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9-226 Copper toxicity in dairy cows - a case history

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Cases of naturally occurring copper toxicity in cattle are rare and when incidents occur are usually more common in calves prior to weaning. In the last three years and particularly since 2000 the Veterinary Laboratories Agency has received a marked increase in the number of reports of copper toxicity in dairy cows in England and Wales. The findings from one affected herd investigated between 1999 to 2001 are described. The herd under investigation comprised 139 Jersey and 249 Holstein/Friesian cows. The sudden deaths of 2 Jersey cows in December 1999 and a further 5 Jersey cows and 1 Holstein/Friesian cow between January and June 2000 were diagnosed as chronic copper toxicity based on clinical, biochemical and pathological findings. Kidney copper concentrations provided a more reliable indication of toxicity than liver copper concentrations. Kidney copper concentrations ranged from 1024 µmol/kg DM to 9371 µmol/kg DM (reference range 125-600 µmol/kg DM) and liver copper concentrations ranged from 8148 µmol/kg DM to 23493 µmol/kg DM (reference range 300-8000 µmol/kg DM). Ante-mortem bloods collected close to the time of death revealed blood copper concentrations >47 µmol/l (reference range 9-19 µmol/l). Farm investigations did not identify any unexpected sources of copper; the dairy ration was supplemented with both inorganic and organic (chelated) copper. The approximate intake of copper in the milking herd at the time of the first case was 1010 mg/head/day, or 63.5 mg/kg dietary dry matter. Supplementary copper was removed from the ration soon after the first case was diagnosed and inorganic copper only was reintroduced in the autumn of 2000. Despite these measures a further Jersey cow was diagnosed with copper toxicity in May 2001. The findings from this investigation and other similar cases have been used to determine a case definition used to identify cases for an ongoing survey of copper poisoning in cattle over 15 months of age. The case definition used is a combination of characteristic gross pathology and biochemical parameters (liver copper concentration>8000 µmol/kg DM and kidney copper concentration>650µmol/kg DM). Where necropsy material is not available an alternative case definition of plasma copper concentration >50 µmol/l and elevated liver enzymes accompanied by clinical/pathological evidence is applied.

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