Anti-infective Agents

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This unit looks at anti-infective agents. These are medications that are used to treat various infections that can occur in the body. Infections are caused by pathogens. Pathogens are disease producing organisms. The pathogens that most commonly cause infections are classified as bacterial, viral, or fungal.

Bacteria are single celled organisms that can be classified by shape and whether they are gram positive or gram negative. Bacillus shaped bacteria look like rods, and coccis shaped bacteria look like spheres. Bacterial infections are treated with antibiotics which either inhibit the growth of the bacteria or kill the bacteria.

Viruses are organisms that have to invade another cell to live. They are considered obligate organisms because of this fact. They splice themselves into normal body cells and multiply. Viruses do not respond to antibiotics. We have been able to develop vaccines to prevent some viral infections, like influenza, chicken pox, small pox, mumps, and rabies. Other viruses have no vaccines, like the cold virus and HIV. Some viral infections are treated with antiviral agents. They shorten the course of the infection and help to relieve symptoms, but the virus still runs its course.

Fungal infections are caused by an organism called a dermatophyte. They most commonly are superficial infections of the skin, mucous membranes, hair, nails, and moist skin areas. They can also occur systemically. They are treated with antifungal agents that are given topically, orally, or by the intravenous route depending on the site of the infection.

Medications that are used to treat infections work in conjunction with the body’s natural defense mechanisms. The natural defense mechanisms that help to fight infections include age, nutrition, immunoglobulins, circulation, white blood cells, and organ functions. When these natural defenses are impaired, the medications do not work as effectively.

Another issue that needs to be looked at when treating infections is resistance. Resistance is the ability of the organism to fight off the anti-infective agent and to continue to grow and reproduce. Some bacteria have a natural resistance to medications. This is why a culture and sensitivity study is often done with infections. This testing outlines which anti-infective agent will work against a specific organism. This allows the physician to order the anti-infective agent that will take care of the infection. There is also what is referred to as acquired resistance. Acquired resistance to anti-infective agents is caused from prior exposure to anti-infective agents. An example of this is MRSA. This is methicillin resistant staphylococcus aureus. It is resistant to methicillin, penicillin, and cephalosporins. There are only a few agents that will effectively treat a MRSA infection.

One cause for acquired resistance is the overuse and misuse of anti-infective agents. When anti-infective agents are taken unnecessarily or incorrectly, resistance can develop. This is one area that nurses can have an impact. Education on the correct use of anti-infective agents provided to the patient
can help to decrease resistance. Some important teaching is that antibiotics do not treat viral infections, antibiotics need to be taken as prescribed, and antibiotics need to be taken until gone, not stopped when they are feeling better.