Reminder of important clinical lesson

Severe diet-related iron deficiency anaemia in a 17-month-old child

Oliver Swadling, Salah Mansy

Department of Paediatrics, ESHT, Hastings, UK

Correspondence to Dr Oliver Swadling, oswadling@doctors.org.uk

Summary

A 17-month-old girl presented with an upper respiratory tract infections, and was found to have a haemoglobin of 3.3 g/dl. Although noticeably pale, she was largely asymptomatic. Her iron deficiency anaemia was found to be the result of poor diet. With oral iron supplements and improved diet, her haemoglobin increased rapidly, and she is now doing very well.

BACKGROUND

Iron deficiency anaemia is the most common nutritional deficiency affecting infants in the UK¹ The prevalence in 6-month-olds to 24-month-olds in socioeconomically deprived areas can be as high as 40%.^{2 3} The dietary characteristics most common in infants with iron deficiency anaemia are late weaning, prolonged weaning, introduction of cow's milk before 1 year of age and excessive consumption of cow's milk, (ie, more than 600 ml/day).³ This child illustrates how severe anaemia can be well tolerated and largely asymptomatic in infants, and how this common treatable problem can be easily missed.

CASE PRESENTATION

A white British 17-month-old girl was referred to our paediatric day unit by her general practitioner (GP). She had presented that day with a sore throat, fever and cough, and concern that she was not tolerating oral fluids. The referral letter commented that she looked pale, but this was not the reason for presentation or referral.

Apart from a 2-day history of sore throat our patient has been generally very well, with no previous admissions. She was a term baby, exclusively breast fed until 7 months old. Since then she has been a fussy eater, and was slow and difficult to wean. Now at 17 months of age cow's milk accounts for a large proportion of her diet; she has around 1 litre of semiskimmed cow's milk each day. She eats very little meat, fish or vegetables; the solid component of her diet is frequently just jam sandwiches. Pica had not been noticed. Despite this inadequate diet she weighs 12 kg and has followed centile lines for weight and height. Her parents reported, when asked, that she had appeared increasingly pale over the last few weeks. No blood loss had been noticed.

On examination she was alert, happy, active and full of energy. There appeared to be no limitation of activity. She was generally pale including palms and soles, but most noticeably at her conjunctiva and mucosa. She was well hydrated and not oedematous. No bruising could be seen. Her heart rate was 143, with a grade 2 systolic murmur at the left lower sternal edge that was not radiating. Her

respiratory rate, capillary refill time and blood pressure were within the normal ranges throughout. A spleen and liver were palpable. Other signs of anaemia such as koilonychia, platynichya, glossitis and angular stomatitis were not evident.

At venepuncture her blood appeared thin and watery. The blood results confirmed a microcytic, hypochromic anaemia, but the haemoglobin (Hb) of 3.3 was lower than her energetic character suggested.

An abdominal ultrasound scan confirmed a mild hepatosplenomegaly.

INVESTIGATIONS

- ▶ Hb=3.3 g/dl
- ▶ Mean cell volume=49.6 fl
- ▶ White cell count= $6.3 \times 10^9/l$
- ▶ Platelets= $192 \times 10^9/l$
- ▶ Blood film report: a moderate microcytosis with some hypochromasia is seen. There is moderate elliptocytosis, slight polychromasia and slight platelet anisocytosis.
- ▶ Vitamin B₁₂=1026 pg/ml
- ▶ Serum folate=10.7 ng/ml
- ▶ Serum ferritin=3 ng/ml
- ▶ Serum iron=<1.8 µmol/l
- ▶ Serum transferrin=3.6 g/l
- ▶ Iron binding=82 µmol/l
- ▶ Tissue transglutaminase antibodies=1 µ/ml
- ▶ 25 hydroxy vitamin D=<8 nmol/l
- ▶ Total protein 56 g/l
- ▶ Albumin 31 g/l

DIFFERENTIAL DIAGNOSIS

Alternative causes of microcytic hypochromic anaemia, such as thalassaemia, were excluded by there being no family history of haemoglobinopathy, a white British ethnicity and impressive response to treatment.

It is important to remember that although poor diet is the most common cause of iron deficiency anaemia in infants, there are other causes that must be considered. These include causes of reduced intake such as cleft palate, cerebral palsy, neglect or mental health problems, causes of

reduced absorption such as cow's milk protein allergy, cystic fibrosis, coeliac disease and inflammatory bowel disease and excessive loss through chronic diarrhoea.

TREATMENT

The decision to treat by transfusion or iron supplements was discussed within our team, and with this patient's family. Although largely asymptomatic, this girl's tachycardia and hepatomegaly suggest heart failure; a transfusion could be justified. We decided to trial a course of oral iron supplements, with close inpatient monitoring. A 3 mg/kg/day of oral elemental iron was prescribed. We involved a dietician to work with her parents to improve her diet and reduce milk intake. The cow's milk was replaced with an iron fortified formula milk, and vitamin D supplements added. Her Hb improved rapidly. At 1 week her Hb=5.8, then at 2 weeks Hb=9.2. This is a much faster rise than the 2 g/dl/4 weeks that we usually see. This rapid improvement from oral supplements reinforces our decision not to transfuse. Compared to blood transfusion, an oral iron supplement with monitoring is safer, less invasive, cheaper and requires less specialist support. This could be reproduced in resource-limited areas, as long as monitoring is available.

OUTCOME AND FOLLOW-UP

We have been seeing this family regularly in outpatient clinic, as has their GP and our dietician. As well as monitoring her Hb and diet we have been working hard to reinforce dietary education.

DISCUSSION

There is much provision of nutritional education for parents perinatally, but much less at the time of weaning. Parents receive advice on how to feed their children from family, friends, food advertising, the media and health professionals. This is frequently questionable and often conflicting. In the UK there is no routine screening programme for detecting anaemia in children. The current

edition of 'Health for All Children' does not recommend universal screening for anaemia.^{4 5} As this case demonstrates clinical signs can be subtle. As healthcare professionals we could make a significant difference by taking every opportunity to educate and advise parents on how to feed their children, and to look for signs of anaemia.

Learning points

- ▶ Children can compensate for, and tolerate, anaemia remarkably well.
- ▶ Parents do not always receive adequate dietary advice when weaning their children onto solid foods.
- ▶ Children should begin weaning to an appropriately iron-rich solid diet at 6 months of age.³
- ▶ Cow's milk should not be introduced until 1 year of age.³
- ▶ Children older than 1 should not have more than 600 ml of cow's milk each day.³

Competing interests None.

Patient consent Obtained.

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