Heavy metals

“Veterinary” diagnosis of lead poisoning in pregnancy
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A high index of suspicion is essential in cases at risk of lead exposure in pregnancy

Lead exposure in pregnancy could potentially cause adverse outcomes, including premature labour, iron deficiency anaemia, and intrauterine growth restriction. This case of lead poisoning in a pregnant woman highlights the importance of early recognition and removal of lead sources in the prevention of maternal and perinatal morbidity.

Case report

A 28 year old primigravid woman attended our antenatal clinic for her booking appointment with a 10 week singleton pregnancy. Apart from the fact she smoked, screening classified her as low risk. She had an uneventful course, but during the 29th week of gestation both of her cats became increasingly unwell.

Midge and Pepsi, two three year old, sibling, neutered female, domestic shorthair cats, were taken to the veterinarian. Midge had already been seen for non-specific signs three weeks previously. At that time she had seemed dull and was progressively disinclined to eat. Some gagging and retching was seen, along with repeated uncomfortable looking swallowing movements. No abnormality was found on clinical examination, and these signs resolved within two days with, or in spite of, treatment with ranitidine.

Now both cats had vomiting and diarrhoea and were anorexic. Pepsi's weight had decreased from 4.4 kg to 3.75 kg in the intervening three weeks. They were dehydrated and had pale mucosas. Midge had prolapsed nictitating membranes and showed a swaying gait and a fine tremor of her pinnas. Pepsi seemed to be hyperaesthetic and was hypersalivating. Both cats were admitted for supportive treatment and investigation of possible lead toxicity.

The owner’s house was at least a hundred years old, so the initial thought was to have the lead concentrations in the drinking water checked. Further discussion then revealed that both the owners had been very busy renovating their house over the previous weeks, which included stripping walls with a hot airgun or blowtorch.

Blood samples of the cats revealed mild anaemia and raised alanine transaminase and alkaline phosphatase. They were started on intravenous fluids and ranitidine and were showered to remove any contamination from their coats. Twelve hours later they were still vomiting. Midge was particularly subdued, and both showed hyperaesthetic myotonic spasms on minor stimulation.

Samples were sent for blood lead concentrations. The cats continued to deteriorate, so permission was sought to start chelation treatment with sodium calcium edetate, 25 mg/kg four times daily, on a presumptive diagnosis of lead toxicity. On chest radiography, Midge was found to have a mega-oesophagus and so had a gastrostomy tube placed.

Pepsi was fed through a nasogastric tube. The blood results confirmed the diagnosis. Midge had lead concentrations of 1348.5 µg/l and Pepsi had 867.2 µg/l (normal range 0-249 µg/l). Unfortunately, Midge failed to improve and died on day seven of treatment.

After seven days of chelation treatment, Pepsi's blood lead concentration had fallen to 215.8 µg/l; after a tense wait she suddenly decided to start eating on day nine, whereupon she was discharged and needed no further treatment. She remains well to this day.

As soon as the lead poisoning of the cats was diagnosed, the veterinarian advised the pregnant woman to attend her general practitioner. Her serum lead concentrations were 464 µg/l at 29 weeks and 506 µg/l at 30 weeks (upper normal value 108.2 µg/l). Her haemoglobin was 110 g/l. She was then referred to the consultant antenatal clinic. Assessment of fetal wellbeing included ultrasound scanning, which showed measurements consistent with the gestational age. The management plan included consultant led antenatal care with serial ultrasound scans, iron supplementation, and increased surveillance.

She remained well throughout her pregnancy. Serum lead concentrations were 307 µg/l at 34 weeks and 232.3 µg/l at 38 weeks. After an uncomplicated spontaneous labour at term, she progressed to a spontaneous vaginal delivery of a baby girl with Apgar scores of 9 at one minute and 9 at five minutes. The birth weight was 3.18 kg. The neonatal blood lead concentration was 220 µg/l. Chelation treatment was not given to the infant. No signs of encephalopathy were present. Developmental milestones were met in the initial neonatal period. One month postpartum, the maternal blood lead concentration remained stable at 209 µg/l. Paediatric follow-up was done and confirmed normal development at 6 and 9 months. The neonatal blood lead concentration was 220 µg/l at six months.

Discussion

Clinical presentation

To our knowledge, this is the first case of incidental diagnosis of lead poisoning assisted by a veterinarian in an asymptomatic pregnant woman. Patients with lead poisoning can be asymptomatic or may have subtle, non-specific symptoms, including malaise, anaemia, abdominal pain, constipation, vomiting, peripheral neuropathy, muscle weakness, and neuropsychiatric disorders. Sources of lead exposure can be occupational and environmental. Lead based paint was used in 70% of houses built before 1960. Renovation and remodelling activities at those houses can disturb lead based paint and generate lead dust and fumes. Lead particles can then be inhaled or ingested.
Ingestion of lead based paints is the most commonly identified source of lead poisoning in cats (and dogs). Because of their grooming habits, cats are more at risk of accidental ingestion of lead particles that contaminate their fur and paws. The cats would have ingested a large amount of lead over a short period of time by licking lead based paint dust from their fur, so they would show early symptoms. Lead poisoning should be considered a possibility when an animal shows both gastrointestinal tract and nervous system signs. In pregnancy, lead is transferred to the fetus through the placenta. Fetuses of women with high body lead content could therefore potentially be exposed to significant amounts of lead. High lead concentrations cause neurobehavioural effects in infants exposed to significant amounts of lead. Treatment methods include improved diet, vitamin supplementation, treatment of iron deficiency, and abstinence from tobacco and alcohol. Chelating agents are usually contraindicated in pregnancy. Vitamin C seems to lower the absorption of lead. Adults with high concentrations of serum ascorbic acid are less likely to have high blood lead concentrations.

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1 Shannon M. Severe lead poisoning in pregnancy. *Arch Pediatr* 2005;5:37-0.
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