

Comment on “Surgical management of fungal endophthalmitis resulting from fungal keratitis”

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Dear Editor,

We read with interest the article by Gao *et al*^[1] on fungal endophthalmitis associated with fungal keratitis in 27 eyes of 27 patients. They have reported^[1] that multiple surgeries including penetrating keratoplasty (PKP), pars plana vitrectomy (PPV), intracameral or intravitreal antifungals, cataract extraction and evisceration resulted in a final visual acuity better than counting fingers in 55.6% eyes. Most common causative fungal pathogens in their study^[1] were *Fusarium* (44%), *Aspergillus* (22%), and *Alternaria* (7%).

The exact incidence for endophthalmitis with keratitis is not known, but it can vary from 0.5% to 6.3%^[2-3]. Most common organism noted by Henry *et al*^[2] in a large series of 49 such eyes was fungus. Patients in the primary keratitis group were more likely (78%) to have fungal etiology compared to surgical wound associated keratitis (23%). Treatment modalities included in this study were intraocular antifungals, PKP and anterior chamber irrigation with antifungal agents but no vitrectomy was performed. The outcome in their study was very poor, wherein evisceration was done in 31% eyes^[2]. Dursun *et al*^[3] looked at 159 cases of *Fusarium* keratitis, of which 10 (6.3%) progressed to culture-proven endophthalmitis. All patients received oral ketoconazole or fluconazole and topical natamycin 5%. In two cases, intravitreal amphotericin B injections were also given. Four patients required a PKP, enucleation was performed in 2 patients, 2 patients required a combination of a PKP and PPV and one patient developed phthisis^[3]. Chakrabarti *et al*^[4] and Kim *et al*^[5] reported that prompt vitrectomy combined with intravitreal antifungals can improve visual acuity in fungal keratitis with endophthalmitis.

In current study^[1], the authors mention that out of 27 eyes of culture proven exogenous fungal endophthalmitis, posterior segment was involved in only 21 eyes, which is not understood. We believe a diagnosis of endophthalmitis cannot be made without posterior segment inflammation. It would be interesting to know why the 6 eyes without posterior segment were clinically diagnosed as endophthalmitis. Also it has been shown that the corneal infection was more than 3 mm×3 mm in 24 eyes and PPV was carried out as initial surgical procedure in 9 cases out of total 15 cases which underwent PPV^[1]. Visibility would be very poor for carrying out PPV in the presence of large areas of corneal infection which could result in incomplete removal of infection and higher rate of PPV related complications. PPV with temporary keratoprosthesis could be another surgical modality in such cases of endophthalmitis with hazy media^[6]. Intra-cameral and intrastromal antifungal delivery could be part of aggressive strategy to tackle fungal keratitis. The treatment of endophthalmitis in keratitis is difficult due to severity of infection, late diagnosis and difficulties in examination of the posterior segment due to corneal involvement. In the current study^[1], more than half eyes with fungal endophthalmitis had been reported to achieve a final visual acuity of better than finger-counting. This may be explained by 6 (22%) cases which actually had no posterior segment infection. Long term use of corticosteroids, weak systemic immunity, dry eye, lack of intact posterior capsule, corneal perforation and inadequate wound closure may predispose to endophthalmitis in cases of microbial keratitis^[7]. The manuscript will be enriched if the details of ocular and systemic predisposing factors for keratitis progressing to endophthalmitis in the current study^[1] are analyzed.

The outcome of keratitis with endophthalmitis is dismal even in the current era, some cases can go to phthisis or require evisceration^[1-4]. In these cases early diagnosis with aggressive management remains the mainstay of therapy.

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REFERENCES

- 1 Gao Y, Chen N, Dong XG, Yuan GQ, Yu B, Xie LX. Surgical management of fungal endophthalmitis resulting from fungal keratitis. *Int J Ophthalmol* 2016;9(6):848-853.
- 2 Henry CR, Flynn HW Jr, Miller D, Forster RK, Alfonso EC. Infectious keratitis progressing to endophthalmitis: a 15-year study of microbiology, associated factors, and clinical outcomes. *Ophthalmology* 2012;119(12):2443-2449.

- 3 Dursun D, Fernandez V, Miller D, Alfonso EC. Advanced fusarium keratitis progressing to endophthalmitis. *Cornea* 2003;22(4):300-303.
- 4 Chakrabarti A, Shivaprakash MR, Singh R, Tarai B, George VK, Fomda BA, Gupta A. Fungal endophthalmitis: fourteen years' experience from a center in India. *Retina* 2008;28(10):1400-1407.
- 5 Kim DY, Moon HI, Joe SG, Kim JG, Yoon YH, Lee JY. Recent clinical manifestation and prognosis of fungal endophthalmitis: a 7-year experience at a tertiary referral center in Korea. *J Korean Med Sci* 2015;30(7):960-964.
- 6 Tripathy K, Venkatesh P. *Surgical management of endophthalmitis*. In: CME on endophthalmitis. Rajasthan Ophthalmological Society; 2015:36-53.
- 7 Scott IU, Flynn HW Jr, Feuer W, Pflugfelder SC, Alfonso EC, Forster RK, Miller D. Endophthalmitis associated with microbial keratitis. *Ophthalmology* 1996;103(11):1864-1870.

Author Reply to the Editor

Dear Editor,

We appreciate the comments about our article^[1] from Srujana D and colleagues. In our study, 27 cases of fungal endophthalmitis contiguously spreading from keratitis with positive fungal culture results, including 21 cases with the posterior segment involved and 6 cases with infection confined in the anterior segment, were evaluated. Srujana *et al* mentioned that the diagnosis of endophthalmitis could not be established without an involvement of the posterior segment. We insist that because of the special diffusion mode of fungal endophthalmitis resulting from keratitis and the relatively slow growth of fungi, there are cases with severe infection in the anterior chamber but no definite involvement of the posterior segment. Endophthalmitis with only the anterior segment involved was mentioned in many studies^[2-6]. In our study, positive fungal culture results of hypopyon were found in the 6 cases with anterior segment infection. Ocular echography can be useful in evaluating the posterior segment of patients^[7]. Mild anterior vitreous inflammation certainly cannot be ruled out in patients with no obvious vitreous opacity.

In our series, a total of 15 patients underwent vitrectomy, 9 of whom was in the first surgery. We agree with Srujana *et al* that in eyes with a large corneal infection focus, the complications after vitrectomy would increase due to the opaque vision and subsequently incomplete removal of the infection. As a matter of fact, 6 out of 9 eyes received vitrectomy combined with penetrating keratoplasty for the first time. The reason why vitrectomy could be successfully performed in the other 3 eyes was that the opacity in these eyes was small or off center. In addition, there were 6 patients who did not undergo vitrectomy in their first operation. They were treated with penetrating keratoplasty, before vitrectomy was implemented because of the accelerating posterior segment infection. In these eyes, the vitreous could not be removed thoroughly for the unclear

media. However, the condition would be better with infection control, and a second vitrectomy would be easier if necessary. More than half of our patients got the final visual acuity of better than finger counting. We believe that the relatively good prognosis was not only related to the 6 patients with only the anterior segment infected, but also to the appropriate treatment protocol. Among our patients, except the 6 cases with only hypopyon (cases 3, 4, 11, 13, 18 and 19) and 3 cases with infection extending to the posterior chamber (cases 1, 9 and 23), the remaining 18 cases were severely infected with vitreous abscess or even orbital cellulitis. Even though, eight out of the 18 cases (44%) achieved visual acuity of better than finger counting (including one case with retinal detachment). There were also 5 of the 18 eyes which were eviscerated for the infection progress. A prompt and aggressive intervention can effectively reverse the deterioration and improve the prognosis of fungal endophthalmitis.

Srujana *et al* recommended to obtain the medical history of whether there was long-term use of glucocorticoids, low immunity, dry eye, capsular integrity breaking, corneal penetrating injury or delayed wound closure, which may make eyes susceptible to bacterial keratitis. We believe this is helpful for diagnosis and therapy of such cases, especially those with unknown causes, and will pay more attention to these items in the future work.

REFERENCES

- 1 Gao Y, Chen N, Dong XG, Yuan GQ, Yu B, Xie LX. Surgical management of fungal endophthalmitis resulting from fungal keratitis. *Int J Ophthalmol* 2016;9(6):848-853.
- 2 Pflugfelder SC, Flynn HW Jr, Zwickey TA, Forster RK, Tsiligianni A, Culbertson WW, Mandelbaum S. Exogenous fungal endophthalmitis. *Ophthalmology* 1988;95(1):19-30.
- 3 Shen YC, Wang CY, Tsai HY, Lee HN. Intracameral voriconazole injection in the treatment of fungal endophthalmitis resulting from keratitis. *Am J Ophthalmol* 2010;149(6):916-921.
- 4 Durand ML. Endophthalmitis. *Clin Microbiol Infect* 2013;19(3):227-234.
- 5 Greenwald MJ, Wohl LG, Sell CH. Metastatic bacterial endophthalmitis: a contemporary reappraisal. *Surv Ophthalmol* 1986;31(2):81-101.
- 6 Vilela RC, Vilela L, Vilela P, Vilela R, Motta R, Pôssa AP, de Almeida C, Mendoza L. Etiological agents of fungal endophthalmitis: diagnosis and management. *Int Ophthalmol* 2014;34(3):707-721.
- 7 Dacey MP, Valencia M, Lee MB, Dugel PU, Ober RR, Green RL, Lopez PF. Echographic findings in infectious endophthalmitis. *Arch Ophthalmol* 1994;112(10):1325-1333.

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