Endophthalmitis is a potentially visually devastating complication of intraocular surgery, ocular trauma or postoperative external eye injuries. The role of adjunctive intravitreal corticosteroids (in addition to antibiotics) in the treatment of endophthalmitis remains controversial. Although specific immunomodulatory agents, such as anti-tumor necrosis factor alpha (TNF-α) (e.g., in the treatment of Crohn’s disease) are important agents in the treatment of numerous other conditions.

Cytokines are key mediators of intraocular inflammation. Intraocular injection of interleukin (IL)-1 (e.g., in the vitreous) decreases scores by 60 – 72 hours (Table 1). B.c.-infected eyes displayed elevated levels of IL-1 α, β, IL-8, MIP-1 α, MIP-1 β, and TNF-α (Table 2).

The right eye of 69 New Zealand white rabbits received an intravitreal injection of either 3.5 - 4.0 x 10^5 Staphylococcus epidermidis (S.e.) (n = 36) or 10^2 Bacillus cereus (B.c.) (n = 33) organisms. The left eye of each animal served as a control and received no injections. Eighteen S.e. and 12 B.c. infected eyes also received treatment at 24 hours after either vancomycin (vanc) (1 mg/ml/1 ml) (n = 9, B.c.; n = 6) or vancomycin/piperacillin/dexamethasone (vanc/penico/ 400/500/1 ml) (n = 9, B.c.; n = 6). Animals were then sacrificed at various time points following inoculation or treatment.

Prior to sacrifice, both eyes of each animal were examined for signs of endophthalmitis (photophobia, conjunctival and iris injection and vitritis) using a standardized grading protocol. Following euthanasia, each eye was removed, dissected, and the corneal contents of infected (right) and control (left) eyes were individually analyzed for multiple cytokine levels using Quansys Biosystems Q-Plex miniaturized sandwich ELISA mouse and human arrays.

All sixty-nine rabbit eyes receiving intravitreal bacterial injection showed signs of intraocular inflammation. None of the non-infected (control) left eyes showed inflammation. Photophobia, conjunctival and iris injection, and vitritis continued to increase over the course of 168 hours in the S.e. infected/un-treated group and over the course of 60 hours in the B.c. infected/un-treated group (Table 1). Both S.e. and B.c.-infected eyes that were treated with either vanc alone or vanc/dex showed a peak in intraocular inflammatory scores at 48 hours and subsequent decrease in scores by 60 – 72 hours (Figures 1 and 2).

S.e.-infected eyes had elevated levels of IL-1, IL-2, MIP-1 α, and IL-8, and low levels of MCP-1 (Figure 1a-d). B.c.-infected eyes displayed elevated levels of IL-1, IL-8, MIP-1 α, and IFN-γ (Figure 2a-d).

Successful treatment led to a significant decrease in cytokines levels, as shown in Tables 1 and 2.