ORIGINAL ARTICLE

Analytical Study of Corneal Endotheliitis in 26 patients

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ABSTRACT

Purpose: To analyze and review the clinical manifestations, complications, and recurrence rate in diagnosed cases of corneal endotheliitis.

Methods: A retrospective case review was done by taking stock of the record files of 26 patients who were examined between 2010 and 2012 and diagnosed with corneal endotheliitis at Qilu Hospital of Shandong University.

Results: Other than two patients of nine years and eleven years old all the other 24 cases were between 35-75 years of age. The authors reviewed the records for clinical manifestations, complications, and recurrence in established cases of corneal endotheliitis. Redness, photophobia, lacrimation, KP (++), congestion, decreased visual acuity and opacity were the commonly observed clinical manifestations in all cases. In addition to these, three patients had developed secondary glaucoma at the time of presentation, and 28% of the cases were complicated with raised IOP. Three (11.5%) of the cases previously treated at 6 months, 8 months, and 4 years experienced a recurrence of the condition; causes of recurrence are yet to be established.

Conclusions: With a 13% recurrence rate and dismal complications like glaucoma and raised IOP, corneal endotheliitis leads to dire consequences that often culminate in blindness. More studies need to be conducted to explore causes of recurrence, complications and preventive methods to avert loss of sight from the corneal endotheliitis.

Keywords: Corneal Endotheliitis, Clinical Manifestations, Recurrence, Keratic Precipitates

INTRODUCTION

In 1982, Khodadoust and Attarzadeh first described two bilateral cases of corneal endotheliitis that had linear KPs with accompanying peripheral corneal edema, being similar to the finding seen in the allograft rejection of the corneal endothelium.[1] Corneal endotheliitis can be defined as a broad range disorder in which corneal endothelium is the primary site of the inflammation. Many investigators have reported various forms of corneal endotheliitis and thus a number of nomenclatures have been given to this unique clinical entity, including progressive herpetic corneal endotheliitis[2] herpetic endothelial keratitis[3] idiopathic corneal endotheliopathy[4] and sporadic diffuse corneal endotheliitis[5] clinical entity can be attributed to various causes, all of which share a common site of inflammation-corneal endothelial cells. Hence, inflammatory entities (e.g., epithelial keratitis and interstitial keratitis) that involve other parts of the cornea—namely, the epithelium and the stroma—do not fit the criterion of this disease. Corneal endotheliitis is caused by a variety of mechanisms, including immunerelated mechanisms without any known causative organisms (e.g., graft rejection following penetrating keratoplasty) and infectious mechanisms, such as

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those caused by viruses. Research has shown that corneal endotheliitis can be caused by herpes simplex virus (HSV), cytomegalovirus (CMV), varicella zoster virus (VZV)[6], and mumps infection 23 human CMV, a ubiquitous lymphotropic herpes virus, causes various systemic and ocular clinical entities, including retinitis in immunocompromised hosts. Ocular CMV manifestations range from corneal endotheliitis, episodic anterior uveitis, sector iris atrophy with iritis, chronic anterior uveitis, and ultimately, to retinitis. A few cases of CMV-related corneal stromal[7,8] and endothelial changes[9,10] have been reported in immunocompromised patients. Recent research has shown an increasing number of cases of CMV-associated anterior segment inflammation with a different range of clinical presentations in otherwise healthy Individuals[6,7,11-15]. Antiviral and corticosteroid hormone drugs[16] are now the first choice for corneal endotheliitis treatment and most ophthalmologists have accredited their effect. But there are few reports about the complication and recurrence rate of this disease because of the lack of long-term follow-ups for the patients. In this article author has summarized and analyzed the clinical manifestations, complications and recurrence through the cases of 26 hospitalized patients with the corneal endotheliitis at our hospital during September 2010 to December 2012.

MATERIAL AND METHODS

In a retrospective case series, 26 cases of viral corneal endotheliitis diagnosed and managed at Qilu Hospital of Shandong University, between September 2010 and December 2012 were included. The medical records of the patients were specifically reviewed for past and personal history, clinical findings. They were classified according to the focus of infection into disc form type (type I), diffuse type (type II) and linear type (type III). Out of these 26 patients, there were 16 male and 10 female, aged between 35-75, except two female patients were 9 years and 11 years old respectively, the mean age of patients was (44.73±16.32).

Local application: Acyclovir eye drops 5 times /day, ganciclovir eye drops and ointment QID, and atropine mydriatic agent. Dexamethasone 2-3mg, subconjunctival injection, 1% Prednisolone acetate (PRED Forte), 4 ~ 6 times according to the severity of inflammation, or Tobramycin+Dexamethasone (TobraDex) eye drops, Cyclosporine eye drops and Dicofenac sodium eye drops were used 3-4/day to reduce the ocular pain symptoms and inflammation. The time interval of drug administration was extended as the inflammation improved.

Systemic administration: Acyclovir 400mg po 5 times/d for severe cases of corneal endotheliitis. Acyclovir IV drips, 10-20% glucose and amino acid IV drip. Glucocorticosteroid for severe cases of corneal endotheliitis of Type II and III, dose was decreased gradually till withdrawal. Diclofenac sodium 3-4 times/day for ocular pain symptom.

Others: Drugs to decrease IOP, and Cycloplegic drugs.

Follow-up and Treatment effects: Initially all the patients were followed up once a month for 6 months post-discharge and then they were followed up every 6 months or annually according to their conditions. Eye irritation, cornea, anterior chamber and IOP were checked every time. Clinical judgment: Cure Standard: improvement of symptoms, recession of corneal stromal edema, corneal endothelium edema, KP, clearance of aqueous humor , normal IOP, and visual acuity increased to normal. Effective: symptoms decreased, corneal stromal edema and corneal endothelium edema subsided but with gray-white haze, KP receded or became less, aqueous humor cleared, normal IOP, visual acuity increased but still under normal level. Ineffective: symptoms worsened, corneal stromal and endothelium edema increased, formation of more KPs, aqueous humor haze, IOP increased or remained normal and visual acuity decreased.

Standard for clinical cure: Symptoms disappeared, corneal stromal edema and corneal endothelium edema receded, KP subsided or decreased, aqueous humor became clear, and visual acuity improved to premorbid levels or left corneal macula as shown in the figures (Fig. 1,2,3).
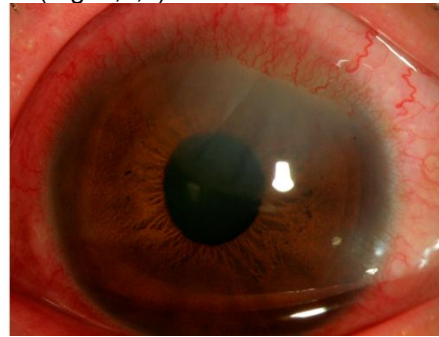

Fig. 1a: Slitlamp photo of a case with linear type corneal endotheliitis before treatment.
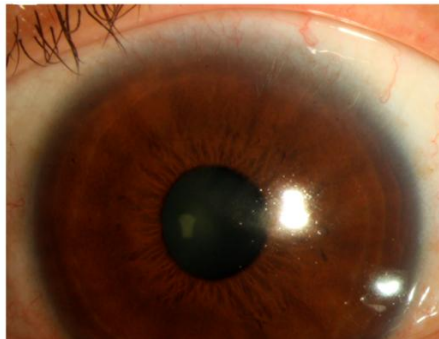

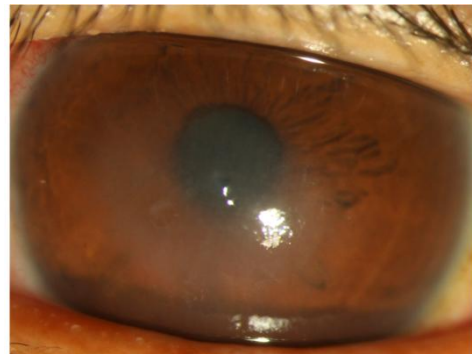**Fig. 1b:** Slitlamp photo of a case with linear type corneal endotheliitis after treatment.

Fig. 2a: Slitlamp photo of a case with disciform type corneal endotheliitis before treatment.
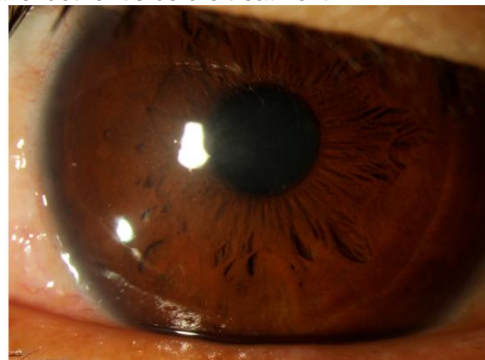
Fig. 2b: Slitlamp photo of a case with disciform type corneal endotheliitis after treatment.

Fig. 3a: Slitlamp photo of a case with diffuse type corneal endotheliitis before treatment.

Fig. 3b: Slitlamp photo of a case with diffuse type corneal endotheliitis after treatment

RESULTS

Redness, photophobia, lacrimation, KP (++), congestion, decreased visual acuity, opacity, decreased endothelial cell count and abnormal endothelial cell morphology were the commonly observed clinical manifestations in all cases. The rate of commonly observed sign and symptoms are summarized in the table 1. Type I (10 eyes): all had corneal epithelial erosions (Fig. 1); six with high IOP, mean IOP: 4.91kPa. Type II (nine eyes): Five had corneal epithelial erosions (Fig. 2). Type III (three eyes): three with high IOP, mean IOP: 4.35kPa (Fig 3). 15 eyes were first onset, four were second onset, and two were multiple onsets. Six had HSV keratitis history. In addition to these, three of the cases had developed secondary glaucoma at the time of presentation, and 28% of the cases were complicated with raised IOP. Treatment of the corneal endotheliitis consists of two aspects: anti-viral, anti-inflammatory. Widely recognized as a more reasonable solution is the application of systemic and local anti-viral therapy combined with local corticosteroid. Recovery of the visual acuity and KP recession time: type I 10cases, recovery of the visual

acuity: 9-16d, mean（12.57±1.47）d, KP disappearance time 12-17d, mean（15.77±1.34）d; type II 9 cases, recovery of the visual acuity 13-21d, mean（15.51±1.97）d, KP disappearance time 18-29d, mean（23.33±3.72）d; 27 cases cured including 15 cases of first onset and 5 cases of secondary onset, cure rate was 93.3%; 3 cases got effective treatment, corneal stromal edema disappeared in 4 cases of the multiple onsets 28d after treatment, leaving gray-white haze in the stromal and decreased visual acuity. The cured cases were continuously given acyclovir eye drop and neomycin eye drop 4 times/d for 1 month. Patients were followed up for 3 months to 1 year, 2 cases of recrudescence. Corneal stromal and endothelium edema subsided, KP disappeared or reduced, and restoration of corneal transparency was seen in 23 cases. Corneal stromal edema and reduction in KPs were seen in 3 cases. In cases with poorly control increased intraocular pressure, trabeculectomy can be considered, which can effectively control intraocular pressure, alleviate corneal edema and corneal endotheliitis.

Table 1: Common sign and symptoms and their frequency rate at presentation (n=26 eyes)

Presentation		%age/Nos.
Symptoms	Redness	100% (26)
	Photophobia	33% (8)
	Blurring of vision	92% (23)
	Foreign body sensation	80.7% (21)
Signs	Diffuse infiltrates	19.2%(5)
	Linear infiltrates	34.6% (9)
	Disciform infiltrates	38.4%(10)
	Decreased Endothelial cell density	100% (26)
	Corneal ulcer	26.9% (7)

DISCUSSION

Corneal endotheliitis, an inflammation of the corneal endothelium, is characterized by corneal edema, keratic precipitates (KPs), and mild to moderate anterior chamber inflammation. Mirror reflection microscopy showed that corneal endothelial cells have different degrees of damage, decreased cell density and morphologic anomalies. Corneal endothelial opacity, buckling in Descemet's layer, deep matrix edema and KP are the main characteristics of corneal endotheliitis, some patients show increased IOP and iridocyclitis.[17] As a new clinical entity, the reports of this disease are increasing gradually. Onset of the disease is acute, most cases are monocular, binocular cases are less, men and women ratio in this study was close to 5: 3, aged from 9 to 75 years old, middle-aged and older people are the main object, part of the patients can have simple herpes viral keratitis history. The cause

of corneal endotheliitis has not been clear yet, the domestic and foreign scholars tend to believes it is simple herpes virus infection or autoimmune related. Most scholars according to their clinical observation give the disease, different nomenclature and classification.[17] At present most clinical ophthalmologist accepted Holland classification [17], disc form type (type I), diffuse type (type II) and linear type (type III). This article referred to Holland classification standard, and observed the treatment effects respectively. All cases had been given immediate local and systemic antiviral treatment after diagnosis, and acetate prednisone was selected because of its high biological utilization rate. When the inflammation was controlled, acetate prednisone had been gradually tapered to withdrawal. In the process of reducing drug concentration and frequency is very important for the disease to be cured thoroughly and to prevent recurrence. In this study, according to the above data, type I recovered fastest, and type III recovered slowly. It has very important guiding significance for clinical treatment, especially for clinically less common type III patients who needs to be given hormone and antiviral drugs systemically, application time and dose are higher than other two types, and especially hormone drugs cannot be prematurely withdrawal. In clinical work, early diagnosis and standardized treatment appears especially important, however current diagnosis of corneal endotheliitis is lack of specific indicators, virus isolation and culture can help confirm the diagnosis, but usually it needs a week's time and positive rate is not high, laboratory tests such as cytology test, serum antibody detection assist in making the diagnosis but lack of specificity; fluorescent antibody method and polymerase chain reaction (PCR) method to detect HSV - type 1 antigen and HSV - type 1 DNA, corneal microscope etc., have certain specificity, but needs special equipment and are costly, so their wide usage in clinics are restricted. At present the diagnosis mainly based on history, clinical manifestation and eye symptoms, but due to the part of the eye doctors lacks understanding of corneal endotheliitis and careful clinical examination, the clinical diagnosis for corneal endotheliitis is sometimes difficult. In the clinical diagnosis and treatment process, we find that 3 patients of 26 cases with secondary glaucoma, 18% of the patients had increased IOP, 5 cases were cured patients, 2 cases had a relapse in 6 months, 2 cases in 8 months and 1 case in 4 years, and the reason for recurrence is unknown. The recurrence

was noted in 3(11%) cases. Therefore, further understanding of the recurrence rate and complication of corneal endotheliitis can reduce the repeated onset of secondary glaucoma and increase IOP, in order to avoid the occurrence of blindness.

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