

Feedlot Heart Failure: Where are we, and what have we learned?

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Feedlot congestive heart failure (CHF) has been recognized as a growing threat to our feedlot industry. It is important to differentiate this condition from other known causes of heart failure in cattle. Congestive heart failure is a non-infectious condition that occurs at low to moderate elevation (separating it from traditional high-altitude disease) and has observable signs such as edema (fluid) build up in the brisket area, jugular vein distension, abdominal swelling, difficulty breathing, sway back, and abducted elbows. This condition is considered 100% fatal. On necropsy we reliably see severely enlarged right side of the heart, severe liver congestion (back up of blood), and fluid in the abdomen and chest. Recent estimates of mortality rate attributed to CHF is ~4% of feedlot deaths.

Unfortunately, there is much we still do not understand about the mechanisms of how or why this disease occurs. It is generally understood that low levels of oxygen transfer in the lung sets off a cascade of events leading to increased pressure in the pulmonary artery followed by overwork and thickening of the right side of the heart, ultimately leading to clinical signs and death. However, this still doesn't answer the "why". Several research groups from across the nation have tried to tackle this issue to provide needed information to help fill in the knowledge gap. From some recent research conducted at K-State, health records indicate that cattle succumb to CHF on average 110 days on feed. It is important to note that CHF does not only occur in the late days on feed, and this condition can occur throughout the feeding period. This tells us that growth management and nutrition may play a role, but probably doesn't account for everything. Research from CSU has highlighted that heart changes are more prevalent at slaughter than what we see from death loss at the feedlot. This means a much higher percentage of cattle are beginning to have remodeling of the heart. Showing differences in the heart at slaughter within our feeding population allows researchers to obtain a needed measurement of animals that were not as far along in the disease process.

What about genetics? The US Meat Animal Research Center and the University of Nebraska-Lincoln have been working towards finding genetic risk factors that may be playing a role in this disease. By comparing the genome of pairs of impacted animals' vs normal pen mates from similar genetic background they were able to find heart failure risk markers. To clarify, they did not find a genetic defect or any specific trait that directly causes congestive heart failure. They did find two specific gene markers that when cattle have both, are at a much higher risk of developing heart failure. Current work from many different organizations are looking at connections of these markers to any other production trait as well as matching an easy to obtain phenotype (heart score) to potentially create better predictive breeding tools to help industry.

While many breakthroughs over the past several years have increased our knowledge and understanding of this disease, there is still much to learn on how to reduce the impact to our industry. Like most complex problems, overcoming the challenges of congestive heart failure at the feedlot will take teamwork between industry, academia, and government. With a shared view and continued emphasis of a multi-pronged approach through research discovery, education, implementing sound management decisions this challenge can be overcome.

More information on this disease, including images of animals with symptoms, can be found here:
<https://www.ars.usda.gov/plains-area/clay-center-ne/marc/bchf/bchf-main/>

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