

Variation of liver mineral concentrations in Florida beef cattle diagnosed with ovarian follicular dysplasia

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Introduction

Ovarian Follicular Dysplasia (OFD) is a slowly progressive bilateral abnormal growth and/or development of ovarian follicles eventually transforming into Sertoli-form Granulosa Cell Tumor. Cattle with OFD are often infertile leading to culling from the herd. The leading cause of infertility in Florida beef cows is OFD. The purpose of this study was to describe OFD through mineral analysis in order to lay the groundwork for ante-mortem identification of OFD. Additionally, mineral analysis may provide evidence of inciting factors surrounding the development of OFD.

Materials and Methods

Twenty-eight cows and/or heifers with subfertility and 2 “control” fertile females from 2 Florida beef herds were sampled. A total of 30 Florida beef cows and heifers were followed to slaughter. Ovaries, uteri, oviducts, and livers were collected post-mortem and graded for presence of OFD (0–IV) and other diseases. The liver samples were sent to the Kentucky State Diagnostic Laboratory for micro- and macro-mineral analysis.

Results

Histological analysis of the ovarian tissues from these cattle indicated that OFD was diagnosed in 10/15 (66.7%)

heifers and 14/15 (93%) cows from the first and second ranches, respectively. At the first ranch, 10 animals had grade I OFD and at the second ranch 7 were grade I, 5 were grade II, and 2 were grade III. Additionally, sodium, arsenic, cobalt, cadmium, and barium were all found to be positively associated with increasing severity of OFD. Grade III OFD cattle had significantly ($P=0.05$) higher concentrations of sodium, arsenic, cadmium, and barium in relation to non-OFD cattle, and grade I OFD cattle. Cobalt, cadmium, and barium levels were significantly ($P=0.05$) increased in livers of grade II OFD cattle as well. However, copper and lead levels in the liver were negatively associated with the severity of the OFD. The grade II and III OFD cattle had significantly ($P=0.05$) lower quantities of copper and lead when compared to that of the non-OFD cattle. There were no significant differences in any of the remaining mineral analysis.

Significance

Conclusions: Of the ranches sampled, 86% of the sub-fertile cattle were OFD positive. Levels of sodium, cadmium, copper, and barium have potential for diagnostic value in identifying cows affected with OFD. There is a correlation between specific liver mineral concentrations in OFD cattle, but it is unknown if this is a cause or an effect of OFD.