The results of a recent case-controlled study suggest that homes where guns are kept are almost three times more likely to be the scene of a homicide than comparable homes without guns, even after the independent effects of victim age, sex, race, neighborhood, previous family violence, anyone using illicit drugs, and any history of previous arrests were taken into consideration.[15] A gun in the home did not afford protection from homicide by an intruder. Instead, guns were linked to a markedly increased risk of homicide at the hands of a spouse, a family member, or an intimate acquaintance.[15]

Does this mean that guns are inherently bad? Of course not. Two things must be present for gun violence to occur—violence and immediate access to a gun. In the absence of violence, a gun is no more dangerous than a bucket of gasoline. A lighted match can certainly start a fire, but the potential for serious injury or death is much greater if you toss in a bucket of gasoline. Likewise, violence can certainly cause harm, but the potential for serious injury or death is increased when a firearm is involved.

The question is this: How can we keep the two apart as often as possible? To paraphrase Sam Levinson, it is not hard to be brilliant. All you have to do is think of something stupid and do the opposite.[16] It's stupid to encourage people to keep guns in their homes for protection without a clear understanding of the overall balance of benefits and risks. It's stupid to let people who have committed a violent crime legally purchase guns because they were smart enough to plea-bargain their charge to a misdemeanor. It's stupid to ignore private sales and theft, which are the major sources of supply to the criminal market.[2,17] And it's stupid to permit firearms to be manufactured in the United States without any regard for safety, quality, or capacity for harm.[18]

Physicians are playing an increasingly important role in this debate. Organizations such as the American Public Health Association, the American Academy of Pediatrics, the American College of Surgeons, and the American College of Emergency Physicians have adopted strong position statements in support of efforts to curb firearm violence. To assume that gun control alone will cure our epidemic of violence would be naive. On the other hand, it would be equally naive to ignore the fact that firearms magnify the consequences of interpersonal violence.

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Ocular Infections—A Rational Approach to Antibiotic Therapy

UNTIL THIS CENTURY blindness was frequently the result of serious ocular infection. Before 1900 an estimated 20% to 79% of children in institutions for the blind in Europe were there because of gonorrheal ophthalmia at birth.[1] In the first half of the 20th century, the incidence of serious eye infections declined because of general improvements in health and nutrition and because of simple public health measures such as Credé's prophylaxis: 1% silver nitrate instilled into both eyes at birth. With the introduction of antibiotics in the 1940s, effective treatment of blinding ocular infections finally became a reality. Since that time, to echo a popular slogan, "We've come a long way."

In the review article elsewhere in this issue of the journal, Robert W. Snyder, MD, PhD, and David B. Glasser, MD, discuss in detail the current concepts of antibiotic therapy for ocular infections and the treatment regimen for some of the more common serious eye infections.[2] At first glance the most striking observation in the article is the wide choice of antibiotics available to clinicians today. Despite the emergence of new strains of bacteria that are more and more resistant to the antibiotics currently available,[3] there always seems to be a new "technologic fix" on the horizon that promises to keep us ahead of the game. The current "fix" in ophthalmology is a new class of antimicrobial agents, the fluoroquinolones. These agents initially held great promise as broad-spectrum antibiotics that could be used as monotherapy for the treatment of severe bacterial keratitis.[4] The emergence of resistant strains of bacteria, especially streptococcal species, however, has called into question the use of these

TABLE 1.—*Classes of Antibacterial Agents**

Penicillins	Tetracyclines
Cephalosporins	Chloramphenicol
β-Lactamase inhibitors	Lincosomides
Carbapenems	Aminoglycosides
Monobactams	Aminocyclitols
Macrolides	Metronidazole
Glycopeptides	Sulfonamides
Rifamycins	Trimethoprim
Peptolide	Fluoroquinolones

*From Jones.[6]

agents as the sole treatment of severe corneal infections.[5] But there are more antibiotics to choose from. In a recent review of the literature, 18 classes (Table 1) of antibacterial agents available for the treatment of infectious eye diseases were listed.[6] Third-generation cephalosporins like ceftazidime, β-lactamase inhibitors such as the combination of ticarcillin and clavulanic acid, and newer macrolides including clarithromycin and azithromycin have all filled important niches in the treatment of ocular infectious diseases. A glycopeptide, vancomycin, has assumed the primary therapeutic role in treating infections caused by methicillin-resistant staphylococci and streptococci. Resistance to vancomycin is rare. A new glycopeptide antibiotic, teicoplanin, has similar properties but has less vestibular toxicity and ototoxicity.[7]

Despite a veritable cornucopia of antibiotic agents, new strains of resistant bacteria continue to emerge at an alarming rate. Even more disturbing is the likelihood that fewer new antibiotics will be introduced in the next decade than in previous years because of the excessive cost involved in developing a new chemical product. It is likely that many more fluoroquinolones will be introduced and that they will have improved antibacterial activity, but in general, developments will focus on drug delivery and bioavailability.[8] Genetic engineering holds great promise for future rational drug design to tailor antibiotics to special needs. An example is the lantibiotics, a class of antimicrobial peptides that are synthesized by posttranslational modification. The range of biologic effects exhibited by lantibiotics is extraordinarily diverse and appears to be the consequence of several different mechanisms. An enormous variety of ribosomally synthesized and posttranslationally modified antimicrobial substances is possible, and these agents may prove to be the antibiotics of the future.[9]

Paradoxically, the current availability of so many excellent antibiotics has in some cases adversely affected the diagnosis and treatment of ocular infections. The management of severe ocular infections has traditionally depended on a rational stepwise diagnostic approach that included carefully taken specimens for culture, subsequent antibiotic sensitivity testing, and specific antibiotic therapy based on an etiologic diagnosis. Broad-spectrum antibiotic therapy, better known as "shotgun" therapy, was used only in the early course of an infection before a specific bacterial pathogen was identified. But with the increasing availability of effective broad-spectrum antimicrobial agents, the trend has been to forego the rational diagnostic approach and to depend on these new "superdrugs," either singly or in combination. A reliance on empirical treatment has also been driven by increasing concern about the cost-effectiveness of diagnostic procedures, specifically cultures and sensitivity tests.

In a recent survey evaluating community care of patients with corneal ulcers, antibiotic therapy was instituted without cultures being obtained in 48.7% of all cases being observed by general ophthalmologists. Of interest is that the figure for a tertiary care corneal and external disease service evaluating the same problem was 48.1%.[10] Compliance with standard recommended practice in the care of corneal ulcers appears to be poor, in this instance even by corneal specialists.

Antibiotic sensitivity testing has also been a mainstay of the rational approach to managing severe ocular infections. Admittedly, conventional laboratory tests using antibiotic disk diffusion on agar plates inoculated with the bacterial pathogen are crude in comparison with more sophisticated methods using in vitro broth dilution assays that test minimal inhibitory concentrations.[11] Other methods are being developed at present, however, that promise to revolutionize the concept of antibiotic sensitivity testing. With newer decimal assays, combinations of antibiotic drugs can be evaluated to determine whether there is an additive, synergistic, or antagonistic effect on the bacterial pathogen in question.[12] Highly accurate quantitation of the additive effects of two or more antibiotics on a specific pathogen will undoubtedly provide extremely useful information for clinicians who are caring for patients with severe ocular infections.

Empiric treatment of severe ocular infection without the benefit of cultures and sensitivities is fraught with unnecessary risk. Even if empiric broad-spectrum antibiotic treatment is effective in eradicating a pathogen, the toxic effects of the drug on the cornea or the retina may result in blindness. In the case of bacterial endophthalmitis, empiric broad-spectrum intravitreal therapy is always indicated at the time of diagnostic aqueous and vitreous aspiration, but because of the potential for retinal toxicity, some antibiotics should be avoided.[13] Aminoglycosides are especially damaging to the retina, producing macular infarction even while the infection is successfully responding to treatment. Mounting evidence suggests that aminoglycosides, including amikacin, have a threshold for retinal toxicity that is dangerously close to the therapeutic drug level. It also appears that ceftazidime has a much broader and safer dose range and that it is as effective as aminoglycosides for the treatment of ocular gram-negative infections.[14]

Snyder and Glasser have provided an excellent overview of antibiotic therapy for some of the more serious and refractory ocular infections seen by ophthalmologists. Their article is comprehensive and represents the standard of care for the rational approach to antibiotic

therapy. In this era of cost-benefit analysis, outcome studies, and practice guidelines, I applaud their concern for quality of care above all other considerations. In the treatment of severe ocular infections, the rational approach ultimately ensures both quality of care and cost-effectiveness. The price of failure is blindness. The measure of success is the gift of sight.

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