Neurological disorder in dairy cattle in Brazil associated with the contamination of beer residue by Aspergillus clavatus

Loretti, A.P.1*, Colodel, E.M.1, Dreimeier, D.1, Corrêa, A. M.1, Seitz. A. L.1, Ferreiro, L.2


Introduction: A tremorgenic syndrome in cattle and sheep has been linked to the consumption of malting by-products contaminated with Aspergillus clavatus. This report describes an outbreak of this neuromycotoxicosis in dairy cattle in southern Brazil associated with the feeding of moldy beer residue.

Material and Methods: Signalment, history, clinical findings and management of the herd were retrieved with the owner. Three cows were necropsied. The CNS and organs were fixed in 10% formalin, processed for histology and stained with HE. Immunohistochemistry was performed using a streptavidin-peroxidase complex kit for a monoclonal antibody to detect prion protein (PrP) in brain tissue. Creatine kinase (CK) activity was evaluated. Samples of the beer by-product was sent to mycology. Neither the beer residues' samples nor the isolated fungus were submitted to toxicological analysis since that chemical assay was not readily available for diagnostic purposes in local laboratories. The same foodstuff fed to cattle was dosed to a sheep that was euthanized and necropsied and the tissues examined by histopathology.

Results: The disease occurred on a farm in June 2001. Seven out of 45 cattle were affected in 3 weeks. The animals died spontaneously or were euthanized 2-14 days after the onset of the disease. Clinical signs consisted of flaccid paralysis and gait abnormalities, more pronounced after exercise e.g. stiff, unsteady gait and knuckling at the fetlocks of the hind limbs, frequent falling, inability to rise, muscular tremors of the head and hindquarters and drooling. Main necropsy findings included paleness of the larger medial muscle groups of the hind and forequarters. Histopathology revealed chromatolysis of selected nuclei of the brainstem and neurons of the ventral horns of the spinal cord. The cytoplasm of the neurons was shrunken and eosinophilic, pale or vacuolated. White matter vacuolation of the brainstem was observed in 1 animal. Immunohistochemistry for PrP was negative. Degenerative and necrotic changes of the skeletal muscles were also seen. One cow had increased CK activity. No clinical signs and gross changes were observed in the experimental sheep but microscopic lesions similar to the spontaneous cases were seen in the spinal cord. Coarse, white-grey lumps (mycelia) were detected in the beer by-product fed to cattle from which A. clavatus was isolated. Deaths ceased after the foodstuff consumption was discontinued. Recovery was observed in one animal.

Discussion: It is suggested that the moldy batches of the beer by-product accumulated a highly toxic and almost pure culture of A. clavatus. It is suggested that the gradual ingestion of small amounts of neurotoxic metabolites from this saprophytic fungus for a prolonged period of time caused the neurological syndrome since its mycotoxins have a cumulative effect.

56