TEXAS TECH UNIVERSITY

HIGH ALTITUDE DISEASE, PAP, FEEDLOT HYPERTENSION, AND RESPIRATORY ISSUES

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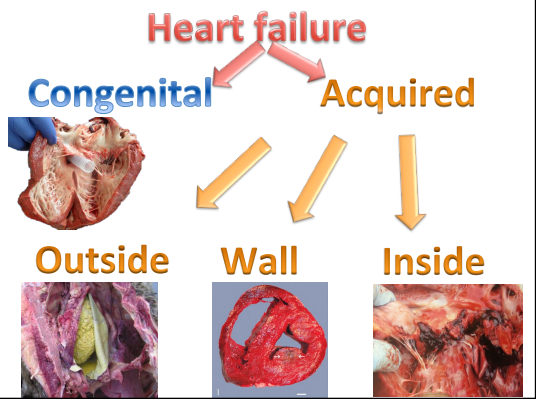
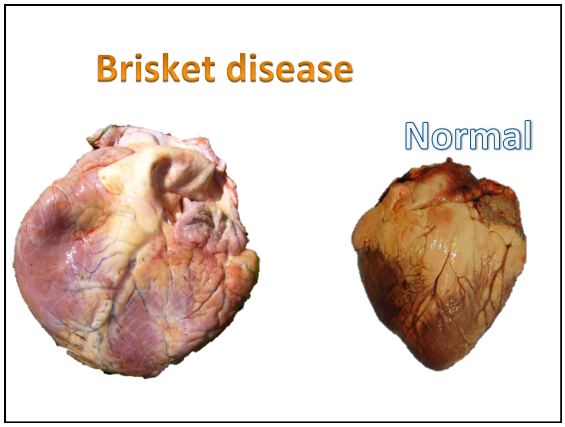
Range Beef Cow Symposium,
November 18th, Loveland, CO.

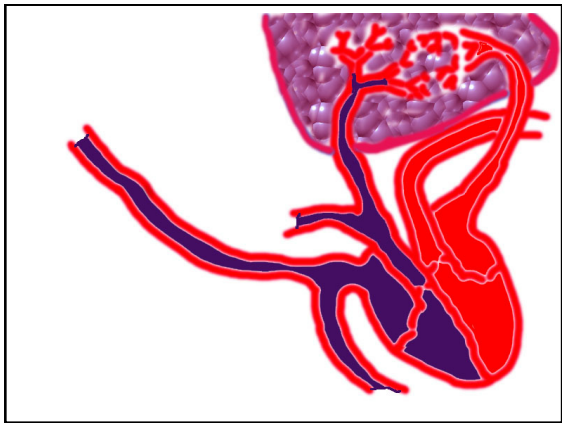
1. BRISKET DISEASE, or congestive heart failure, IS NOT UNIQUE TO HIGH ALTITUDE
2. Congestive heart failure is becoming INCREASINGLY PROBLEMATIC
3. TAKE A CLOSER LOOK – it may not be a chronic pneumonia!

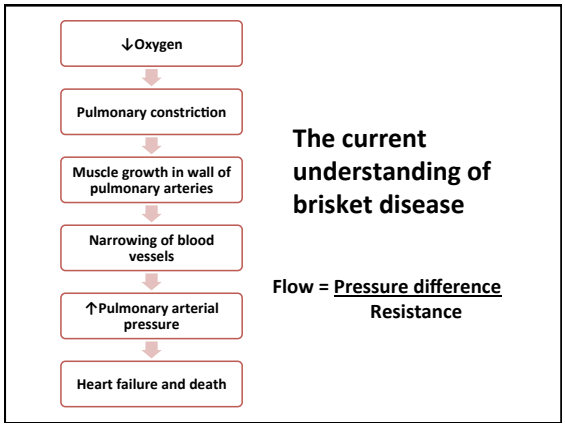
OVERVIEW

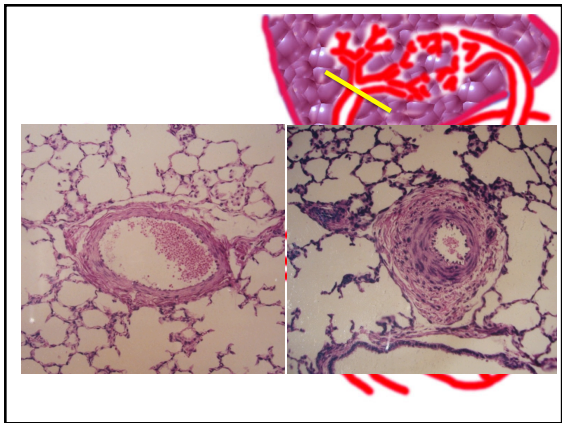
1. Background: the various types of heart failure
2. What is congestive heart failure?
3. What are we doing to manage it?
4. How big of a problem is it? And what are the risk factors?
5. How do pulmonary arterial pressures change with age?
6. Summary

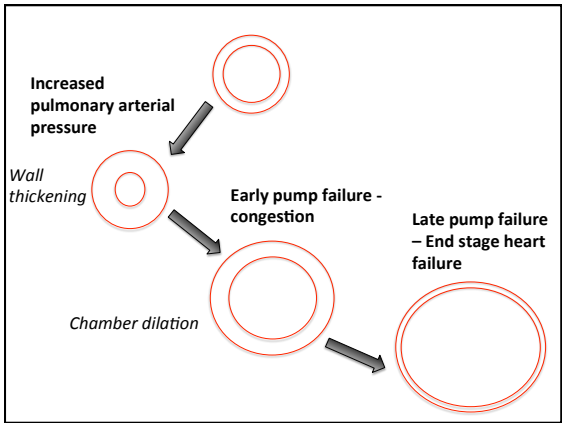


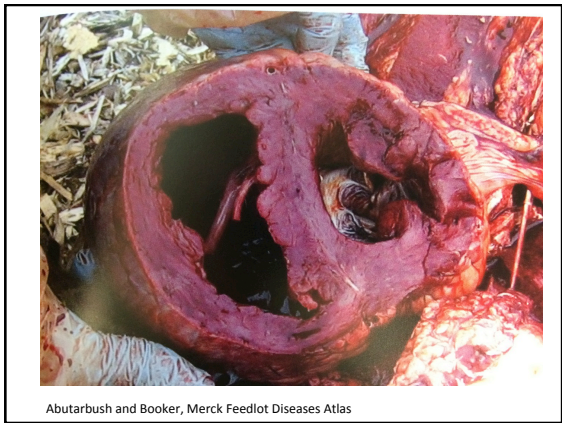




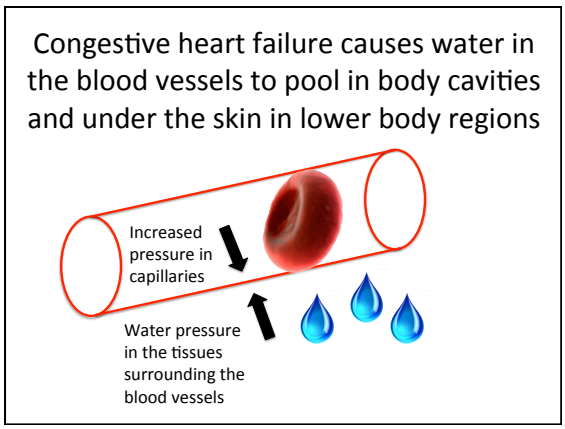




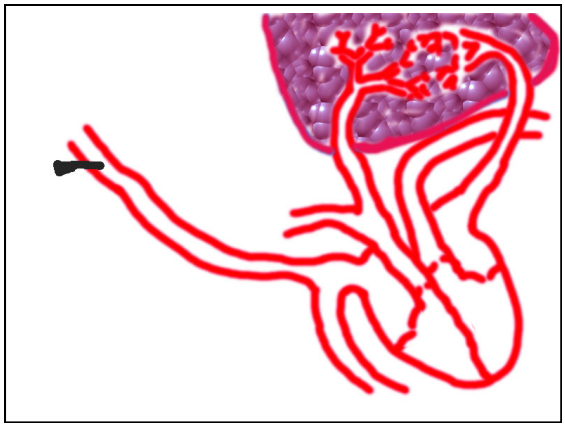


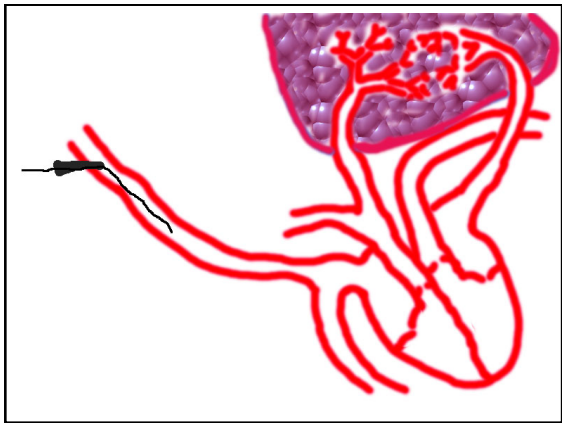


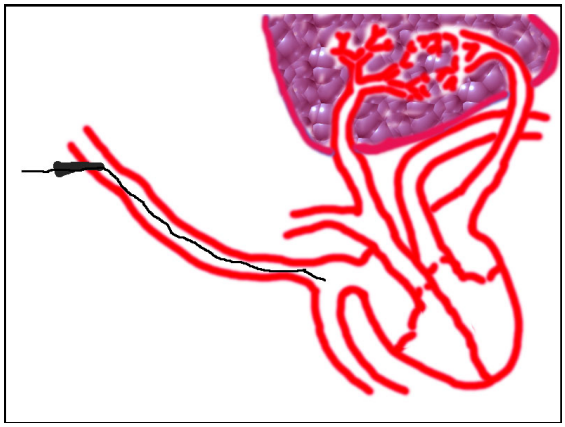
Abutarbush and Booker, Merck Feedlot Diseases Atlas

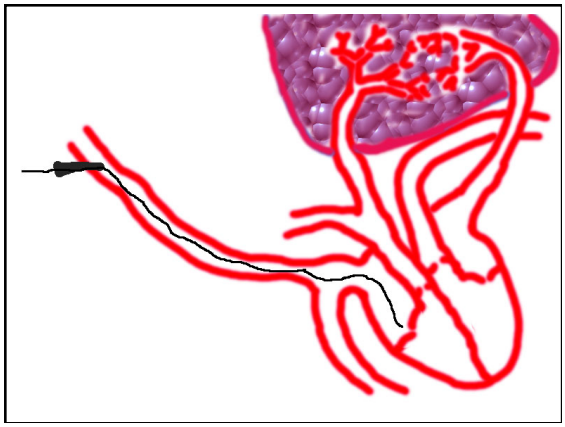


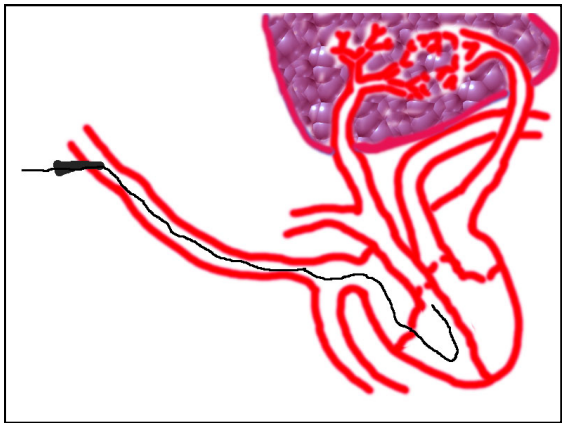
So what is being done?

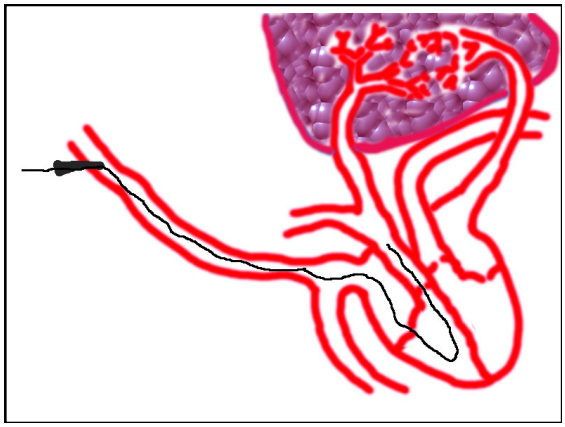












The importance of PAP screening of the breeding herd

Variable	Survived		Died		p-value
	n	Mean ± SD	n	Mean ± SD	
Mean PAP, mm Hg	51	39.5 ± 5.1	6	48.8 ± 11.1	< 0.001

Calves with high PAP at 3 months of age are significantly more likely to die of brisket disease

Congestive heart failure is becoming INCREASINGLY PROBLEMATIC

How big of a problem is congestive heart failure?

Study of 1.6 million cattle

Feedlot Health Management Services (Okotoks, AB, Canada) provided the data.

10 Canadian feedlots: 657-1,145 m (2,150 - 3,760 ft.)

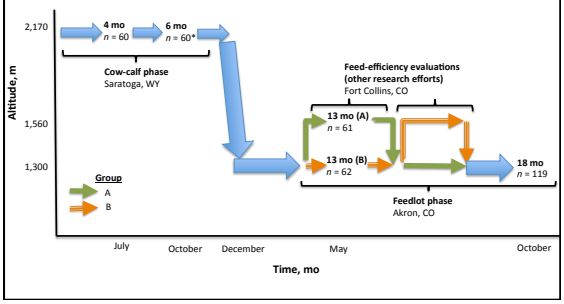
5 US feedlots: 596-1,282 m (2,000 - 4,210 ft.)

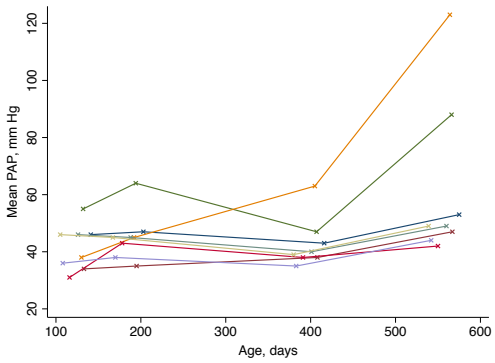
Variable	Category
Feedlot	15 feedlots identified by a unique number
Placement year	2000, 2004, 2008 and 2012
Season of placement	January 1st to April 30th May 1st to August 31st September 1st to December 31st
Age	Calf or yearling
Gender	Male or female
Risk of undifferentiated fever/ respiratory disease	High or low

Risk of CHF from the year 2000 to the year 2012

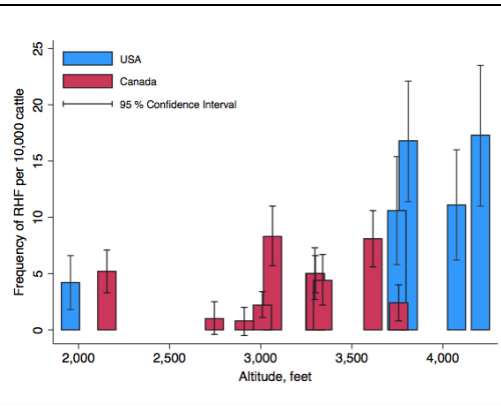
Year	Disease	Attack risk per 1,000 cattle Mean	95 % CI	p-value
2000	CHF	0.27	0.18, 0.37	ref.
	DD	1.75	1.32, 2.19	
2004	CHF	0.37	0.26, 0.47	0.18
	DD	1.77	1.40, 2.15	
2008	CHF	0.61	0.45, 0.78	< 0.001
	DD	2.32	1.82, 2.81	
2012	CHF	0.52	0.37, 0.67	0.003
	DD	2.82	2.13, 3.50	

How do pulmonary arterial pressures change with age?





BRISKET DISEASE IS NOT UNIQUE TO HIGH ALTITUDE



Right ventricular hypertrophy with heart failure in Holstein heifers at elevation of 1,600 meters

Journal of Veterinary Diagnostic Investigation
24(5) 867-877
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DOI: 10.1177/1040638712453580
http://jvdi.sagepub.com

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Abstract. A syndrome of progressive right-sided heart failure occurred among yearling Holsteins at a heifer-raising facility and 2 dairies on the Colorado Front Range between 2007 and 2011. Most cases were seen at the heifer-raising facility, where the disease ranked second only to pneumonia as a major cause of death in animals aged <1.5 years. The disease resulted in the death or premature sale of 55 animals over the 5-year period. Affected heifers were 4–15 months old when they developed dyspnea, tachycardia, distention and pulsation of jugular veins, lethargy, and weight loss. Clinical progression in most was rapid (2 days to 2 weeks). Ten cattle with typical clinical signs were examined postmortem between 2008 and 2010. Seven developed clinical signs after transportation 57–238 days earlier from Wisconsin (elevation: < 275 m); the remaining 3 animals were born and raised at an altitude of 1,600 m. At necropsy, the 10 cattle had marked hypertrophy of right ventricular myocardium, dilated right atria, right ventricles, and pulmonary trunks, as well as hepatomegaly, ascites, and serous atrophy of fat. The principal histological change in lungs was hypertrophied tunicae adventitia and media of muscular arteries. Hepatic changes were typical of chronic passive congestion. Ultrastructural changes in heart were consistent with uncomplicated hypertrophy of cardiocytes with no evidence of primary cardiomyopathy. The syndrome most likely represents brisket disease due to pulmonary hypertension at the modest elevation of 1,600 m.

symptoms of the disease, they were able to confirm all 18 calves actually died from brisket disease. During the study, they examined hearts, took measurements and studied tissue under a microscope.

TAKE A CLOSER LOOK – it may not be chronic pneumonia!

An investigation into beef calf mortality on five high-altitude ranches that selected sires with low pulmonary arterial pressures for over 20 years

Journal of Veterinary Diagnostic Investigation
25(2) 210-218
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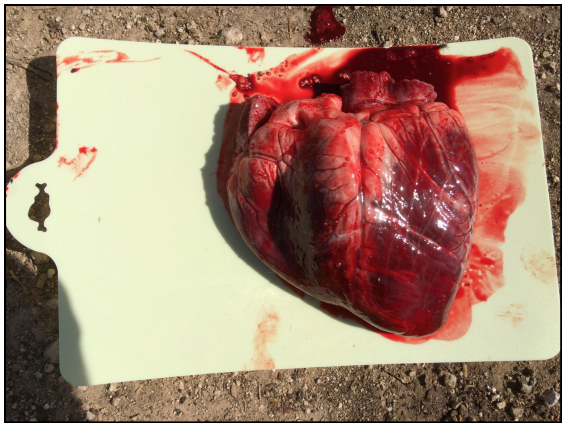
DOI: 10.1177/1040638713478608
http://jvdi.sagepub.com

Joseph M. Neary,[1] Daniel H. Gould, Franklyn B. Garry, Anthony P. Knight, David A. Dargatz, Timothy N. Holt

Abstract. Producer reports from ranches over 2,438 meters in southwest Colorado suggest that the mortality of preweaned beef calves may be substantially higher than the national average despite the selection of low pulmonary pressure herd sires for over 20 years. Diagnostic investigations of this death loss problem have been limited due to the extensive mountainous terrain over which these calves are grazed with their dams. The objective of the current study was to determine the causes of calf mortality on 5 high-altitude ranches in Colorado that have been selectively breeding sires with low pulmonary pressure (<45 mmHg) for over 20 years. Calves were followed from branding (6 weeks of age) in the spring to weaning in the fall (7 months of age). Clinical signs were recorded, and blood samples were taken from sick calves. Postmortem examinations were performed, and select tissue samples were submitted for aerobic culture and/or histopathology. On the principal study ranch, 9.6% (59/612) of the calves that were branded in the spring either died or were presumed dead by weaning in the fall. In total, 28 necropsies were performed: 14 calves (50%) had lesions consistent with pulmonary hypertension and right-sided heart failure, and 14 calves (50%) died from bronchopneumonia. Remodeling of the pulmonary arterial system, indicative of pulmonary hypertension, was evident in the former and to varying degrees in the latter. There is a need to better characterize the additional risk factors that complicate pulmonary arterial pressure testing of herd sires as a strategy to control pulmonary hypertension.



Summary

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Thank you

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…the answer to your first question.