Treating resistant microbial infections with killer corneal cross-linking
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Microorganisms, like bacteria, are surprisingly resilient creatures. They are always evolving, and they are continuously able to outsmart science’s most advanced pharmaceutical agents. This problem is a significant concern when it comes to treating advanced corneal infections, and the community is always in search of finding the next cure-all. Therefore, corneal cross-linking (CXL) has recently been explored as an alternative treatment for resistant infectious keratitis (IK) cases.\(^1^\)-\(^5^\) CXL is a safe procedure for treating IK, and it is performed in a similar manner as CXL for corneal ectasias.\(^1^,\(^6^\)

CXL may combat IK through the following mechanisms:

- CXL directly kills microorganisms by interfering with their RNA and DNA.\(^1^,\(^7^\)
- CXL prevents corneal melting by increasing collagen fiber resistance and stiffness.\(^8^\)
- Apoptosis induced by CXL could help rid corneal infections.\(^3^,\(^9^\)
- CXL may produce free radicals that disrupt the microbial cell walls.\(^2^\)

A number of positive results have emerged from studies that have treated IK with CXL:

- An in vitro study found that CXL was effective at killing several resistant bacterial strains.\(^10^\)
- Rabbits with \emph{Fusarium} keratitis had a significant reduction in fungal load, fewer inflammatory cells, and fewer corneal stromal changes after CXL compared to controls.\(^6^\)
- A number of case reports and small studies have determined that CXL is an effective means of treating humans with resistant corneal infections (bacterial & fungal).\(^1^\)-\(^5^\)
- CXL can help avoid a penetrating keratoplasty during active infection, which can decrease transplant rejections.\(^1^,\(^2^\)

Although CXL may be close to FDA approval for treating conditions like keratoconus, CXL for IK is still in its infancy. Nevertheless, with the constant threat from resistant microbes, you can expect that CXL or other alternative treatments for IK will find their way into your practice, and it will be up to you to guide your patients towards the best treatment.

References:

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