Brucellosis

Brucellosis, commonly known as Bangs disease, comes from the genus Brucella. Brucella is a highly contagious zoonosis contracted by the ingestion of unsterilized milk or meat products that are infected. It can also be contracted by the close contact with the animal secretions. Human to human transmission is rare but yet still possible by means of sexual contact or mother to child. Brucella is a small, gram-negative microbe that is non-motile and has non-spore forming rods. It functions as a facultative intercellular parasite that causes chronic disease and will usually persists for life.

Human symptoms are recognized by profuse sweating and muscle and joint pain. Brucellosis has been recognized in animals and humans since the 19th century. Brucellosis, when first discovered, went by the name of Malta fever. It first came to the attention of British medical officers in Malta during the Crimean war in the mid 1850’s. The relationship between organisms and the disease was first established in 1887 by Dr David Bruce. In 1897, Danish veterinarian Bernhard Bang isolated Brucella abortus as the agent “ Bangs disease”.

Maltesedoctorand archeologist Sir Themistocles Zammit earned his knighthood for recognizing unpasteurized milk as the major source of the pathogen in 1905. The species of the Brucella, Brucella abortus, is the main cause of brucellosis in cattle and bison. The bacteria are shed from an animal around the time of calving or pregnancy. Once exposed, the likelihood the animal becoming infected is variable depending on age, pregnancy status, and the amount of bacteria the animal was exposed to. The most common signs in animals are incidences ofabortion, arthritic joints, and retained afterbirth.

There are primarily two main causes of abortion in animals. One is due to the build up of erythritol which promotes infections in the fetus and the placenta. The second is due to lack of anti-brucella activity in the amniotic fluid during pregnancy. Males can harbor the bacteria in reproductive tracts like the testicles, epididymides, and seminal vesicles. Dairy herds in the US are tested at least once a year with a Brucella milk ring test (BRT). Cows that are found to be infected are often killed and disposed of. US veterinarians are required to vaccinate calves, thereby reducing the chance of zoonotic transmission.

This is referred to as a “ calfhood” vaccination. Most cattle will receive a tattoo in the ear after receiving the vaccination. Canada declared their entire cattle herd brucellosis free on September 19th, 1985. Ring tested ended shortly after in April of 1999 but monitoring still continues in auction markets. The first US state-federal cooperative efforts toward eradication of brucellosis were put into effect in 1934. Brucellosis has infected Ireland for decades. Farmers and veterinarians were bothered by the disease from the interaction with the livestock.

Ireland was declared free of the disease on July 1, 2009. Brendan Smith, Minister of Irelands agriculture, fisheries andfood, quoted that the elimination of the disease from the country was “ a landmark in the history of disease eradication in Ireland” Outbreaks of Brucella abortus and BSE in cattle, Cork RVL, 1990-2003. Along with livestock, dogs can also be infected by the genus Brucella. The species that affects dogs is Brucella canis. The disease is transmitted to other dogs though breeding and contact with aborted fetuses.

The bacteria can harbor in the dogs genitals and lymphatic system and may also spread to the eyes, kidneys, and intervertebral discs. Systems in dogs consist of abortions in females and males show signs of scrotal inflammation and orchitis (inflammation of the testicles. One of the last remaining controversial hot spots for brucellosis is Yellowstone National Park in Montana and Wyoming. The bison and elk that roam free in and around Yellowstone are said to be the last remaining reservoirs for brucellosis. A recent transmission from elk into cattle was recently reported in Idaho and Wyoming.

Cattle, elk, and bison keep a fairly spacious distance from each other let alone interbreed with each other. So how did the disease spread in between the three different species? Yellowstone biologists observed that the disease was being spread by sharing the same foliage in a given area. An infected ungulate would come by, forage on the grasses and shrubs, and leave behind a layer of saliva and mucous on the uneaten plants. The next animal would come by and feed on the same grasses and shrubs and contract the disease through close contact.

Although the disease would be ingested, the biologists believe that the disease what not acquired through the GI tract linings. Instead they believe the disease is absorbed into the body through the epithelial layers of the inner nasal canal and nasopharynx. With the animals nostrils being close to the plants while eating, it would be easy for the animal to inhale some of the existing mucous from the other animals into their own nasal canal. The current controversy about the brucellosis spread is issue with the bison and

elk from the Yellowstone herds possibly infecting the surrounding areas cattle herds.

Ranchers pay up-words of 13 to 15 dollars per cow, twice a year to vaccinate for the brucellosis disease. They are required to vaccinate their entire herd before the herd goes to summer pasture and after they return. Some ranchers pay up to $20, 000 every year for the brucellosis vaccines alone. This being said, the controversy isn’t the pay out for the vaccines every year, but because of the issue with the conservation of the bison and elk herds. The herds are usually situated on public lands and therefore are managed by the state and federal governments through hunting.

This management is believed by some to not be effective enough to eliminate the chance of brucellosis transmission within herds. Along with cattle and other livestock being infected, there comes the possibility of transmission from the livestock to humans. The infection in humans is usually caused by the consumption of unpasteurized milk and cheeses that are made from the milk of and infected animal. Cattle are the biggest concern being the main source of meat and dairy products, but other livestock can also pass the disease. One particular are goats.

Goats are commonly infected with the species Brucella melitensis. This disease is also passed by the consumption of the meats, milk, and cheeses consumed from this animal. Occupational exposure is a risk to lab workers, veterinarians, stockyard employees, and slaughterhouse workers. Some of the vaccines used for the livestock may also cause the disease in humans if accidentally injected. Once infected with the disease, it can induce

inconstant fevers, profuse sweating, weakness, anemia, headaches, depression, and muscular, joint, and bodily pain.

The duration of the disease can vary from a single week up to months and in some cases, years. The first stage is when septicemia occurs; this is followed by a triad of fevers, sweating, and migratory arthralgia and myalgia. If the disease goes untreated it may cause focalizations and become chronic. The focalization of the disease regularly occurs in the bones and joints and spondylodiscitis of the lumbar spine may occur. References: McLean DR, Russell N, Khan MY (October 1992). " Neurobrucellosis: clinical and therapeutic features".

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