

“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

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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 that 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. Pepsi 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 mucosae. Midge had prolapsed nictitating membranes and showed a swaying gait and a fine tremor of her pinnae. Pepsi seemed to be hyperaesthetic and was hypersalivating. Both cats were admitted for supportive treatment and investigation of possible lead toxicosis.

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 well-being 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 cord lead concentration was 260 µg/l, and the maternal serum lead concentration was 200 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 226 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.¹

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.²

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 and children, and lead exposure in utero and after birth can have similar effects.³ Exposure to lead can also affect pregnancy outcomes by causing premature labour, iron deficiency anaemia, and intrauterine growth retardation.

A high index of suspicion in cases at risk of lead exposure is essential, and an appropriate antenatal questionnaire to identify patients at risk may be considered.⁴ Early recognition and removal of sources of lead during the antenatal period can prevent maternal and neonatal morbidity. Advice on safe home renovation strategies is important. Smoking has been found to be associated with high blood and bone lead

concentrations in adults, so encouraging smoking cessation as well as use of vitamin C supplements by pregnant smokers may help to minimise exposure to lead in this population.

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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A day in the life of a doctor

The scientific meeting

The main purpose of a scientific meeting is globalisation. To a doctor, globalisation means visiting the globe. Travel broadens your mind, adds to your Frequent Flyer points, and protects you from minor irritations such as patients and family.

A hefty registration fee ensures the meeting's profitability. It is widely acknowledged that doctors are not expected to pay for their education, but are generous enough to let drug companies do so. Drug companies will also organise the meeting, no strings attached. It is indeed fortunate that altruism, so conspicuously absent from the modern medical profession, exists in the pharmaceutical industry.

You register by joining a queue the length of the Champs-Élysées. As you near the counter, you realise that this queue is for people whose names begin with the letters A-H, and your name begins with I. Your registration fee entitles you to a plastic name badge with your name misspelt, a genuine leatherette meeting bag identical to the 36 bags in your broom cupboard, and a book of meeting abstracts heavy enough to take the creases out of your crumpled suit.

The meeting programme is as elegantly simple as the DIY instructions on assembling a Formula One racing car from a kit. For the modern doctor, there is a CD of the scientific programme to allow you to plan your attendance for the entire four day meeting, slipping seamlessly from one session to another. If you are over 40 years old, it takes four days to master the CD, which achievement you celebrate by attending the

closing ceremony. The younger doctor masters the CD effortlessly, slipping seamlessly from one parallel session to another, arriving at each talk to find the timing is out of synch by exactly the length of one presentation.

The more concurrent sessions that are held, the more oral presentations can be accepted, even if each presenter talks to an audience confined to his or her fellow speakers and the chairperson, who all wish they were at the parallel session next door. Accepting the remaining abstracts as posters, regardless of quality, maximises meeting attendance while minimising cerebral activity for the scientific committee.

Holding plenary sessions in an auditorium the size of the Colosseum confers gravitas without audibility, preventing awkward audience questions. Throwing presenters of poor papers to the lions is no longer good conference etiquette. The purpose of a plenary session is to recuperate from jet lag. A darkened room, an upholstered chair, and a soporific lecturer are the means to this end.

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