

Infection Control in the Optometric Office

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Abstract

This course describes in detail the rationale behind good in-office infection control, what pathogens are encountered in optometric practice, and how to affect proper infection control in the optometric practice.

Learning Objectives

1. To identify the need for infection control in the optometric practice
2. To identify the common pathogens encountered in the optometric practice
3. To examine the currently available anti-infective medications used in the optometric practice
4. To identify methods for proper in-office infection control

I. Introduction

A. Why Look at Infection Control in Optometric Offices?

1. Increasing number of different diseases
 - ◆ HIV—Not seen in man until 1978, now the leading cause of death, world-wide, in people under thirty
 - ◆ *Stenotrophomas maltophilia*—Not seen in man until 1970, now seen in 1 out of every 310 cases (10th leading cause) of culture-proven bacterial keratitis in Texas
2. Increased burden of infection control—Occupational Safety & Health Administration (OSHA) guidelines are being expanded to cope with changing diseases and treatments
3. Optometry has a duty to maintain the same standard of care as all doctors

B. Let's Look at Medical Microbiology

C. Let's Look at Ocular Infections and Infestations

D. Let's Look at Managing Ocular Infections and Infestations

E. Let's Look at In-Office Infection Control

II. Medical Microbiology

A. General Considerations

1. Medical Microbiology—The study of pathogens that cause disease in man
2. Pathogens can be:
 - a. Prion Infection
 - b. Viral Infection
 - c. Bacterial Infection
 - d. Fungal Infection
 - e. Parasitic Infestation
 - i. Protozoan infestation
 - ii. Helminthes Infestation

- f. Arthropods
- 3. Cells are the building blocks of living organisms
- 4. Only 10 % of the cells in the human body are human
- 5. Modes of Transmission—Reservoirs and Vectors
 - a. Reservoirs
 - i. Man
 - ii. Animal
 - iii. Insect
 - iv. Environment
 - b. Vectors
 - i. Oral-Fecal—Sort of self-explanatory, but includes raw meats, etc.
 - ii. Droplet —Coughs, sneezes, and body fluids
 - iii. Direct—Human touch or fomite (inanimate objects capable of harboring pathogens)
 - iv. Nosocomial—Infections originating in a hospital or other medical setting
 - v. Blood to blood
 - vi. Transplacental
 - vii. Sexual
- 6. Bioclassification (Example: *Mammalia Homo sapien caucasus*)
 - a. Kingdom
 - b. Genus
 - c. Species
 - d. Serotype (Virus) or Sub-Species (other)

- B. Prions
- C. Viruses
- D. Bacteria
- E. Fungi
- F. Parasites

III. Ocular infections and Infestations

- A. Prion Infections—None that we know of, but...
- B. Viral Infections
- C. Bacterial Infections
- D. Fungal Infections
- E. Parasitic Infestations

IV. Managing Ocular Infections and Infestations

- A. Managing Viral Infections
 - 1. Topical Antivirals
 - a. Viroptic (trifluridine)
 - i. Only active against Herpes Simplex Keratitis (HSK)
 - i. No Longer Expensive
 - b. Vira-A (vidarabine)
 - i. Only available in an ointment form
 - ii. Not used much
 - c. Vistide (cidofovir)

- i. Effective against many types of viruses—especially herpes viruses and adenoviruses
 - ii. Not yet available
- 2. Oral Antivirals
 - a. Zovirax (acyclovir)
 - i. Used for herpes viruses
 - ii. Used for lid lesions (Zoster)
 - b. Valtrex (valacyclovir)
 - ♦ A slightly better version of acyclovir?
 - c. Famvir (famciclovir)
 - ♦ Only needs to be taken three-times-a-day

B. Managing Bacterial Infections

- 1. Antibiotics only work against bacteria, branching bacteria, and as an adjunct to Acanthamoeba infections
- 2. Three basic mechanisms of antimicrobial action
 - a. Inhibit cell wall synthesis
 - i. Penicillins
 - ii. Cephalosporins
 - ii. Vancomycin
 - b. Inhibit protein synthesis
 - i. Aminoglycosides
 - ii. Chloramphenicol
 - iii. Macrolides
 - iii. Tetracyclines
 - iv. Bacitracin
 - c. Inhibit DNA synthesis
 - i. Trimethoprim
 - ii. Sulphonamides
 - i. Fluoroquinolones
- 3. Topical antibiotics
 - a. Aminoglycosides—Most against gram-negative bacteria
 - i. Gentamycin
 - ii. Tobramycin
 - ii. Neomycin (available as a combo drug)
 - iii. Azithromycin
 - b. Fluoroquinolones—most effective of topical antibiotics
 - i. Ofloxacin
 - ii. Ciprofloxacin
 - i. Norfloxacin
 - ii. Moxifloxacin
 - iii. Gatifloxacin
 - iv. Levofloxacin
 - v. Besifloxacin
 - c. Macrolides
 - ♦ Ilotycin (erythromycin)
 - d. Bacitracin
 - e. Sulphonimides
 - f. Polymixin B Combinations
 - i. Polytrim (trimethoprim/polymixin B)
 - ii. Polysporin (bacitracin/polymixin B)
 - iii. Neosporin (bacitracin/neomycin/polymixin B)
 - a. Chloroptic (chloramphenicol)
- 4. Oral antibiotics
 - a. Penicillins
 - i. Dycill (dicloxacillin)
 - ii. Amoxil (amoxicillin)
 - iii. Augmentin (amoxicillin / clavulanate)
 - b. Cephalosporins
 - i. Keflex (cephalexin)

- ii. Duricef (cefadroxil)
- c. Macrolides
 - i. E.S.S. (erythromycin)
 - ii. Zithromax (azithromycin)
 - iii. Biaxin (clarithromycin)
- d. Fluoroquinolones
 - ♦ Cipro (ciprofloxacin)
- e. Tetracyclines
 - ♦ Vibramycin (doxycycline)

V. In-Office Infection Control

A. In-Office infection control is all about the following:

1. Identifying sick people when they come in—before if possible
2. Sequestering sick people when they come in
3. Protecting the patient, the doctor, the staff, and the next patient from the sickness

B. Static vs. Cidal

1. Static—Prevents new growth, but does not kill existing organisms
2. Cidal—Kills the offending life form (virucidal, bacteriocidal, etc.)

C. Disinfection vs. Sterilization

1. Disinfection—All vegetative forms of life and viruses are irradiated
2. Sterilization—All forms of life, including spores, cysts, and viruses are irradiated

D. The Spaulding Classification

1. This classification is designed to determine what amount of infection control is required
2. Critical—Necessary when sterile tissue or vascular tissue is entered (corneal spuds, burrs, spatulas)
 - a. Heat or chemical sterilization required
 - b. Long-Term exposure to sporicidal chemicals
3. Semicritical—Necessary when mucosal tissue is entered (forceps, lacrimal dilators, canulas, tonometer probes)
 - a. Brief exposure to sporicidal chemicals
 - b. High level disinfection
4. Noncritical—Necessary when skin is touched (forceps, phoropters, stethoscopes, occluders)
 - ♦ Intermediate level disinfection

E. Methods of disinfection and sterilization

1. Hand washing—the single most important procedure for preventing nosocomial infections
2. Gloving
 - a. Non-Sterile
 - b. Sterile—Use a proper fit
3. Chemical disinfection
 - a. Isopropyl alcohol 60 %
 - b. 0.1 % sodium hypochlorite (bleach)
 - c. H₂O₂ (hydrogen peroxide)
 - d. Acetone solvent
 - e. Acetone/alcohol combinations
 - f. Gluteraldehyde
 - g. Phenols
 - h. DEBAC (Dimethyl Ethylbenzyl Ammonium Chloride)
4. Sterilization
 - a. Chemical
 - b. Dry heat
 - c. Autoclaving—Saturated steam under pressure

- F. The major infection control issues in the optometric practice**
1. **Surface disinfection**
 - a. Use after each sick patient
 - b. Do alcohol wipe off after each patient
 2. **Tonometer tip disinfection**
 - a. Disinfect after each use
 - b. Alcohol is okay, but dulls the tip
 - c. A saline rub doesn't do
 3. **Contact lens disinfection**
 - a. Don't use hydrogel trials when you can avoid it
 - b. When you can't, use H₂O₂ with long soak times (controversial)
 - c. Repeat on unused lenses each month
 4. **Instrument sterilization**
 - a. Clean first—use ultrasound
 - b. Use chemical disinfection
 - c. Use heat sterilization
 5. **Sharps and biohazard**
 - a. OSHA required
 - b. \$50,000 fine for recapping
 - c. Watch what goes into the regular trash
 6. **Ophthalmic drop instillation**
 - a. Don't touch the tips to anything
 - b. Date bottles
 - c. Change bottles at regular intervals

VI. Conclusion

- A. Have a system in place for controlling infection**
- B. Make sure you use that system**
- C. Keep yourself safe**
- D. Keep your doctor safe**
- E. Keep your patients safe**