Original Article

Red Eye Diagnosis and Management in Primary Health Care

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Abstract

Background: Red eye is one of the most important topics in medical practice. It is frequently encountered in primary health care and emergency departments. It is usually marked by an ocular inflammation. It is often considered as benign but the condition entails a vast array of differential diagnoses with some being considered as medical emergencies and so require urgent action. **Objectives:** In this paper, we will review the studies relevant to diagnoses, differential diagnosis, clinical features, and management of diseases that may cause red eye presentation. **Methodology:** PubMed database was used for articles selection using the keywords Red Eyes, and Evaluation. **Conclusion:** Family physicians need to have basic understanding of the management of the main diagnoses behind red eye. They also should know when to refer the patients to a higher center. Early diagnosing and recognition of the disease is important for early intervention or quick referral to an ophthalmologist. It can be even sight saving in a lot of patients. Further studies into the management of more common diseases such as conjunctivitis with larger sample studies and longer follow up duration can help in the future.

Keywords: red eye, evaluation, management

Introduction

Red eye is one of the most important topics in medical practice because it is frequently encountered in primary health care and emergency departments. It is marked by an ocular inflammation. Although it is labeled as benign most of the times, the physician should be aware that the condition entails a vast array of differential diagnoses with some being considered as medical emergencies and so require urgent action. Generally, presentation includes discharge, redness, pain and photophobia and different visual changes. The most common cause of red eye is conjunctivitis. Although there are some differences between the viral and bacterial causes, broad spectrum antibiotics are often given despite the absence of a specific test that can differentiate between both. A proper history and thorough examination are needed in order to differentiate among the different causes and etiologies to treat accordingly. In this paper, we will review the studies relevant to diagnoses, differential diagnosis, clinical features, and management of diseases that may cause red eye presentation.

Methodology

PubMed database was used for articles selection using the keywords Eye, Evaluation, Management, and Primary Health Care. With regard to the inclusion criteria, the articles were selected based on the relevance to the project which should include one of the following topics; Red Eye evaluation, Red Eye management and diagnosis. Exclusion criteria were all other articles which did not have one of these topics as their primary endpoint, or repeated studies, and systematic reviews or meta-analyses.

Discussion

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A complaint of red eye could be interpreted in different ways and only a combination of excellent history taking and diligent physical examination could point out the correct diagnosis. Therefore, it is of importance for physicians to be familiar with red eye differential spectrum in order to avoid any unnecessary delay in evaluation and subsequent management. Autoimmune and rheumatologic conditions are known risk factors for developing red eyes such as anterior uveitis, episcleritis, and scleritis [1]. Contact lenses are pretty popular and users are susceptible to an infected keratitis [2]. The most common accompanied symptom of red eye is eye pain. These often present in an acute fashion and should alert the physician towards the possibility of an underlying emergency that requires urgent referral to an appropriate center.

Conjunctivitis

Conjunctivitis is defined simply as an inflammation or swelling of the conjunctiva. It is considered as one the most commonly encountered conditions among primary health physicians. Numerous causes can lead to conjunctivitis; however, it can be sorted into two broad categories: infectious and noninfectious. Noninfectious causes include blepharitis, foreign body, corneal abrasions, chemical burns and subconjunctival hemorrhage. On the other hand, infectious causes are mainly divided into viral and bacterial. Allergic conjunctival inflammation is commonly seen in patients with atopy. The presenting itchiness, diffuse erythema, lacrimation and the bilateral involvement should point into this diagnosis. Another clue to this diagnosis is the finding of papillae under the upper eyelid, which can become large and cobblestone-like especially in severe cases. Adenovirus is recognized as the most common causing agent in cases of viral conjunctivitis. Adenoviral conjunctivitis is considered highly contagious but its symptoms are mild in intensity. The symptoms include redness, tearing, discharge (watery in form) and blurry vision. It is often associated with upper respiratory tract infection. Therefore, the systemic findings that can be found in such cases are pharyngitis, fever or headache. The condition is self-limiting with a duration of around 2 weeks.

Regarding bacterial conjunctivitis, it has some other features that distinguish it from the viral cause. It is mostly unilateral with a greater amount of discharge. Moreover, the discharge is copious in amount, purulent in form and associated with lid swelling and severe pain. All of these features can help the physician in distinguishing it from the viral counterpart. The physician must be alert in cases of suspicion of Neisseria infection. This should prompt urgent referral because of the nature of the condition that leads to corneal ulceration and subsequently vision loss. A classic presentation can include discomfort, blurred vision and waking up with sticky eyelids [3].

Subconjunctival Hemorrhage

Conjunctival blood vessel can sometimes rupture leading to the appearance of a red patch. Except for its appearance, no other symptoms accompany the condition and the pain is experienced when there is corneal involvement or a foreign body. This condition is diagnosed clinically and in cases of cornea injury, blunt trauma, or persistent pain, referral is the optimal choice [3].

Episcleritis

When the episclera's outer layers get inflamed, it is known as episcleritis. It is a self-limiting condition and takes around 2-3 weeks to resolve [3]. It presents with an isolated patch of ocular injection and mild watering with or without mild pain. The diagnosis is made upon clinical grounds.

In episcleritis, the inflammation may cause mild pain in chronic and nodular forms. Therefore, pain does not necessarily mean an acute problem [1].

Regarding anterior scleritis, the patient may have pain that radiates to the face. On fluoresce, it may show peripheral keratitis especially with the necrotizing form of anterior scleritis [1]. To differentiate between episcleritis and scleritis, the patient should be observed under phenylephrine. Under phenylephrine, the conjunctival and episcleral vessels fade but the scleral vessels does not. If eye redness improves after phenylephrine instillation, it is a characteristic finding of episcleritis and the diagnosis can be made [1].

Uveitis

Uveitis is defined as an inflammation of the uveal tract. It can be divided into anterior and posterior uveitis. Anterior uveitis has an acute onset and it is mostly idiopathic in etiology. The patient usually presents with redness, photophobia and eye pain. Consensual photophobia is a key feature of the disease. The etiology behind anterior uveitis is usually idiopathic. Nevertheless, there are multiple conditions that can cause this inflammation, such as spondyloarthropathies, syphilis, tuberculosis, Lyme disease, toxoplasmosis, and herpesviruses. Some drugs also can lead to anterior uveitis, for example rifabutin, cidofovir, sulphas, and moxifloxacin [4]. Systemic involvement should prompt the physician into considering that a systemic disease might be the culprit behind the uveitis and so systemic workup is recommended. Conjunctival injection, corneal deposits and floaters are different signs which can be apparent upon examination [3]. Therefore, the family physician should train on eye examination techniques and master their skills with instruments such as the slit lamp [5]. The slit-lamp is necessary especially in cases where there are cells and flare within the anterior chamber, this should lead the physician to suspect inflammatory conditions such as an anterior iritis or an infected keratitis [2].

Acute Angle-Closure Glaucoma (AAGC)

AAGC is considered as a medical emergency and it is crucial for the health practitioner to be able to recognize the condition and refer the patient immediately. The presentation consists of unilateral eye pain, headache, nausea and vomiting. Such presentation should be suspected as AAGC until proven otherwise. Upon examination, conjunctival injection, a mid-dilated pupil and a cloudy cornea are common [3]. Furthermore, AAGC cases are reactive to phenylephrine and

the condition may be worsened if the patient receives phenylephrine [6]. Thus, it is necessary to avoid such a complication by accurately measuring the intraocular pressure before giving the patient any phenylephrine. AAGC is more common in older females of Asian descent. High risk group also includes patients with shallow anterior chamber, or hypertropia, and patients on certain drugs such as topiramate or sulfa [6].

Table 1. Comparison of Common Red Eye Diseases

Diagnosis	Pain	Photophobia	Topical anesthesia	Phenylephrine	Visual acuity	Pupils	Anterior Chamber	Fluorescein
Sub conjunctival haemorrhage	None	None	Not applied	No	↔	↔	Clear	No uptake
Conjunctivitis	Minimal to none	None	Reduces irritation	Mild improvement	↔	↔	Clear	No uptake
Episcleritis	Mild	None	Reduces irritation	Resolves redness Within 15 minutes	↔	↔	Clear	No uptake
Anterior scleritis	Severe boring/piercing and worse at night and with eye movements	Possible	Does not improve pain	Does not improve redness	↔ or decreased	↔	Clear	Peripheral keratitis
Anterior Uveitis	moderate to severe	Consensual	Does not improve pain	Does not improve redness	↔ or decreased	Constricted	Cells or flares	Dendrites
Acute angle closure glaucoma	moderate to severe	Present	Does not improve pain	Exacerbates condition	Decreased	Mid-sized,dilated, nonreactive	Shallow	No uptake

Management of Red Eye

In terms of management, family physicians need to have basic understanding of the management of the main diagnoses. They also should know when to refer the patients to a higher center.

Allergic Conjunctivitis:

In patients with allergic conjunctivitis, the main approach should not be only drug-based. Non-pharmacological measures should be considered as well. The clinician should advice the patient to avoid the known allergens and to avoid eye rubbing. The patient should be instructed to use saline irrigation, and cold compressions. It is also recommended to prescribe ocular lubricants, which can be helpful in improving the symptoms. It is important as well to teach the patient how to store the lubricants in cold temperature in order to induce better vasodilation. The vasodilation can counteract the chemosis and eyelid swelling from allergy along with diluting, flushing away the allergens, and forming a barrier to protect the ocular surface [7-9].

There are varieties of drugs that can be used in this condition. Antihistamines, antihistamine/vasoconstrictor combinations, mast cell stabilizers, non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids, topical immunomodulating agents, and antihistamine/mast cell stabilizer combinations are all valid options for such disease. In acute cases, topical steroids show the best outcomes along with antihistamines. Mast cell stabilizers are more expensive and usually kept for prophylaxis and long-term maintenance in these patients. The combinations therapy tend to help in relieving the symptoms but the risk of developing adverse effects is higher in these options.

Antihistamine/vasoconstrictor combination is recommended to be used when there is a need for more frequent doses due to its fast acting nature. The drug lasts only for 2 to 4 hours. Regarding antihistamines, the new generation topical ones such as levocabastine and emedastine are better than the first generation (e.g. pheniramine and antazoline). The new generation medications also give a longer duration of action and higher toleration. Emedastine difumarate is another

selective histamine H1-receptor antagonist, which helps in temporal relief of symptoms and signs [10].

Topical mast cell stabilizers work directly on the allergy mediators and prevent their release, along with chemokines and cytokines. These medications are not usually prescribed by the family physician. Non-steroidal anti-inflammatory drugs prevent prostaglandin formation, which is responsible for itching, and can be used for long term. Corticosteroids are usually used for treatment of chronic ocular allergic conditions [7-9].

Viral Conjunctivitis:

Due to the high transmission rates in viral conjunctivitis, educating the patient with washing techniques, strict disinfection, and isolation of the patient are important steps to limit the number of affected people. This disease is a self-limiting disease and antivirals are not effective. Nevertheless, the physician should focus on the symptomatic relief that holds most of the weight. Artificial tears, topical antihistamines, and/or cold compresses are recommended to be used in these patients.

The use of topical antibiotics in such condition has been shown to be ineffective treatment and there is no effect on protection against secondary infections. On the contrary, topical antibiotic usage may have some adverse effects, such as, allergy, toxicity, higher risk of infecting the other eye, increase resistance, and may even delay diagnosis of other possible diseases. The family physician shall refer the patients to an ophthalmologist if their symptoms had not been resolved within 10 days, due to high risk of developing complications [11].

On the other hand, in patients with conjunctivitis due to herpes simplex virus, topical and oral antivirals are indicated. The main effect of this therapy is reduction of the total disease course. Family physician shall try to avoid giving these patients topical corticosteroids due to the possible potentiating the virus and their side effects. Referral to the ophthalmologist is indicated when eyelid, eye involvement, and/or Hutchinson sign are seen or suspected in these patients [7-9].

Subconjunctival Hemorrhage:

Patients with subconjunctival hemorrhage should be informed that their condition is self-limiting and the management is based on symptomatic relief. The treatment includes warm compresses and lubricants. Nevertheless, if pain is experienced, referral to the ophthalmologist is necessary. This referral is important mainly to rule out any foreign body and/or corneal involvement. Pain is not the only indication of referral in these patients. Corneal involvement, history of trauma, and drainage are all considered as indications for referral [7-9].

Bacterial Conjunctivitis:

Bacterial conjunctivitis is another variety of the diseases, and the main stream of management is based on antibiotic therapy. However, new studies have shown that bacterial conjunctivitis can be self-limiting in some cases. Many patients may recover well after one to two weeks from presentation with no drugs given. Topical antibiotics reduce the duration of the disease, decrease transmission, and hasten the return to normal lifestyle. Moreover, contact lens wearers should always receive topical antibiotics and removal of the lens is recommended to be done by the family physician. The choice of topical antibiotic is not very difficult. All broad-spectrum antibiotics lead almost to the same results. Therefore, choosing the topical antibiotic should depend on the availability, cost, patient's allergies, and resistance patterns. Clinicians should avoid topical steroids due to the risk of potentiating the infection and prolonging the course of the disease [12].

The wait-and-see policy, and/or antibiotic treatment are strategies that both can be done in cases of uncomplicated conjunctivitis. However, the antibiotic therapy is recommended in cases of purulent or mucopurulent conjunctivitis, severe discomfort, immunocompromised patients, and when chlamydia or gonococcal infection is suspected. An important indication for referral is when a methicillin-resistant S.aureus conjunctivitis is suspected. The other causes of bacterial conjunctivitis that may need special care are chlamydia (needing oral antibiotic to both sexual partners), gonococci (topical and oral antibiotics needed), and trachoma (single dose of azithromycin or topical antibiotics or other oral antiobiotics). Drug, chemical or toxin-induced conjunctivitis can be due to eye drop preparations (mainly because of benzalkonium chloride), and the management of this is by immediate cessation of the offending agent and this usually resolves the symptoms [7-9].

Episcleritis:

Episcleritis is self-limiting in most of the cases and takes two to three weeks to be resolved. Supportive care is the recommended approach to be offered by the family physician. Artificial tears, and in some cases short course of topical steroids are advised. Referral to the ophthalmologist is needed in these patients to establish the diagnoses and follow up. In patients with uveitis, the referral to the ophthalmologist should be immediate (maximum within 24 hours of presentation). In patients with recurrent episodes of uveitis or bilateral granulomatous disease, the clinician should do a full systemic workup including CBC, ESR, and chest x-ray among others to rule out systemic disease. Another disease that warrant an immediate ophthalmology referral is acute angle-closure glaucoma [13]. However, the family physician can prescribe drugs to reduce the intraocular pressure such as topical anti-hypertensive eye drops (e.g. timolol maleate, apraclonidine, and pilocarpine) [7-9].

CONCLUSION

Patients' referral with eye problems is common in daily life of physicians and one of the main presentations is red eye. The reasons behind this simple red eye varies from simple allergic reasons to sight losing causes and emergencies like glaucoma making physicians obliged to know how to diagnose and know the main differential diagnoses. Especially when non-pharmacological approach is needed,

providing physicians with more tools to approach such common diseases is necessary.

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