Bacterial Zoonoses: What You Don't Know Can Hurt You

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Zoonotic disease has always been an area where veterinarians have been involved. Zoonotic infections can be viral, bacterial, fungal and parasitic in origin. The veterinary profession has helped protect people from potentially lethal zoonotic infections, for example by widespread vaccination of domestic animals against rabies. Complacency over infectious diseases had increased in industrialized countries with the advent of antibiotics and vaccinations to the point where infectious disease was an issue apparently of little importance. Recent times have shown this assessment to be incorrect with new players such as HIV and more recently SARS. There are however still plenty of old players around that have not went away just because they were ignored, some of them are zoonotic. It is our duty as veterinarians to protect the general public from these threats as best as possible. It is also vital to have an understanding of zoonotic disease to prevent infection of those people routinely involved with large numbers of animals, namely the veterinary health care team including veterinarians. Fortunately many of the zoonotic diseases of concern are preventable or the chances of transmission to humans can be significantly reduced by proper education and management techniques.

Bacterial zoonoses

Many zoonotic diseases are bacterial in origin. Many of these bacteria are enteric organisms, as a result feces is a major way to spread these infections. Others can be transmitted via bites or scratches such as Bartonella. Especially with enteric bacteria it is important to remember that clinically healthy animals can still harbor pathogenic bacteria. Elimination of these bacteria is often not possible so it is very important that measures are put into place in practices to minimize the risk to other patients, staff and the general public. It is also very important to educate clients to the potential risks, especially if the household has members that are not fully immunocompetent.

Salmonellosis

Salmonellosis has received public attention on occasion. Most cases of this disease are acquired as a result of ingestion of contaminated food. Raw chicken and uncooked eggs are generally recognized as common sources of salmonella infections in man. The risks of exotic pets, especially in regard to turtles have also been widely publicized. Another area that has received some media attention is rawhide chews which can be contaminated with salmonella. Depending upon the source, a large percentage of rawhides and pig ears can harbor salmonella. In one outbreak it was shown that contact with the treats or pets that consumed them was responsible for human salmonellosis. Of 94 pig ear samples from retail outlets 51% were harboring Salmonella. Salmonella was also found in other treats including beef hoof, braided chews and similar products. Of great concern were outbreaks of multidrug resistant Salmonella typhimurium in small animal facilities including an animal shelter and 2 small animal clinics in 1999. In one veterinary clinic the likely source of the infection was a kitten with diarrhea, 10 of 20 employees developed clinical signs. In another instance one affected person was an employee and 2 were clients that had brought their cats to the clinic for treatment. After discharge the cats developed diarrhea and the owners subsequently became ill. This obviously raises the specter of liability for the pet and owner's illness.

It certainly is not surprising that dogs can also harbor Salmonella species. Most recent studies have shown a prevalence of around 1 to 2 % in normal dogs and cats. Percentages may be higher in animals with diarrhea. Very high prevalence had been found in racing sled dogs, where 69% of dogs without diarrhea were shedding salmonella. In Greyhounds with diarrhea 61% were positive for Salmonella, in non-diarrheic dogs the percentage was 11%. The increased proportion of Salmonella positive animals in these dogs may relate to the stress of athletic performance or to their diets.

Raw meat can be a source of salmonella infection in dogs. This has been shown in a variety of studies looking at athletic dogs such as Greyhounds and sled dogs that routinely receive uncooked meat as part of their diet. Recently there has been considerable interest in raw diets for pet dogs, the most popular called BARF (biologically appropriate raw food). The internet is replete with sites that popularize this type of diet and it's supposed health benefits. It does however mean that owners are routinely contaminating their environment with potentially infectious materials such as raw chicken. Dogs are not known to be especially clean eaters and it is highly likely that infectious organisms are disseminated throughout the home. In a recent study on a small number of dogs, 30% of dogs fed a BARF diet were shedding Salmonella, 80% of the food samples were positive. This has also been my personal experience where dogs fed BARF diets are positive for Salmonella (2 of 3 tested) even without clinical signs of diarrhea.

Campylobacter

The prevalence of campylobacter closely parallels that of Salmonella in cats, with approximately 1% harboring this infection. The prevalence in dogs is considerably higher in some studies where up to 28% of dogs are infected. Other studies however show the prevalence to also be around 1%. The majority of human cases are acquired by ingestion of contaminated food. The percentage of

poultry with campylobacter is higher than the percentage with salmonella. There is the possibility of spread from dog or cat to man. The majority of dogs will not show clinical signs if infected.

Leptospirosis

Vaccination has decreased the importance of certain strains of leptospirosis, namely L. canicola and L. icterohaemorrhagiae. Recently there has been an increasing frequency in which leptospirosis is diagnosed in dogs with renal failure. The causative serovars are considered the atypical ones and include L. bratislava, L. grippotyphosa, L. pomona, and L. autumnalis. Clinical signs are not specific enough to allow a clinical diagnosis without doing an MAT (microscopic agglutination test) to detect antibodies against the organism. Clinical signs can vary from inapparent to terminal acute renal failure. The majority of infections seem to occur in spring and fall, probably because of environmental conditions that favor the organism. Under the right environmental conditions it is possible for the disease to become almost epidemic in it's spread. The reservoir species include cattle, pigs, rodents, raccoons and skunks to name a few. Leptospirosis is also a major zoonotic organism in humans. Although dog to man transmission is rare, it can occur and veterinary staff dealing with these patients are at risk. Transmission is via urine, shedding can be prolonged if not terminated with antibiotics. Newer vaccines are available that protect against some of the atypical strains.

Prevention

Some very simple management techniques can prevent bacterial infections from being transmitted. Hand washing is vital; it should be done between each patient and certainly before eating. Food should also remain out of the area where animals are handled. In those cases with diarrhea or proven infections gloves should be worn when handling the patient and hands washed after removing the gloves. Patients with diarrhea, confirmed or suspected zoonotic infections should also be isolated from other animals, especially those that are very susceptible to infections such as those with major trauma, surgeries or on immune suppressive therapy. Animals fed raw meat diets should be considered carriers of pathogens until proven otherwise. Antibiotics should obviously be used wisely to limit the emergence of resistance strains. Dogs diagnosed with renal failure that do not have an obvious cause, i.e. ethylene glycol intoxication, should be tested for leptospirosis. Even after exposure a short course of antibiotics can prevent clinical disease in humans.

References

Available by request from the author