

Polioencephalomalacia in cattle, 2012~2016

Ji-Youl Jung, Kyunghyun Lee, Byungjae So, Eunjin Choi Choi*

Animal Disease Diagnostic Division, Animal and Plant Quarantine Agency, Gimcheon 39660, Republic of Korea

Introduction: Polioencephalomalacia (PEM) is a non-infectious disease of ruminants such as cattle, sheep, and goats that is clinically characterized by nervous signs as a consequence of necrosis in the gray matter of the cerebral cortex. The clinical signs in cattle with PEM include ataxia, temporary blindness, circling, restlessness, sensitivity to light, standing in a corner, mild excitation, and loss of appetite. In more severe cases, hyperexcitability, rigidity, head pressing, severe seizures, coma and finally death have been observed. Thiamine deficiency, lead and salt toxicities, and sulphur intoxication are known etiological factors of PEM. PEM is well-recognized syndrome in sheep, goats, and cattle, but we have little information in Korea. In the present study, we describe the prevalence and pathological features in blood of bovine PEM diagnosed in Animal and Plant Quarantine Agency (APQA).

Materials and Methods: Tissues or bodies from 1,151 cattle farms were submitted to the Animal Disease Diagnostic Division, APQA for disease diagnosis in 2012~2016. After postmortem examination, all tissues including brain were fixed in 10% neutral buffered formalin solution and embedded in paraffin wax for histopathology. The embedded tissues were sectioned and subsequently stained with haematoxylin and eosin. Tissues were collected for etiological examination: PCR, RT-PCR, bacteria isolation, blood chemistry for thiamine, etc.

Results: Prevalence of PEM in cattle was median 2.35% in 2012~2016: the year of 2012 (2 cases, 0.68%), 2013 (2 cases, 0.72%), 2014 (16 cases, 6.27%), 2015 (3 cases, 1.66%), 2016 (4 cases, 2.78%). We were able to observe local or diffuse necrosis, softening and yellow discoloration of affected cortical areas, and its autofluorescence in the gray matter of the cerebrum under ultra violet light in all PEM cases. The most prominent lesions were localized in the cerebral cortex. Histopathological findings that were common to all cases included abundance of glial cells with vacuolar large cytoplasm, gliosis, neuronal necrosis, pericapillary edema, perivascular cuffing with monocytes, neutrophils and/or eosinophils, etc. The thiamine levels in whole blood was determined. Reference range of thiamine in cattle is 75-185 nmol/L. Thiamine values in case and affected animals were 6.0-167.13 nmol/L.

Conclusions: Bovine PEM has been sporadically occurred in Korea. Like many countries, bovine PEMs in Korea were related with necrotic lesions in the gray matter of the cerebral cortex. Thiamine deficiency was regarded as a main cause of PEM in Korea.

References

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Preventive effects of soyasaponin Ab against postmenopausal osteoporosis

Han-Jun Kim¹, Eun-Ji Choi¹, Chan-Woong Choi¹, Kyung Wha Sah¹, Hyo Sung Kim¹, Woo-Duck Seo², Sun Hee Do^{*1}

¹Department of Veterinary Clinical Pathology, College of Veterinary Medicine, Konkuk University; ²National Institute of Crop Science, Rural Development Administration

Introduction: Osteoporosis is one of the diseases that occur after menopause, which causes serious problems such as skeletal deformity, pain, and economic burdens. Here we assessed the anti-osteoporotic effects of the soyasaponin Ab treatment for the possible alternative therapy.

Materials and Methods: Female 8-week-old C57BL/6 mice (n=40) weighing an average of 25 g were ovariectomized at the age of 9 weeks. The OVX mice were randomized and divided into experimental groups (n=10 per group). The experimental groups included Con (sham-operated), OVX (only OVX, untreated), GSGE (OVX + GSGE 5 mg/kg in saline), and SOYA-3 (OVX + soyasaponin Ab 5 mg/kg in saline). Treatment was initiated 1 week after the operation and continued for 10 weeks. Anti-osteoporotic activities were analyzed by Micro-computed tomography analysis (μ CT), serum biochemistry, and histological analysis.

Results: *In vivo* studies showed significant improvement in serum bone alkaline phosphatase (BALP) activity in the soyasaponin Ab treated group ($p < 0.01$). The μ CT analysis revealed that trabecular bone volume and bone mineral density were increased in soyasaponin Ab group ($p < 0.01$). Moreover, the histological analysis indicated that bone volume density (bone volume / trabecular bone volume, %) was significantly increased in 5mg/kg of soyasaponin Ab treated groups compared to negative control group (OVX) ($p < 0.01$).

Conclusions: In conclusion, the use of a soyasaponin Ab can be a promising alternative to conventional therapeutic approach for osteoporosis by preventing bone loss.