

Bovine Malignant Melanosis

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Abstract

A 2-year-old primiparous Holstein cow was presented with a history of anorexia and difficulty rising. Physical examination revealed a left displaced abomasum, which was corrected surgically using a right flank omentopexy.

Appetite and milk production initially improved following surgery, but the cow became progressively ataxic. At slaughter, she was condemned due to melanosis throughout the carcass, which included a spinal lesion at L2-3.

Histologically, clusters of melanin were found within the dura and pia mater of the spinal cord, the adrenal gland and adipose tissue. Gross and histological lesions were compatible with a diagnosis of malignant melanosis.

Introduction

Bovine malignant melanosis is an uncommonly documented central nervous system aberration in dairy cattle. Melanoma in cattle is reported to represent 0.2% to 11% of all neoplasia³ and usually originates in cutaneous locations. Lesions may develop in the skin at various locations¹² and the majority are benign or non-neoplastic.⁵ The disease is considered uncommon, but not rare.

Melanosis has been more widely recognized in swine and horses. In conventional swine, cutaneous melanoma occurs congenitally as benign and self-limiting melanotic lesions on skin and in lymph nodes.⁶ The lesions are characterized by macroscopic and microscopic ulceration, inflammation, phagocytosis, formation of giant cells and the absence of mitosis and metastases to visceral organs and remote lymph nodes. Melanosis of the regional, and rarely visceral, lymph nodes is considered to be due to drainage of the regressing, cutaneous melanotic lesions.² One case of malignant melanoma in a pig, present at birth as a cutaneous lesion, resulted in postmortem findings of metastases to the kidneys, liver, heart, lungs, brain, skeletal musculature and lymph nodes.⁴

The disease in horses has been described as a progressive pigmentary disorder of aging gray or white horses characterized by the presence of nodules of melanin-laden cells in the skin and other tissue.⁷ In one case,

a single epidural melanoma at L5-6 resulted in posterior paresis in a horse.¹³ A melanotic hamartoma of the hindbrain of one horse resulted in exercise intolerance accompanied by a gurgling, adventitious respiratory noise and excessive tongue and jaw movements. The lesion was localized to the hindbrain and meninges, and involved melanocytes.¹⁰

Other reports include an invasive melanoma in a newborn lamb which originated in the spinal meninges¹ and a congenital fibrotic melanoma in a calf that was not highly malignant, as no metastases were documented.⁹ Malignant melanomas are the most common intraocular neoplasia in the dog.⁸

This paper describes a case of malignant melanosis in a Holstein cow.

Clinical Report

A red-and-white, two-year-old primiparous Holstein cow was presented for anorexia. She had freshened normally 50 days prior to presentation and was of normal height and weight, with no history of problems. The owner reported the animal had difficulty rising, which at the time was attributed to new environment. The cow previously was kept in a loose housing arrangement, and now was held in a stanchion.

On physical examination her temperature was normal at 102.2°F (39°C), heart rate was 60 bpm and respiratory rate was 16 breaths per minute. Rumen motility was decreased and a ping was ausculted in the left paralumbar fossa. The uterus and udder were normal on palpation. Left displaced abomasum was diagnosed and confirmed by right flank laparotomy.

A ruminal tap was obtained intraoperatively to rule out rumen acidosis as an etiology of her difficulty in rising. Rumen pH was normal at 6.5. A routine right flank omentopexy was completed. Procaine penicillin-G was administered postoperatively at 4500 IU per lb (10,000 IU per kg) every 12 hours.

Post surgery, the cow's appetite and milk production initially improved. Over the course of the next few weeks, however, she became progressively ataxic, rising only with intense stimulation. The owner chose to market her 30 days postoperatively.

At slaughter, the carcass was condemned under the Wholesome Meat Act by U.S. Department of Agri-

culture inspectors for generalized pigmentary deposits.⁷ Extensive melanosis throughout the carcass included a lesion at L2-3 that radiated into the spinal column and surrounding musculature. Histologically, numerous clusters of melanin were present within the dura and pia mater of the spinal cord, the adrenal gland and adipose tissue. These changes, coupled with those described grossly, were consistent with malignant melanosis.

Discussion

A melanoma is a benign tumor comprised of melanoblasts, while a malignant melanoma is comprised of anaplastic melanoblasts.¹¹ Features of malignant melanoma include: 1) locally invasive masses, 2) multiple nodular growths in parenchyma of the lungs and visceral organs, and 3) gray- or brown-colored tumors. Because anaplastic melanocytes have a diminished capacity to produce melanin, malignant melanomas are likely to be less intensely colored than melanosis.⁷

Melanotic abnormalities are divided into three categories in veterinary literature: melanosis, melanoma and malignant melanoma. There is no clear delineation between melanosis and melanoma. Melanosis is regarded by some as an unelevated black focal area where there is no nodular growth, metastasis or cachexia.⁷ The morphologic diagnosis in this case of malignant melanosis is consistent with previously reported descriptions.

Summary

The clinical management of this case could not have precluded the postmortem findings, as the absence of cutaneous lesions coupled with a normal presentation made antemortem diagnosis difficult. Similarities between this case and those previously reported in swine and

horses^{2,4,6,7,10,13} should facilitate the inclusion of malignant melanoma as a differential diagnosis in idiopathic spinal disease in dairy cattle. All cases reported had progressive ataxia and/or melanin infiltration. Further research is needed to facilitate antemortem diagnosis and true prevalence of disease in the cattle population.

References

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