treated with eye lubricants as above, with the addition of selenium supplement which also helps in disease control.

Subconjunctival haemorrhage

A subconjunctival haemorrhage is due to burst small blood vessels at the subconjunctival level. It is like a bruise which is painless and will go away within days to weeks depending on the extent of the haemorrhage. The patient can be advised and reassured accordingly. This can happen spontaneously, or from trauma (like rubbing the eyes), or to those patients on blood-thinning agents. However, this can also be associated with hypertension and diabetes. Therefore, it is a good practice to check the blood pressure and glucose level in patients with subconjunctival haemorrhage.

Management of the painful red eye

Acute angle-closure attack

In the management of the painful red eye, the clinician will need to consider whether it is an emergency case. The acute angle-closure attack is an ocular emergency which requires ophthalmologists referral promptly. In the area with the logistic problem, for damage control, the clinician can give intravenous (IV) or oral Acetazolamide 500mg stat to reduce the eye pressure. While waiting for transfer, ocular topical medications namely topical steroids and anti-glaucoma eye drops should be started. Before giving Acetazolamide, the clinician needs to ensure that the patient is not allergic to Sulphur based compounds and no major blood disorder like Thalassemia. An alternative to Acetazolamide is Mannitol 20% at a dose of 1-2 g/kg administered intravenously over 30 minutes. The definitive treatment for such cases is the laser peripheral iridotomy, carried out by the ophthalmologist (Figure 1). Some cases require more extensive surgery involving cataract removal and trabeculectomy.[2,5,8]

Orbital cellulitis and severe thyroid eye disease

In cases of orbital cellulitis and severe thyroid eye disease, it is mandatory to refer urgently to the Accident and Emergency, A&E in centres supported by ophthalmologists and Otorhinolaryngologists. In both cases, visual acuity and relative afferent pupillary defect (RAPD) tested using the swinging light test need to be documented as the baseline. Orbital cellulitis patients can expect a CT scan of the orbits and brain to rule out subperiosteal abscess –which requires surgical drainage involving the ENT surgeons, admission and IV antibiotics.[6] Severe TED cases will require admission under the care of the ophthalmologists, orbital scan, preferably MRI to better assess the severity, with the mainstay of treatment is systemic (IV) corticosteroids. Failure to respond may require surgical orbital decompression. In all cases of TED, cessation of smoking in those who smoke is crucial as it will help with the disease control.[1]

Acute anterior uveitis, scleritis and ulcerative keratitis

Other cases in this category requiring referral to the ophthalmologists would include acute anterior uveitis, AAU, scleritis and ulcerative keratitis. The management of AAU include ocular topical steroids to reduce inflammation and cyclopentolate 1%, a pupil dilator to reduce eye discomfort and photophobia. Patients should also be advised that further investigations needed to rule out systemic associations.[2,4] Scleritis management revolves around immunosuppression to control the inflammation, with systemic corticosteroids being the mainstay, and other steroid-sparing agents like mycophenolate mofetil, azathioprine.[3] Patient with this may also require systemic workup. Ulcerative keratitis is another condition requiring urgent ophthalmology referral, as it is another potential sight-threatening condition involving ulceration and thinning of the cornea, with inflammation or infection. The usual cause is microbial and the ophthalmologists will initiate topical antibiotics administered frequently and monitor progress daily initially.[7-9]

Other

The less urgent painful red eye like corneal abrasion can be managed by the clinician as out-patient. Such cases usually present with a recent history of sharp eye pain with redness and epiphora (watery eyes) following rubbing of eyes or minor injuries. This can be treated with antibiotic eye ointment such as chloramphenicol, with preservative-free eye lubricant.[10-12]

CONCLUSION

The red-eye is one of the most common eye presentations to the GPs and polyclinics. Some red eye cases are simple and can be managed by the GPs. While others, especially the painful ones may be more than meets the eye, requiring referral to the ophthalmologists for further management and systemic investigations. Therefore, it is hoped that this article will reinforce and update existing knowledge and increase the reader confidence in managing common simple red eye cases. Unresolved and complicated red eye cases require ophthalmologist referral and further investigations in a timely manner.

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Siew Leng Ting: Contributed to the conception and design of the manuscript, revised critically content of the manuscript

REFERENCES

1. Bartalena L, Baldeschi L, Dickinson AJ, Eckstein A, Kendall-Taylor P, Marcocci C, et al. Consensus statement of the European Group on Graves' orbitopathy (EUGOGO) on the management of Graves' orbitopathy. Thyroid 2008;18(3):333-346.
2. Denniston A, Murray P, editors. Oxford handbook of ophthalmology. OUP Oxford; 2014 Oct 23.
3. Harthan JS, Opitz DL, Fromstein SR, Morettin CE. Diagnosis and treatment of anterior uveitis: optometric management. Clin. Optom. 2016;8:23.
4. Jones NP. Immunosuppression in the Management of Presumed Non-infective Uveitis; Are We Sure What We are Treating? Notes on the Antimicrobial Properties of the Systemic Immunosuppressants. Ocular immu Inflamm 2020;28(6):994-1003.
5. Kanski JJ, Bowling B. Kanski's clinical ophthalmology e-book: a systematic approach. Elsevier Health Sciences; 2015 Mar 24.
6. Kyari F. Emergency management: orbital cellulitis. Community Eye Health 2018;31(103):60.
7. Lim LT, Miller D, Ah-Kee EY, Ferguson A. Preseptal Cellulitis Or Orbital Cellulitis? West Indian Med J 2015;65(1):304-307.
8. Lusthaus J, Goldberg I. Current management of glaucoma. Med J Australia 2019;210(4):180-187.
9. Nasser L, Rozycka M, Rendon GG, Navas A. Real-life results of switching from preserved to preservative-free artificial tears containing hyaluronate in patients with dry eye disease. Clin Ophth (Auckland, NZ) 2018;12:1519.
10. Yang EB, Oetting TA. Adult Chlamydial Conjunctivitis. EyeRounds.org: Adult-Chlamydial-Conjunctivitis-Red-Eyes-Chronic (uiowa.edu) Accessed October 30, 2020.
11. Aldebasi Y. Assessment of knowledge and compliance regarding contact lens wear and care among female college students in Saudi Arabia. Int J Curr Res Rev 2012;4: 162-169.
12. Dubey G, Prabhu AV, Khan T, Pant K, Ragni K, Mahesh C. Role of Polyunsaturated Fatty Acid Derivative Flaxseeds in the treatment of dry eyes- An overview. Int J Curr Res Rev 2020;12:35-40.

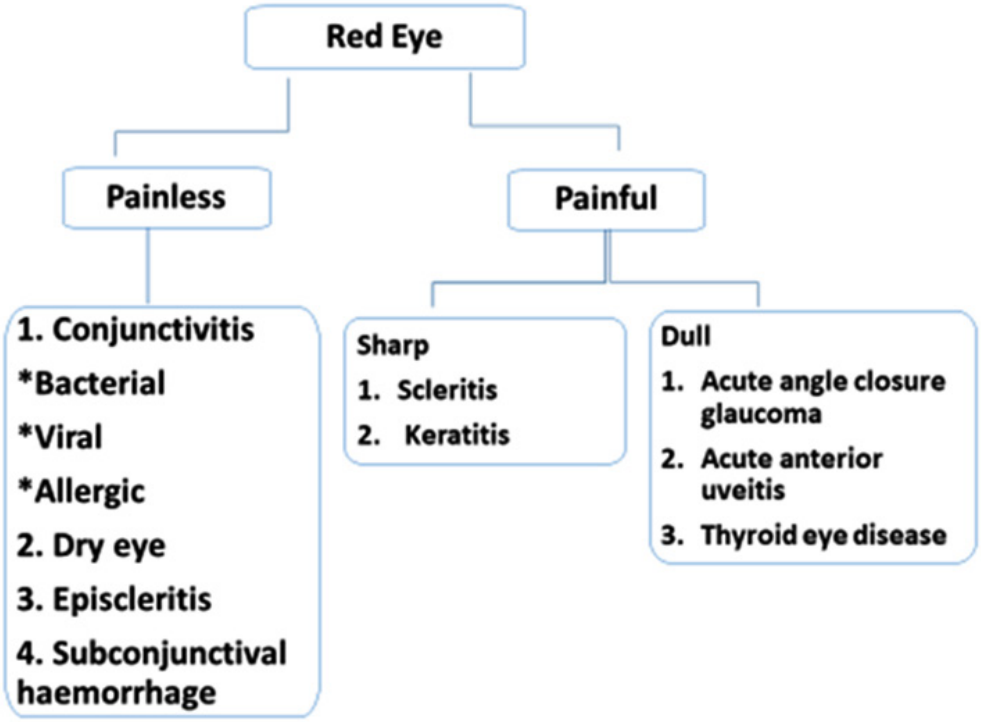

Figure 1: Differential diagnosis of red eye.