

TECHNICAL BULLETIN

Relationship between body weight, body condition score (BCS) and outcomes in chronic disease

Key points

1. Cachexia is very common in many chronic diseases
2. Weight and muscle loss due to cachexia negatively impacts quality of life and can shorten survival
3. Appropriate nutrition and medications that support appetite and weight management can be used as part of a multi-modal treatment approach to impact survival in dogs and cats with chronic diseases

There are many factors that influence prognosis in various canine and feline diseases. Weight loss, decreased body condition and decreased appetite can all adversely affect disease outcomes in dogs and cats.¹

Dogs and cats with chronic diseases are at risk for developing **cachexia**, which is loss of lean body mass associated with chronic disease. In people, the loss of lean body mass has negative effects on immune function, wound healing, strength and survival.¹ In dogs and cats, **shortened survival** may be due to these direct negative effects, but may also be due to humane euthanasia when owners perceive decreased quality of life as a result of weight loss and lack of appetite.¹

Cachexia occurs in a variety of chronic diseases in people, including chronic kidney disease (CKD), congestive heart failure (CHF), cancer, chronic obstructive pulmonary disease (COPD), rheuma-

DIAGNOSING CACHEXIA

- While it is important to weigh patients at every visit, muscle loss can be detected at a single visit thus allowing for diagnosis of cachexia in patients with chronic diseases^{2,3}
- Reliance on body weight alone may prevent an early diagnosis of cachexia^{1,2}
 - Weight loss may lag behind muscle loss
 - Patients may not have had a body weight measurement in the past 6-12 months for comparison

toid arthritis and acquired immunodeficiency syndrome (AIDS). In dogs and cats, cachexia is being increasingly studied and appears to be common in CKD, CHF and cancer.¹⁻³ The pathophysiology of cachexia is complex and multifactorial and includes increased energy requirements, decreased energy intake, metabolic alterations and decreased nutrient absorption.¹

CACHEXIA VS. SARCOPENIA¹

- **Sarcopenia:** loss of lean body mass that occurs with aging in the **absence of disease**
- **Cachexia:** loss of lean body mass that occurs in association with **chronic diseases**
 - Healthy animals receiving inadequate calories have metabolic adaptations that allow fat to be used as primary fuel source so that lean body mass is preserved
 - In diseased animals (acute and chronic), concentrations of various inflammatory cytokines and cortisol are altered, causing decreased fat utilization and increased muscle catabolism
 - Result is marked loss of lean body mass



Chronic kidney disease and renal cachexia

Impact

- Low body weight is associated with a shorter survival time in cats with chronic kidney disease (CKD)
 - Cats <9.3 lbs at the time of diagnosis had significantly shorter survival times than those that were ≥9.3 lbs at the time of diagnosis⁴
 - Body condition score is associated with survival time in dogs with CKD
 - BCS < 4/9 associated with shorter survival time^{5,6}
 - Decreased muscle condition score at the time of diagnosis is associated with shorter survival in dogs with CKD⁶
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- *Weight loss is very common in cats and dogs with CKD*
 - *Weight loss accelerates in cats following diagnosis of CKD*
 - *Low body weight or BCS at the time of diagnosis is a negative prognostic indicator*
 - *Renal diets are important in the management of CKD, but there may be obstacles to getting cats and dogs to eat them*

Clinical considerations

- Appropriate nutrition and medications that support appetite and weight management can be used as part of a multi-modal treatment approach to impact survival
- Weight loss is common in cats and dogs with CKD
 - Ranges from 42%-82% of cats⁴ and 29-61% of dogs with CKD⁵
- In cats, weight loss can be detected up to 3 years before diagnosis of CKD and accelerates after diagnosis⁴
- In a survey of 1,079 owners of cats with CKD, 43% reported that their cat had an abnormal appetite⁷
 - This included anorexia (loss of appetite), hyporexia (reduced caloric intake) and alterations in food preferences
- Although renal diets have been demonstrated to be beneficial for both dogs and cats with CKD⁸, they may not be prescribed in all cases, or may not be the sole diet eaten by the pet⁷
 - In the above owner survey, only 51% of cats had been prescribed a therapeutic diet, and 51% of owners reported feeding an over-the-counter commercial diet alone or in combination with the therapeutic diet⁷



Congestive heart failure and cardiac cachexia

Impact

- In dogs with congestive heart failure (CHF) due to dilated cardiomyopathy (DCM) or chronic valvular disease, dogs that gained weight (vs losing weight or even maintaining body weight) survived the longest, showing the positive effects of weight gain during treatment of a chronic disease⁹
- In another more recent study of dogs with CHF due to DCM or myxomatous mitral valve disease, cachexia was associated with shorter survival³
 - Nearly 50% of the dogs had cachexia as defined by muscle loss; 42.1% of the dogs had cachexia as defined by loss of $\geq 5\%$ body weight in 12 months or less

Clinical considerations

- Appropriate nutrition and medications that support appetite and weight management can be used as part of a multi-modal treatment approach to impact survival
- In one study of dogs with congestive heart failure due to dilated cardiomyopathy, over 54% of dogs had some degree of cachexia¹⁰
- Appetite is an extremely important indicator of quality of life for owners of dogs and cats with heart disease^{11,12}
- Prevalence of cachexia in cats with CHF due to cardiomyopathy is up to 66.7%, depending on the definition used²
 - 41.6% using muscle condition score, 66.7% using the definition of $\geq 5\%$ weight loss after diagnosis

- *Appetite is a very important indicator of quality of life for dogs and cats with heart disease*
- *Cachexia is prevalent in dogs and cats with congestive heart failure, and can be addressed as part of an overall treatment plan*

Cancer and cancer cachexia

Impact

- Dogs with lymphoma that are underweight at diagnosis have shorter survival times¹³
 - Longer survival time for those that gain more than 10% bodyweight during treatment
- Cats with BCS less than 5 had shorter survival times (median survival time, MST, 3.3 months) compared to those with BCS ≥ 5 (MST 16.7 months)¹⁴
 - Cancer remission rates were higher in cats with BCS ≥ 5
 - 91% of cats with cancer had muscle loss; this was even seen in cats with normal or overweight BCS¹⁴

Clinical considerations

- Appropriate nutrition and medications that support appetite and weight management can be used as part of a multi-modal treatment approach to impact survival
- In one study, 91% of cats with cancer had muscle loss; this was even seen in cats with normal or overweight BCS¹⁴



- In another study of dogs with cancer, 35% of dogs had mild to severe muscle wasting¹⁵
 - 37% of the dogs in that study had experienced body weight loss of 5% or more
- Inappetence and weight loss are considered unacceptable side effects of chemotherapy by dog and cat owners¹⁶

Conclusions

- These studies highlight the high prevalence of cachexia in chronic disease states in dogs and cats and the negative relationship between decreasing body weight and body condition score on survival
- Appropriate nutrition and medications that support appetite and weight management can be used as part of a multi-modal treatment approach to impact survival in dogs and cats with chronic diseases
- Patients should be weighed at every veterinary visit to allow for early detection of weight loss
 - In addition to body weight, assessment of Body Condition Score (BCS) and Muscle Conditional Score (MCS) may facilitate earlier detection of cachexia
 - In particular, MCS may be helpful in alerting veterinarians to the presence of cachexia both in patients for which a previous weight is not known or in patients in which muscle mass loss may precede weight loss



HELPFUL RESOURCES

Body Condition Score (BCS)

Evaluates body fat.

- CAT: <https://wsava.org/wp-content/uploads/2020/08/Body-Condition-Score-cat-updated-August-2020.pdf>
- DOG: <https://wsava.org/wp-content/uploads/2020/01/Body-Condition-Score-Dog.pdf>

Muscle Conditional Score (MCS)

Evaluates muscle mass; involves visual exam and palpation over the temporal bones, scapulae, lumbar vertebrae and pelvic bones.

- CAT: <https://wsava.org/wp-content/uploads/2020/01/Muscle-Condition-Score-Chart-for-Cats.pdf>
- DOG: <https://wsava.org/wp-content/uploads/2020/01/Muscle-Condition-Score-Chart-for-Dogs.pdf>

Nutritional Assessment

WSAVA and AAHA recommend that a screening nutritional assessment is performed at every visit. If risk factors are identified, a more in-depth extended evaluation should be performed. Nutritional assessment includes: physical exam, BCS, MCS and diet history.

- <https://wsava.org/wp-content/uploads/2020/01/WSAVA-Nutrition-Assessment-Guidelines-2011-JSAP.pdf>
- <https://www.aaha.org/globalassets/02-guidelines/nutritional-assessment/nutritionalassessmentguidelines.pdf>

World Small Animal Veterinary Association (WSAVA) Global Nutrition Toolkit:

- <https://wsava.org/wp-content/uploads/2020/05/WSAVA-Global-Nutrition-Toolkit-English.pdf>

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