Primary hypothyroidism in a miniature jenny associated with neonatal congenital hypothyroidism dysmaturity syndrome

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A 7-year-old miniature jenny with a history of stillborn foals in 2012 and 2013 was maintained on pasture from spring through fall, fed grass hay and oats in winter, and had access to blue and brown salt blocks. She was bred at pasture and was reported to be a few weeks overdue at foaling. Her udder development and milk production were normal, and her placenta was expelled within 4 h. A miniature jack foal was born in an uncomplicated foaling. He had an abnormal appearance and crooked front legs but was able to stand and nurse. The foal was examined shortly after birth, and administered selenium, tetanus toxoid, and an enema. The significant findings included: prolonged gestation, mandibular prognathism, front limb angular limb deformities, carpal and tarsal bone dysgenesis, and subnormal body temperature, which were signs consistent with congenital hypothyroidism dysmaturity syndrome (CHDS). Six weeks later the foal developed respiratory signs and was euthanized. Due to the history of stillborn/CHDS foals, a series of tests were performed on the miniature jenny to determine if she was hypothyroid and if dietary risk factors for CHDS were present (i.e. low trace mineral status or exposure to nitrates or glucosinolates [GSL]). Serum samples were submitted to Prairie Diagnostic Services, Saskatoon, SK for evaluation of concentration of vitamin E, trace minerals, tri-iodothyronine (T3) and total thyroxine (T4) (Immulite assay). Mane hair was submitted for determination of selenium. A thyrotropin releasing hormone (TRH) response test was performed, by drawing blood (pre), administering 0.5 mg of TRH IV, and taking a post-stimulation sample 4 h later. An adequate response to TRH is a doubling or more of pre-thyroid hormones by 4 h. The pasture contained GSL plants. Serum cobalt at 0.928 ppm and serum selenium at 0.108 ppm, were considered marginal for equids, and hair selenium at 0.42 ppm, was deficient. The T3 pre-TRH level was 1.83 nmol/L and post-TRH levels was 4.05 nmol/L (fold change 2.2). The pre-TRH and the post-TRH T4 level were both 10 nmol/L. As donkey T4 levels are higher than horses, we interpreted the resting T4 value as deficient. The lack of a post-TRH T4 response was compatible with thyroid dysfunction. The CHDS has been reported in donkey neonates, where clinical signs included hypothermia. The failure of T4 to increase following TRH administration indicated the miniature jenny had primary hypothyroidism, which may be related to consumption of GSL through pasture and/or hay. The GSL interfere with iodide uptake and organification and have been reported to cause materno-fetal thyroid dysfunction. The low serum and hair selenium, and low cobalt level indicated inadequate dietary mineral intake by the miniature jenny, which is a risk factor for CHDS, and which may have contributed to the jennie's thyroid dysfunction.

Keywords: Hypothyroidism, jenny, hypothermia, thyroxine, TRH