THAT'S HOW YOU GET THAT?! INFECTIOUS DISEASE PATHOGENS & TRANSMISSION

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OVERVIEW OF THE ISSUE

Once folks become aware of disease of any kind, the typical first question is, “How can I get it?” Add an animal into the scene and the second inquiry naturally is, “Can my pet get it?” Almost immediately followed by, “Can we give it to each other?!” Of course, the answer to all of these very important questions is, “It depends…” Let’s explore all the characteristics on which these answers depend, beginning with what type of disease is it? Bacterial, viral, or fungal? Is it a parasite? Or a protozoa? Maybe a prion?

Pathogens are classified in multiple ways beginning with biological type. Bacteria are the oldest and simplest microbes and lack a proper nucleus. However, bacteria are able to reproduce without the support of a host. Only an estimated 5% of bacteria are pathogenic and produce disease. Viruses are among the smallest of all microbes and despite having a proper nucleus, cannot reproduce without the help of a host. Viruses have either RNA or DNA, but not both. Viral replication processes allow for mistakes or mutations much more often than other microbes. Fungi are basically plants that lack chlorophyll and are typically much slower growing than other microbes. Fungi, like bacteria, can be beneficial or pathogenic. Protozoa are a specific type of parasite that are typically found in the gastrointestinal tract of hosts. Helminths are large, can be visible to the naked eye and have a life cycle that requires them to exit the host for reproduction. Prions are unique among microbes in that they are simply misfolded proteins. Not much is known about prions, but the knowledge base continues to grow. All of these types of pathogens are found in veterinary medicine and are important for veterinary personnel to understand.

In order to be successful (and survive!) a pathogen must first colonize the host; After invasion, the pathogen must quickly locate a nutritionally compatible niche in the host body all the while evading the host’s immune responses; Naturally, once solidly established in the host, the pathogen must replicate and finally exit and spread to a new host. While each of the myriad of pathogens in the universe are uniquely special in their own way, all are transmitted via only a handful of mechanisms. There are multiple modes of transmission for infectious diseases that are important in veterinary medicine. While some sources may have slightly different names for the modes, the concepts will be the same. Modes of transmission include environmental surface or transmission via fomites, airborne transmission, vector-borne transmission, ingestion and transmission via direct contact. It’s impossible for a veterinary practice to be disease-free by it’s very nature the clinic will have sick animals entering. The situation poses a bit of a challenge as we want to make sure that clinics do not become the next site for an outbreak of any infectious disease in your community. Some mechanisms for control of transmission in the clinical setting include:

1. Quarantine
2. Isolation
3. cordon sanitaire

Working in veterinary medicine is indeed one of the most satisfying jobs on the planet. However, it's important to keep ourselves safe and healthy while we take care of those animals that need us. Understanding what's necessary for pathogens to thrive and survive as well as the different types of pathogens: bacteria, viruses, fungi, protozoa, helminths, and prions, is it necessary first step towards preventing pathogen transmission. Veterinary personnel are at risk for pathogen transmission via direct contact with infected animals and their fluids as well as through indirect contact through contaminated fomites. Clinical staff routinely encounter zoonotic pathogens such as influenza, dermatophytosis or ringworm, and gastrointestinal parasites such as hookworms. Because of the variability of pathogens in veterinary medicine it's important to remember the differences between modes of transmission.

OBJECTIVES OF THE PRESENTATION

1. List 3 zoonotic pathogens commonly encountered in animal care settings
2. Outline two different modes of pathogen transmission
3. Discuss broad-stroke mechanisms for controlling disease transmission
4. Explain the difference between quarantine and isolation
5. Outline when to implement isolation and quarantine protocols

SUMMARY

References/Suggested Reading

Nienhaus A, Skudlik C, Seidler A. Work-related accidents and occupational diseases in veterinarians and their staff. Int Arch Occup Environ Health 2005;78:230–238.