Morphological characteristics of ovarian follicular dysplasia (OFD) observed by ultrasound in four Florida beef herds

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A slaughterhouse study commissioned by Florida Cattleman’s Association in 2007, identified ovarian follicular dysplasia (OFD) as a primary cause of infertility in Florida beef cows. Ovaries with OFD have progressive bilateral development of solid clustered follicles containing multiple Call-Exner bodies that originate in the rete ovarii and the hilar region, and progress into the cortex to eventually form bilateral Sertoli-type granulosa theca cell tumors (GTCT). The goal of this study was to access the usefulness of ultrasound by bovine practitioners for on-farm diagnosis of ovarian follicular dysplasia. Ultrasound images of right and left ovaries from 390 cull cows and heifers representing four Florida ranches were made with 5 MHz linear probes (Aloka, Ibex) and 10-12 females per ranch were followed to slaughter the following day for collection of reproductive tracts. Fixed ovaries were measured, sectioned para-sagittal through the hilus, photographed, and arranged in histology cassettes for complete examination of the cut surface. Large ovarian structures including corpus luteum, Graafian follicles, atretic follicles, dysplastic follicles, rete ovarii, dysplastic follicles and tumors were counted and measured for each ovary. Ovaries with OFD were graded I to IV. Grade I OFD contained small individual dysplastic follicles with diameter less than 200 µm mostly limited to the rete ovarii and medulla. Grade II OFD possessed dysplastic follicles greater than 200 µm diameter that were present in the medulla and cortex. Grade III OFD had extensive multi-sized dysplastic follicles scattered throughout the entire cortex of the ovary and Grade IV OFD had Sertoli-type GTCT. Grade II-IV often had dystrophic mineralization of dysplastic follicles. Gross morphology of fixed sagittal sections and ultrasound images were blindly compared against OFD grade in 40 individual ovaries. Ovarian follicular dysplasia was identified at slaughter in 29/41 cows and in 1/5 of heifers. The distribution of OFD for 30 affected females was Gr I 16/30, Gr II 9/30, Gr III 4/30 and Gr IV 1/30. Characteristics that could be detected by routine ultrasound included increased size and length, increased hyperechogenicity and decreased number of fluid filled follicles. Hyperechogenic shadows were evident in higher grade OFD. The study demonstrated that Grade III and IV OFD can be observed by routine ultrasound but Grade I and II may require higher resolution ultrasound probes, imaging analysis software or Doppler ultrasound.

Keywords: Follicular dysplasia, bovine, ultrasound, Call-Exner bodies, Sertoli-type granulosa theca cell tumor