

CASE REPORT

Pica in a child with iron deficiency anemia

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ABSTRACT

Introduction: A patient with iron deficiency anemia was diagnosed with pica based on her history of eating soil and stone, her pale demeanor, and other laboratory findings. After four months of treatment, her habit of eating soil and stone decreased. There was an association found between pica and iron deficiency anemia, though the details remain unclear. **Objectives:** This is a case report of pica in a child with iron deficiency anemia. **Case:** A three-year-and-five-month-old girl was brought in with a history of eating soil and stone dating back to one year ago. Her anthropometry was as follows: weight of 17 kg, height of 99.8 cm, and head circumference of 51 cm. The patient received a daily iron supplementation dose of 20 mg. After treatment, her condition improved as her soil eating habits decreased, her hemoglobin level was 9.1 g/dl, and her hematocrit was at 35%. **Conclusion:** Further follow-ups and comprehensive management are needed, including nutritional education, iron therapy, and behavior treatment from her parents until her hemoglobin levels return to normal and she stops eating soil and stone.



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Highlights

1. Pica is correlated with iron deficiency anemia.
2. The girl had a low level of ferritin, so iron supplementation was given.
3. Comprehensive medical and behavioral treatments are needed for pica patients.

BACKGROUND

Pica is persistent nonnutritive and nonfood substance consumption lasting at least one month. It is detrimental to developmental levels, is not supported culturally and socially, and needs clinical attention (American Psychiatric Association, 2013; Bryant-Waugh et al., 2010). Studies show that pica is more common in males, children four years old or younger, those living in rural areas, bottle feeders, those who are malnourished, and those in low socioeconomic families with illiterate mothers (Nemer et al., 2014). Pica is associated with iron deficiency anemia, low hemoglobin (Hb), hematocrit (Hct), zinc (Zn), selenium (Se), and total antioxidant levels. It is also linked to a higher oxidative stress index, but



this relationship is still unclear (Bay et al., 2013; Miao et al., 2015). This is a case report of pica in a child with iron deficiency anemia.

OBJECTIVE

The purpose of this case report was to describe an iron deficiency anemia presenting as pica.

CASE

A three-year-and-five-month-old girl was brought in with a history of eating soil and stones. According to her mother, she had been eating soil and stones for one year. The mother had tried to stop this behavior, but the patient continued to do it. Her anthropometry was as follows: weight of 17 kg, height of 99.8 cm, and head circumference of 51 cm. She was delivered spontaneously at term by a midwife and was breastfed until the age of two. A physical examination revealed the patient to be a conscious, pale girl with normal vital signs and neurological reflexes. Her hemoglobin level was 7.1 g/dl; her hematocrit was at 25%; her serum iron concentration was 20 $\mu\text{g/dl}$ (50-101 $\mu\text{g/dl}$); her ferritin was 2.5 ng/ml (6-65 ng/ml); and her total iron binding capacity was 362 $\mu\text{g/dl}$ (100-400 $\mu\text{g/dl}$). The urine and stool examination revealed normal limits. As per DSM-V, she was diagnosed with pica with iron deficiency anemia. The patient received a daily iron supplementation dose of 20 mg. After four months of treatment, the mother reported a reduction in stone and soil consumption, and her hemoglobin level was 9.1 g/dl with a hematocrit of 35%.



Figure 1. The girl with pallor in the skin and lips mucose



Figure 2. Four months after iron supplementation

DISCUSSION

Commonly ingested non-food material in pica cases include soil, clay, paper, paint, coins, strings, rags, hair, feces, vomitus, leaves, worms, and cloth. The patient observed in this case report had been eating stone and soil since she was two-years-and-four-months-old. She also suffered from iron deficiency anemia. The meta-analysis study showed that pica was associated with 2.4 times greater odds of anemia, lower Hb concentration, lower Hct concentration, and lower Zn concentration (Miao et al., 2015). Her hemoglobin level was 7.1 g/dl and her hematocrit was at 25% during the first examination. This may be due to the soil she ate displacing nutrients, thereby contributing to deficiency development.

The soil also contained compounds that bound both iron and zinc. Unfortunately, zinc level was not measured in this case. Anemia is associated with poverty, malnutrition, poor education among mothers, and lack of stimulation (Saloojee and Pettifor, 2001). In this case, the patient's family was low-income and low-educated. The patient received a daily iron supplementation dose of 20 mg. After four months of treatment, her condition improved and her soil eating habit decreased, resulting in a hemoglobin level of 9.1 g/dl and hematocrit of 35%. It is theorized there was an association between pica and iron deficiency anemia in this case. Although, it remains unclear whether the iron deficiency led to the pica or whether it was the iron bound to the soil causing iron deficiency. Several other case reports have also shown that pica is associated with iron deficiency anemia (Howarth, 2013; Kettaneh et al., 2005; Nafil et al., 2015; Singh, 2013).

Strengths and Limitations

Further studies are needed to explore other possibility.

CONCLUSION

Further follow-ups and comprehensive management are needed, including education about nutrition, iron therapy, and behavior treatment from the subject's parents until her hemoglobin levels become normal, and she stops eating soil and stones.

Acknowledgment

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Conflict of Interest

All authors have no conflict of interest.

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Author Contribution

The author contributed to all processes in this study, including preparation, data gathering and analysis, drafting, and approval for the manuscript's publication.

Patient Consent for Publication

This case report has been approved by the patient and his/her guardian

REFERENCES

- American Psychiatric Association, 2013. Feeding and Eating disorder. In: Diagnostic and Statistical Manual Of Mental Disorders, Fifth edit. ed. American Psyachiatric Publising, Washington DC.
- Bay, A., Dogan, M., Bulan, K., Kaba, S., Demir, N., Öner, A.F., 2013. A study on the effects of pica and iron-deficiency anemia on oxidative stress, antioxidant capacity and trace elements. *Hum. Exp. Toxicol.* 32(9):895–903. doi: 10.1177/0960327113475676.
- Bryant-Waugh, R., Markham, L., Kreipe, R.E., Walsh, B.T., 2010. Feeding and Eating Disorders in Childhood. *Int. J. Eat. Disord.* NA-NA. 43(2):98-111. doi: 10.1002/eat.20795.
- Howarth, D.A., 2013. Pica - a case report. *Aust. Fam. Physician* 42(5):299–300.
- Kettaneh, A., Eclache, V., Fain, O., Sontag, C., Uzan, M., Carbillon, L., Stirnemann, J., Thomas, M., 2005. Pica and Food Craving in Patients with Iron-deficiency Anemia: A Case-control Study in France. *Am. J. Med.* 118(2):185–188. doi: 10.1016/j.amjmed.2004.07.050.
- Miao, D., Young, S.L., Golden, C.D., 2015. A meta-analysis of Pica and Micronutrient Status. *Am. J. Hum. Biol.* 27(1):84–93. doi: 10.1002/ajhb.22598.
- Nafil, H., Tazi, I., Mahmal, L., 2015. Prevalence of Pica in Iron Deficiency Anemia in Marrakech (Morocco). *Med. Sante Trop.* 25(3):273–275. doi: 10.1684/mst.2013.0199.
- Nemer, F.M. El, Alian, D.M., Eldin, M.S., Khalil, H.E.M., 2014. Prevalence of Pica among Children Attending Pediatrics Clinic at El-Menoufiya University Hospital. *Am. J. Biosci.* 2(4):147–152. doi: 10.11648/j.ajbio.20140204.15
- Saloojee, H., Pettifor, J.M., 2001. Iron Deficiency and Impaired Child Development. *BMJ* 323(7326):1377–1378. doi: 10.1136/bmj.323.7326.1377.
- Singh, A.P., 2013. Pica- A Case Report on Eating Disorder of Rural Adolescent Girl. *Int. J. Sci. Res. Publ.* 3(9):1–5.