

Carotenemia induced by iron deficiency

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DESCRIPTION

A 56-year-old Chinese woman presented to the department of general internal medicine of our hospital with a 3-week history of general fatigue. According to her daughter's remark, she has looked unwell for 1 year and has been suffering from menstrual pain and hypermenorrhea due to a giant uterine myoma for 20 years. She denied hot flash, chill and night sweat as menopausal symptoms. Her skin of whole body was extremely yellow ([figure 1](#)), however her sclera was not icteric. And her conjunctiva was anaemic. Blood test revealed microcytic anaemia with iron deficiency (haemoglobin: 69 g/L, Mean Corpuscular Volume: 63%, ferritin: 2 mg/mL). Abnormal findings were not detected in bilirubin (0.6 mg/mL), glucose (106 mg/dL), creatinine (0.69 mg/dL), Thyroid Stimulating Hormone (1.99 μ IU/mL) and F-T4 (1.0 ng/dL). Detailed history revealed that she has been eating four uncooked carrots and 20 mint candies per day for 3 months. Thus, she was diagnosed with carotenemia due to pica, which made her eat excessive carrots and mint candies. Pica was elicited by iron deficiency. And iron deficiency is suggested to be induced by hypermenorrhea related with the giant uterine myoma. We administered ferric oxide and her compulsion to eat carrots and mint candies disappeared in 3 days, before the improvement of anaemia.

Pica is one of the eating disorders characterised by compulsive ingestion of various substances including inedible things. The word pica is derived from the Latin for the bird magpie, which gleans various objects for its nest. Pica can be specified depending on the ingested substance, for example, pagophagia for ice, amylophagia for starch, cautoxyreiophagia for burned matchsticks and geophagia for clay.¹ Pica may occur in half of the iron deficient patients.² Iron administration rapidly reduces cravings due to the pica, usually before the haematological parameter improvement.

Carotenemia is a medical condition characterised by xanthoderma which represent yellow-orange skin pigmentation. It is mainly induced by the excessive ingestion of food containing carotene, for example, oranges, apricots, mango, carrots and pumpkins.³ However, some conditions such as diabetes, hypothyroidism or kidney disease can induce carotenemia. The

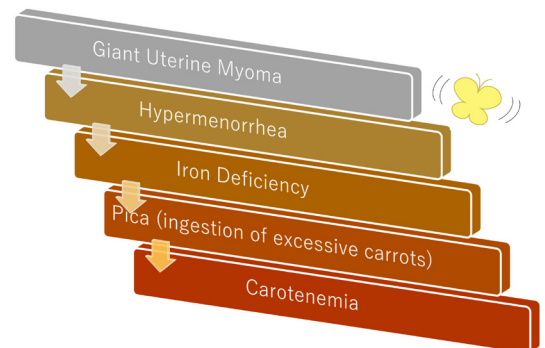


Figure 2 'Butterfly effect'; induced carotenemia due to giant uterine myoma.

Learning points

- ▶ Carotenemia should be differentiated from jaundice by obtaining appropriate physical examination and detailed patients' history.
- ▶ Carotenemia can be induced by pica due to the iron deficiency.

differential diagnosis of jaundice, detailed history and specific physical examination are the key to a definitive diagnosis. Skin pigmentation usually is prominent on the palms, soles, forehead and nasolabial folds. Compared with the jaundice, the sclera and mucous membranes are intact.

In this case, the assumed aetiology was the 'butterfly effect' of the giant uterine myoma eventually inducing carotenemia, which seemed to have no association ([figure 2](#)).

Physicians should consider that the yellow-orange skin pigmentation is not only observable in the case of jaundice but also in the case of carotenemia, which can be induced by pica due to the iron deficiency.

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REFERENCES

- 1 Moore DF, Sears DA. Pica, iron deficiency, and the medical history. *Am J Med* 1994;97:390-3.
- 2 Crosby WH. Pica. *JAMA* 1976;235:2765.



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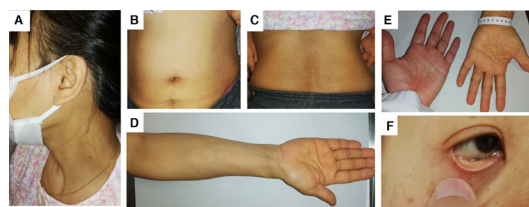


Figure 1 (A–D) Yellow skin of whole body. (E) Comparison of patient and author's skin (author is also mongoloid). (F) Normal sclera and anaemic conjunctiva.

3 Al Nasser Y, Albugeay M. Carotenemia.[Updated 2019 Dec 6]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing, 2020. Available: <https://www.ncbi.nlm.nih.gov/>

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