Hereditary cobalamin malabsorption

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Contributors:
Linda G. Shell, DVM, DACVIM (Neurology)

Urs Giger, Dr. med. vet. Dipl. ACVIM & ECVIM (Internal Medicine) Dipl. ECVCP (Clinical Pathology)

Synonyms:
Methylmalonic aciduria
Vitamin B12 deficiency

Disease description:
Selective cobalamin (vitamin B12) malabsorption has been reported in Giant schnauzers, Australian Shepherds, Beagles, Border collies, Komondor, Shar peis and one cat. Affected animals usually begin to show clinical signs at 6-12 weeks of age which include anorexia, lethargy, cachexia, and failure to thrive, but may not show signs until later in life. Laboratory abnormalities can include a nonregenerative anemia with marked poikilocytosis, neutropenia with hypersegmentation and thrombocytopenia. Urine is positive for methylmalonic acid (this test can be done at PennGen: www.vet.upenn.edu/penngen) and serum vitamin B12/cobalamin levels are low. Different mutations have been identified in the ileum receptor (cubulin/aminonless[AMN]) in giant Schnauzers and Australian shepherds but not other breeds. In the Shar peis the defect may be associated with iron deficiency. In the Border collies isolated methylmalonic aciduria without obvious cobalamin deficiency may occur.

Once vitamin B12 injections are started, there should be a rapid resolution of clinical and laboratory abnormalities.

Disease description in this species: Dog: see above

Cats: only isolated rare cases have been seen without further studies to determine the ileal and molecular defect.

Genetic Basis:
autosomal recessive inheritance in the breeds studied and where the molecular defect has been determined.
Specific Test: urinary MMA test, serum cobalamin test, mutation test

Mutation: AMN Gene
   Australian Shepherd: c.3G>A
   Giant Schnauzer: c.1113_1145del

Etiology:
Genetic, hereditary

Breed predilection:
Australian shepherd
Beagle
Border collie
Giant schnauzer
Komondor
Shar pei

Age predilection:
Juvenile to young adult

Clinical Signs and/or Epidemiological Indicators:
Anorexia, hyporexia
Cachexia, weight loss
Malaise, failure to thrive

Diagnostic procedures:    Diagnostic results:
Hemogram               Anemia
                        Anisocytosis
                        Neutropenia, hypersegmentation
                        Poikilocytosis (no macrocytosis)
                        Thrombocytopenia, mild
                        Hyperammonemia, variable
Serum B12 analysis of serum   Serum vitamin B12 unmeasurable
Urinalysis                   Proteinuria, mild albuminuria
Urine MMA spot test           Positive
DNA mutation test            Affected (only for some breeds)

Treatment/Management/Prevention:
SPECIFIC
1) Vitamin B12 (cyanocobalamin): 50 mcg/kg daily for 4 days and then q 2-4 weeks SC for life
SUPPORTIVE

1) Fluids
2) Antibiotics
3) Intensive care when seriously ill

Differential Diagnosis:
Other inborn errors of metabolism
Neurological disorders
Gastrointestinal disorders

References: