Optimal use of corticosteroids and antibiotics is largely determined by the clinician's experience and the individual patient's response to therapy. A conservative approach would avoid prescribing corticosteroid treatment for presumed bacterial ulcers until the organism has been identified, the epithelial defect is healing, and/or the ulcer is consolidating. If the ulcer is associated with *Nocardia* or fungus, the outcomes of corticosteroid therapy are likely to be poor; for most bacteria other than *Nocardia*, the risk is low and the addition of corticosteroids may be beneficial.[185] Although a small, retrospective study that included fungal keratitis[186] found the use of corticosteroids in the initial treatment of corneal ulcers to be a risk factor for requiring a penetrating keratoplasty, a more recent clinical trial has shown that corticosteroids may not have this direct correlation.[181] Therefore, judicious use with close follow-up would be prudent.[181, 186, 187]

In cases where the corneal infiltrate compromises the central cornea, topical corticosteroid therapy may be added to the treatment regimen following at least 2 to 3 days of progressive improvement with topical antibiotic treatment, typically after identification of the pathogen (and after fungal infection has been ruled out).

The IOP must be monitored, and the patient should be examined within 1 to 2 days after initiation of topical corticosteroid therapy. Risks of long-term topical corticosteroid therapy, including cataract and glaucoma, should be discussed with the patient.

Despite the controversy, many experts believe that the judicious use of topical corticosteroids can reduce morbidity.[181] Patients being treated with ocular topical corticosteroids at the time of presentation of suspected bacterial keratitis should have their corticosteroid regimen reduced or eliminated until the infection has been controlled. Inflammation and symptoms (e.g., decreased vision, photophobia, lacrimation, injection, and hyperemia) may temporarily increase as corticosteroids are reduced because of the lack of local immune suppression. The increase in inflammation may not be due to worsening of the infection and, therefore, patients should be advised of possible increased symptoms. Chronic topical immunotherapy, such as use of corticosteroids, increases the risk of infectious crystalline keratopathy, which has the striking appearance of a snowflake or ice crystals in the stroma of the cornea. These can often be seen associated with sutures in the cornea or surgical or traumatic junctions within the stroma (e.g., graft-host junction of a penetrating keratoplasty).[188] Management of these infections often requires discontinuation of the topical immunotherapy and the addition of long-term therapy with topical antimicrobial agents to eradicate the typically encapsulating bacteria. These infections are extremely difficult to manage and often require surgical intervention to achieve successful treatment. Typically, these patients complain of only mild symptoms, such as blurred vision, and have a relatively asymptomatic course prior to diagnosis, most likely due to the topical immunotherapy and sequestration of organisms in biofilm.

Modification of Therapy

The efficacy of the therapeutic regimen is judged primarily by the clinical response. The results of cultures and sensitivity testing may have an impact on therapeutic decision-making, especially if the patient does not respond to initial therapy. When the patient is improving, therapy need not be adjusted solely on the basis of laboratory studies. Dual antibiotic treatment designed to achieve broad-spectrum coverage may become unnecessary once the causative organism has been isolated.

In general, the initial therapeutic regimen should be modified when the eye shows a lack of improvement or stabilization within 48 hours. Keratitis due to *Pseudomonas* and other gram-negative organisms may exhibit increased inflammation during the first 24 to 48 hours despite appropriate therapy. Several clinical features suggest a positive response to antibiotic therapy:[109]

- Reduced pain
- Reduced amount of discharge
- Reduced eyelid edema or conjunctival injection
- Consolidation and sharper demarcation of the perimeter of the stromal infiltrate
- Decreased density of the stromal infiltrate in the absence of progressive stromal loss
- Reduced stromal edema and endothelial inflammatory plaque