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Popular Article

Control and Prevention of Anthrax

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Anthrax is a zoonotic disease caused by *Bacillus anthracis* is a gram-positive, rod-shaped bacteria that, can remain infective in soil for many years thus can be a potential source of infection for grazing livestock. The mechanical transmission can be occurred through biting flies and infected carcass. Anthrax vaccine is non encapsulated Sterne strain vaccine. This vaccine is used universally for livestock immunisation, at age of 2-4 weeks before expected outbreak/season, as it is a live vaccine, antibiotic should not be administered within one week of vaccination. Re-vaccination should be done in animal becoming sick after initial treatment of anthrax or vaccination. Animals should be moved to another pasture, away from where the carcass or any possible soil contamination. Suspected contaminated feed (meat meal, bone meal etc) should be immediately removed. Immunisation and specific control procedure are necessary to control the disease and prevent its spread. These include the following:

1. Notification of the appropriate regulatory official
2. Rigid and force meant of quarantine. (After vaccination, 2 weeks before movement off the farm, 6 weeks if going to slaughter).
3. Prompt disposal of dead animal, manure, bedding or other contaminated material by cremation or deep burial with quicklime.
4. Isolation of sick animals and removal of animals from contaminated area.
5. Cleaning and disinfection of stable, pen, milking barns and equipment used on livestock farm.



6. Use of insect repellent
7. Control of the scavengers that feed on dead animals.
8. Observation of general sanitary procedures by people who handle disease animal slaughter house workers, routine vaccination is suggested for these personnel.
9. Formaldehyde can be used decontaminate infected soil.
10. Infection through clinical samples to lab workers can be avoid by sanitary practices. Risk for workers who come in contact with imported animal hides, fur, bone meal, animal hair or brittle etc can be reduced by improvement in industry standards and import restriction. Routine pre-exposure vaccine is recommended for people in this kind of group.
11. The administration of hyper immune serum to in contact animals may prevent further losses during the quarantine period but prophylactic administration of a single dose of a long-acting tetracycline or penicillin is much common practice.
12. When spore formation expected to have begun (within few hours of exposure to air) disinfection is almost impossible by ordinary means. Strong disinfectant such as 5% Lysol required being in contact with spores for at least two days. Strong solution of formalin or sodium hydroxide (5% to 10%) are probably most effective. Peracetic acid (3% solution) is an effective sporicidal, if applied to soil in appropriate amount (8L/m²). It is an effective sterilant. Veterinary anthrax vaccine contains spore form attenuated strains of B. anthracis and are classified into two categories
 1. **live attenuated vaccines**, encapsulated and non-toxicogenic: (cap⁺/tox⁻)- Strain used in these vaccines are lost to the plasmid pXO1 encoding the capsule antigen.
 2. **live attenuated vaccines**, non-encapsulated and toxicogenic: (cap⁻/tox⁺)- Strain used in these vaccines are lost to the plasmid pXO2 encoding the capsule antigen.

The sporulation character of both vaccine classes has the advantage of keeping the live vaccine viable over long period. The Pasteur vaccine has disadvantage that the various animal tissues show varying susceptibility to vaccines and anthrax may result from vaccination in some cases. For overcoming the virulence use of saponin or saturated saline solution in the vehicle to delay the adsorption in carbozoo vaccine.

Sterne vaccine has overcome the risk of causing anthrax by vaccination and produce a strong immunity. A febrile reaction does occur after vaccination, the milk yield of dairy cows will be



depraved and pregnant sow will probably abort. Ring vaccination has been used to control outbreak of disease. Surface contamination of a pasture can persist for three years and cattle grazing this pasture should be re-vaccinated annually for this period. Milk from vaccinated cow is usually discarded for 72 hours after the injection. Ordinarily the organism of the Sterne vaccine do not appear in the milk and cannot be isolated from blood for 10 and 7 days respectively after vaccination. Vaccinated animals are usually withheld from slaughter for 45 days. Death as a result of anthrax have occurred in three months old llama after vaccination with a Sterne vaccine due to overdose. In these species and goats 2 dose of vaccine one month apart should be given with first dose one quarter of the standard dose.

Anthrax vaccine adsorbed- Active immunization against *Bacillus anthracis* prepared from a cell-free filtrate of *Bacillus anthracis* but no dead or live bacteria use in humans.

For prophylaxis 3 doses of vaccine should be given. Primary series of vaccine should be given @dose of 0.5 ml I/M at 0, 1 and 6 months. Booster series given @dose of 0.5ml I/M at 6 and 12 months after primary series and then 1-year intervals. 0.5 ml S/C vaccine at 0, 2 and 4-weeks post-exposure combined with antimicrobial therapy should be given as post-exposure prophylaxis. Anthrax is living spore of encapsulated a virulent strain Sterne 34F2 vaccine. The dose rate in cattle is 1ml, in sheep goat 0.5ml S/C.

1st vaccine should be given at 3-6 month of age and then annually. In endemic areas re vaccination at 6-month interval is recommended. This vaccine can be used during pregnancy and lactation. It is available in 100 ml vials (100 dose for cattle and 200 dose for sheep / goat)

Anthrax as biological weapon- Anthrax can be created easily in lab and is incredibly durable. The spores of anthrax bacteria can lie dormant for years before entering in a living host where were they reactive and multiply. These characteristics make anthrax an extremely dangerous bioterrorism weapon. Anthrax bacteria has been used in bioterrorism and warfare since World War I when Scandinavia deployed anthrax against the Imperial Russian Army. It also used by the British army during World War II to weaken German livestock. More recently anthrax bacteria used in bioterrorism attacks in Japan and United States (1993). In 2001 letters contaminated with *B. anthracis*/ anthrax spores were mailed to several news media offices, results in death of 5 people and infection of 17 others.

