HYPERLIPIDEMIA IN CASPIAN MINIATURE HORSES: EFFECTS OF UNDERNUTRITION

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SUMMARY

The susceptibility of Caspian miniature horses to hyperlipidemia was followed in a study of healthy Caspian miniature horses in which food but not water was withheld for 48 hours. Two months before the study, the horses were fed a high-energy diet. The mean of weight gain was 26.46 kg per horse during this period. All horses had a normal rectal temperature, respiratory rate, and pulse throughout the experiment. During the period of food deprivation, levels of serum triglyceride, aspartate aminotransferase, and alanine aminotransferase significantly (P < .05) increased and glucose concentration decreased. As a conclusion, Caspian miniature horses were susceptible to hyperlipidemia, but they did not show classic hyperlipemia syndrome.

INTRODUCTION

The Caspian miniature horse is the most ancient domestic breed of horse in existence. This tiny horse was probably a direct ancestor of the oriental breeds and subsequently of all light horse breeds. These animals are extremely rare and were pulled back from the brink of extinction in 1965 by Louise Firouze, an American living in Iran.1 The Caspian miniature horse is a native of the area around the Elborz Mountains and Caspian Sea in Iran. The current theory is that the Caspian is the ancient miniature horse of the Mesopotamia, which, after being used by the Mesopotamians in the third millennium BC until the seventh century AD, was believed to have become extinct.2 The greatest importance of the Caspian lies in the fact that the breed is likely the ancestor of all modern breeds of hot-blooded horses.1,3,4

Hyperlipidemia and hyperlipemia are disturbances of lipid metabolism that result in the accumulation of triglycerides in the blood of equids. Hyperlipidemia is an elevation of serum triglycerides concentration up to 500 mg/dL, without lacteascent plasma or fatty infiltration of the liver. Hyperlipemia develops when the serum triglycerides concentration exceeds 500 mg/dL or the plasma is lactescent and hepatic lipidosis is present.5 Hyperlipemia has primarily been reported in ponies and donkeys with a negative energy balance as a result of feed restriction, pregnancy, lactation, or disease-induced anorexia.6 Hyperlipemia has been seen in miniature horses but is uncommon in large horse breeds.7 The purpose of this study was to determine the susceptibility of Caspian miniature horses to hyperlipidemia and hyperlipemia.

MATERIALS AND METHODS

The experiment was performed on 8 healthy Caspian miniature horses (4 male, 4 female) with an average age of 4 years (range, 4-8 years) and an average weight of 204.4 kg (range, 196-223 kg). They were housed in a private stud belonging to Mrs. Louise Firouze. The horses were fed a diet of alfalfa hay and oats and had free access to water. Two months before the experiment, the diet was changed, and the horses were fed with a high-energy diet consisting of 2 kg alfalfa hay and oats and had free access to water. Two months before the experiment, the diet was changed, and the horses were fed with a high-energy diet consisting of 2 kg alfalfa and 3 kg barley daily. The food was offered at 8 AM and 4 PM each day, and all the food was eaten. The estimated energy intake was 16,400 kcal for every horse daily, and the diet consisted of 14.9% crude protein.

The horses were hand walked for 30 minutes or turned out into a sand paddock for 120 minutes each day. The horses were given anthelminthic drug (Ivermectin) at the rate of 0.2 mg/kg.