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385P The effects of a low-nutrient diet on the prevalence of right ventricle hypertrophy and bursal atrophy in two strains of commercial broilers.

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Conventional broilers are often affected by pulmonary hypertension, right ventricle hypertrophy (RVH), ascites, and immunosuppression, which are all major welfare and production concerns. Previous studies have suggested that reducing growth rate via dietary manipulation can alleviate some of these issues. This study compared the effects of a low-nutrient (LD) diet vs. a conventional (CD) diet on 2 strains of conventional broilers (Strain A and Strain B) to determine if reducing growth through diet can improve cardiovascular health. The LD diet contained 2% lower crude protein throughout the trial. A total of 624 birds from 2 strains of mixed sexed broilers were placed in 24 pens (26 birds/pen; 23.2 kg/m²). Half of the pens were fed a LD diet, and the other half were fed a CD diet. Feed was provided ad libitum. Biweekly individual body weights (BW) were measured. On d 28, 4 birds/pen (n = 96) were selected as sentinel birds based on BW. Birds were processed on d 46. Carcass weights were determined, along with harvesting hearts and bursa of fabricius. Some were damaged during harvesting, leaving 88 samples. Bursas were weighed and the ratio of bursa:total body weight (B:BW) was determined. Ventricles were removed, separated, and weighed to determine the right ventricle to total ventricle (RV:TV) weight ratio. Data were analyzed using a complete randomized design with a 2 × 2 factorial arrangement of strains (A and B) and diets (LD vs. CD) as fixed effects, using Proc Glimmix in SAS. Overall mortality and culling averaged 1.28%. Diet affected BW at d 42; CD (2.8kg; SEM ± 0.0305) birds were heavier than LD (2.7kg; SEM ± 0.0308) birds (P = 0.006). No interactions were observed (P = 0.47) between diet and strain on any heart or bursal weights. Diet did not affect RV:TV (LD = 0.155; CD = 0.161; SEM ± 0.0352; P = 0.11) or B:BW (LD = 0.131; CD = 0.137; SEM ± 0.0419; P = 0.48) between groups. Strain did not affect RV:TV (Strain A = 0.156; Strain B = 0.160; SEM ± 0.0354; P = 0.62) or B:BW (Strain A = 0.135; Strain B = 0.133; SEM ± 0.0421; P = 0.84) between groups. There were no differences in RV:TV ratio across diet (P = 0.28) or strain (P = 0.52), although 21 out of 88 (23.9%) birds exhibited below healthy RV:TV ratios based on published literature (0.14 < healthy < 0.24). There were also no differences in B:BW ratio across diet (P = 0.54) or strain (P = 0.78), although 29 out of 88 (33.0%) birds exhibited lower than healthy B:BW ratio based on published literature (healthy > 0.11). Overall, there were no differences between strains or diets on RVH or bursal atrophy, although a portion of these birds exhibited signs of impaired cardiovascular health and bursal atrophy when compared with published literature.

Key Words: broiler, diet, right ventricular hypertrophy, bursal atrophy, health