

## New Understanding of Ophthalmology Disease Process

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### Abstract

This article addresses the etiology, diagnosis, and treatment of ophthalmic diseases. Certain diseases have the gender & age predilection, whereas ulcer is idiopathic non-infectious ulceration of the peripheral cornea. Corneal transplantation has been more prevalent. The normal cornea is more avascular because it is transparent and maintains itself as an immune privileged site. Ocular conditions, including infectious keratitis, keratopathy, corneal abrasions, uveitis, immunological conditions, corneal trauma, alkali injury & contact lens wear can encourage new blood vessels to spring up from the limbus and hence neo vascularization. Neovascularization is generally accompanied with an inflammatory response and always represents a state of disease. Autoimmune disorders with ocular complications in the anterior and posterior segments are also prevalent. Cataract surgery has high success rate and have complications too. Several drugs have the potential to cause the elevation of Intraocular pressure, which can occur via open angle/closed angle mechanism. Open angle glaucoma is mostly induced by steroids. Furthermore, when reviewing complications, grouping them according to which anatomical structure is primarily affected can be helpful.

### Introduction

Eye transplantation is considered to be a misnomer. Corneal transplantation is a surgical procedure where a diseased cornea from the eye is replaced by donated corneal tissue (the graft) in its entirety (penetrating keratoplasty) or in part (lamellar keratoplasty). The most prevalent tissue transplant procedures performed worldwide, penetrating keratoplasty (PKP) has an unsatisfactory long- term success rate [1,2]. A hypothesis that a combination of multiagent immunosuppression therapy (prednisone, azathioprine and cyclosporine) may be an effective regimen to prevent corneal graft rejection in high-risk patients. A randomized clinical trial suggests comparable efficacies between mycophenolate mofetil & cyclosporine. Tacrolimus shown to be effective after corneal transplantation and to prevent allograft rejection in a murine corneal graft rejection model [3]. Utility of these agents in toxicity-sparing protocols for organ transplant recipients had been proposed [4,5]. Recent studies have shown that laser in situ keratomileusis (LASIK) aggravates corneal deposits in patients with exacerbated Avellino corneal dystrophy (ACD) and so LASIK should be avoided in these patients [6-9]. All the exacerbated corneal deposits of ACD after LASIK in the literature showed multiple, fine, extensive opacities in the anterior stroma, and they were mainly concentrated in the LASIK flap interface with or without diffuse central corneal stromal haze. The manifestation of the recurrent or secondary form of ACD is significantly different from the natural-onset, or primary form for the morphological features [10]. Dry eye is a common complication following laser-assisted in-situ keratomileusis (LASIK) and punctal plug are an effective treatment by reducing tear outflow [11]. Canaliculitis is a known complication after punctal plug insertion. The most common pathogens are Actinomyces Israeli and Nocardia species. Atypical mycobacteria lacrimal canaliculitis is an uncommon complication after punctal plug insertion, which is unlikely to respond to conservative treatment and surgical removal is effective [12]. Fusarium and Acanthamoeba keratitis is the prime micro-organisms which occur in the setting of contact lens wear and their misuse. In spite of intensive appropriate topical and systemic therapy the condition worsened but remains central in location and following therapeutic penetrating keratoplasty resolves [13,14].

Every patient who comes for an ophthalmic procedure, including punctalcautery, eyelidlesion/papillomaremovaloranyotherprocedure

that necessitates the use of thermal energy should be instructed as well to remove any eye makeup, especially mascara before the procedure [15]. A case of surgical flash fire causing thermal burn of eye lashes, eyelid skin and eye brow hair in a patient who had some residual mascara on her lashes while cautery was applied for an eyelid lesion. It is a clinical set up and is done in the absence of oxygen-rich environment [16]. High myopia is known to be associated with cataract, and a relationship between myopia and cataract have been suggested [17,18] in this review. Although the deprivation of form vision due to cataracts in childhood leads to increase in axial length, and myopia had been reported [19,20] but if the cataract may affect the axial length in adults is still unknown. Many factors can affect the axial length and lead to myopia [23]. Lid closure in early ocular and visual development is well recognized to cause ocular developmental abnormalities [19,21]. Central dense corneal opacities in early childhood may lead to visual deprivation and amblyopia and was shown to increase the ocular axial length [22,23].

Subconjunctival gentamicin inadvertently injected into the vitreous cavity can induce cataract and retinal toxicity [24]. Expectedly, the need for cataract surgery has increased dramatically because of an increased proportion of old aged and the tendency & awareness towards surgery earlier in the disease process [25]. Amblyopia means reduced visual acuity, which is not even improved by corrective glasses, in an eye that is otherwise normal. It is responsible for diminished vision in 1% to 2% of the childhood population, and it is most often associated with strabismus or anisometropia [26]. Occlusion therapy remains the mainstay of amblyopia treatment. Opinions, however, vary on the number of hours of daily patching

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that should be prescribed, ranging from as little as 1 or two hours to as much as 24 hours per day [27-29]. A randomized clinical trial was conducted by The Pediatric Eye Disease Investigator Group (PEDIG), to compare two hours versus six hours of recurrent patching of near vision exercises, for the treatment of moderate amblyopia in children 3 to seven years of age. PEDIG concluded that both methods produced an improvement of visual acuity of a similar magnitude [30-32]. With increasing incidence of extra nodal Non-Hodgkin's lymphoma (EN-NHL) worldwide, it's important for clinicians to be aware and keep unusual sites of presentation in mind for timely diagnosis and treatment. Non-Hodgkin's lymphoma (NHL) is a diverse group of neoplasms mostly arise in the lymph nodes termed as nodal NHL (N-NHL), but approximately 25-40% arise in tissues other than the lymph node, and therefore, termed extra nodal lymphomas (EN-NHL) [33]. The common extranodal sites involved are gastrointestinal tract, upper aerodigestive tract, bones, and spine while unusual sites with involvement less than 3% is breast, central nervous system, testis, lung and skin [34]. Few cases have been reported with localized NHL laryngeal lymphoma [35]. Laryngeal NHLs are usually of B-cell lineage. The patient reported here had high-grade lymphoma of T-cell lineage. In a solitary laryngeal lymphoma, radiation therapy may be the sole therapeutic modality [36]. Leptospirosis is a zoonotic infection caused by spirochetes leptospira. It presents with both ocular and systemic manifestations. Neuro retinitis has been reported in the few cases of leptospirosis. We present a case of leptospirosis with unilateral neuro retinitis presenting with sudden loss of vision, optic disc edema and macular star. Leptospirosis was confirmed by serological test, and the disease responded optimally to specific therapy [37].

Idiopathic uveal effusion syndrome(IUES) is a very rare condition characterized by serous retinal detachment, usually without abnormal IOP and significant inflammation. IUES should only be diagnosed after exclusion of other etiologies, such as the inflammatory or hydrostatic effusion. Uveal vasculature is a highly fenestrated and permeable structure. Various mechanisms exist to maintain protein and fluid homeostasis within the uvea, including the vortex veins, transscleral albumin diffusion, transscleral hydrostatic water movement, and bulk flow around the sclera emissaria [38]. When those mechanisms are impaired, extravasated protein and fluid are retained in the suprachoroidal space, leading to choroidal effusion. Altered scleral permeability and vortex vein compression can each contribute to the pathogenesis of IUES, but the relative contribution of each may vary in individuals [39].

Ocular involvement in familial Mediterranean fever (FMF) of the anterior segment has been reported more frequently than affections of other parts of the eye. A few case reports also describe FMF patients with episcleritis and/or, as in anterior uveitis [40-44]. Intraocular bevacizumab has been used in the treatment of neovascular glaucoma in patients with proliferative diabetic retinopathy [45-50] and in cases of retinal vein occlusion. The intravitreal or intracameral administration of this drug has beneficial effects on the regression of iris or angle neovascularization [52], and provides good short-term control of IOP [53]. Pegaptanib is considered to be relatively safe when compared to ranibizumab or bevacizumab [66] because it blocks only one subtype of vascular endothelial growth factor (VEGF) However, it is a selective blockade of VEGF & may affect ocular circulation and induce an ischemic event, such as bilateral Non arteritic Anterior ischemic optic neuropathy (NA-AION). Anti-vascular endothelial growth factor (VEGF) therapy is now a first-line treatment for age-related macular degeneration (AMD)[51].

A 5-year-old girl presented with a sudden left proptosis just after being hit by her sister's hand has disclosed an extensive multi-cystic mass in the left orbit with niveau formation by Computed tomography scans [58]. Based on the findings, the tumor was diagnosed as "orbital lymphangioma" [54]. Since the patient could close her eyes completely without corneal involvement and visual acuity loss, biopsy or surgery was performed. Four months later, her left proptosis improved. At the advent of time, it has further improved. Computed tomography scans showed considerable shrinkage of the tumor. This is the first case report of an orbital lymphangioma with a detailed description of considerable spontaneous shrinkage without stimulation from a biopsy and surgery [57].

Management of patients with orbital lymphangioma has been controversial [55] Multiple subtotal excisions, removing as much of the lymphangioma as possible, has long been recommended [50]. Complete excision is usually impossible because of the diffuse, noncapsulated growth pattern but, lately, conservative management [67,68] has become an alternative choice for management of orbital lymphangioma [56]. Although conservative, most of them were performed after biopsy for diagnosis and there is the possibility of tumor size reduction by stimulation from the biopsy. Diagnosis of orbital lymphangioma has long depended on biopsies. However, current imaging methods have enabled noninvasive diagnosis in almost all cases of orbital lymphangioma. Orbital lymphangioma is diagnosed by orbital imaging technology and found multi-lobulated pattern and a cystic internal structure [54]. The current orbital imaging technology permits simple observation of some patients and provides graphic postoperative follow-up data in others. Imaging also broadens the topographic perspective of lymphangioma relative to normal structures, enhancing the perceptions gained from the surgical field and the pathologist's microscope. Based on these improvements, further observations of orbital lymphangiomas should now be possible [57]. Rapid onset of bilateral proptosis without any other systemic findings is an unusual presentation of adult-onset leukemia characterized by bilateral proptosis and bloody eye discharge. Confirmation of diagnosis by blood investigations, intensive chemotherapy and supportive treatment the prognosis in such cases in adults are dismal and one of the main reasons being the late and rare presentation of the disease [58].

A 14-year-old male patient with Graves' orbitopathy was presented with a downward gaze at restriction in the left eye. Magnetic resonance imaging (MRI) reveals an edematous left superior rectus muscle. Retrobulbar injection of triamcinolone acetone (20 mg) was administered in the left orbit. However, edema was still evident on MRI. Three months after the injection, new inflammation was detected in bilateral inferior rectus muscles. The patient then underwent three cycles of steroid pulse therapy (one cycle: methylprednisolone 10 mg/kg/ day × three days). One week after the steroid pulse therapy, eye movement was improved and the inflammation in the left superior rectus muscle, and the bilateral inferior rectus muscles subsided on MRI.

Conversely, the patient noticed diplopia during upward gazes two months later, and MRI showed recurrence of edematous changes in bilateral inferior rectus muscles. The patient was treated with the same protocol of steroid pulse therapy. One month after the second steroid pulse therapy, ocular motility was improved and the inflammation in both inferior rectus muscles had almost resolved. This case illustrates the detailed clinical course of edematous extraocular myopathy in a pediatric Graves' orbitopathy patient, followed-up by successive MRI [59].

Posterior Reversible Encephalopathy Syndrome (PRES) is a clinical entity characterized by a unique pattern of vasogenic brain edema mainly caused by eclampsia, immune suppressing drugs, or severe hypertension. PRES can affect any locations in the central nervous system, including brainstem and Diploopia is noticed. Differentiation from tumors or infarction is very important to avoid unnecessary and invasive interventions. One useful characteristic is the clinical radiologic dissociation. Once brainstem variant of PRES is diagnosed, to monitor and control blood pressure is important because it is often caused by severe secondary hypertension [60].

Bilateral congenital cataract is responsible for treatable childhood blindness, accounting for 5% to 20% of blindness in children worldwide. Demarcation of thickened margins on the posterior capsule defects and white dots on the anterior vitreous face were characteristic features of this cataract. In addition to it, a semi-transparent membrane at the location of the posterior capsule defect bilaterally was detected. This membrane was loosely attached and covered to the borders of the posterior capsular opening and can be removed with vitreus cutter. The cases were managed by standard irrigation – aspiration and anterior vitrectomy [61]. Bilateral conjunctival nodule in Sweet's syndrome was observed in a 47-year-old Chinese male patient. Administration of oral prednisolone has completely resolved fever as well as erythematous papules and blains on the face and arms. However, two well demarcated conjunctival nodules with hyperemia were found in the temporal & nasal aspect of the right & left eye respectively. Excision biopsy of the right eye's lesion showed neutrophilic infiltration without vasculitis, the same histopathologic feature of Sweet's syndrome. Conversely, the one in the left eye was responsive to local corticosteroids [56,62,70]. This is the first reported case of bilateral conjunctival nodules in Sweet's syndrome.

By former and statistical reports, the varix of the vortex vein ampulla is most commonly found in middle-aged groups; and considered to be an asymptomatic finding. The lesion could be incidentally found by clinical demonstration using ultrasonography and overlooked by funduscopy [63]. The typical imaging features on ultrasonography, optical coherence tomography (OCT), Indocyanine green angiography (ICGA), and colour doppler flow imaging (CDFI) especially the dynamic natures under pressure are most useful for diagnosis [71-79].

## Conclusion

Recent developments in management of diseases, including newer classes of drugs, surgical procedures (eg. Trabeculectomy), glaucoma [64] & associated diseases, lasers have augmented the options available to the clinicians or General practitioners in the management of ophthalmic diseases. Several cases of corneal melt associated with topically applied drugs have been reported in literature. The management of Glaucoma remains as a controversial issue mainly because of the high risk graft failure associated with the treatment to be followed. Use of contact lens is limited with its own peculiarities and leaves a sinister remark with poor follow up care Certain diseases that may be complicated have gender, age or genetical proclivity.

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