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Case Report

Iron-deficiency and pruritus: a possible explanation of their relationship

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ABSTRACT

Pruritus of unknown origin is defined as itching lasting for more than 3 weeks without a clear identifiable cause. Aetiology of itching is wide ranging and includes chronic renal failure, cholestasis and internal malignancy. Iron deficiency has been described to be causative of pruritus but the mechanism underlying this association remains unclear. We report the case of a female patient with iron deficiency anemia and generalized pruritus, resolved after intravenous administration of iron-complex supplements and we explained a possible mechanism between this association.

Keywords: Itch, Iron Deficiency, Anemia

INTRODUCTION

Itching is an unpleasant sensation related to a skin eruption or irritation that frequently provokes scratching. In contrast, generalized idiopathic pruritus is often not associated with a primary elementary skin lesion. Most importantly, generalized pruritus can represent the manifestation of a systemic disease. Some studies report that 14–50% of pruritic patients without a clear dermatologic cause have an underlying internal cause for their symptom, among which iron deficiency may act an important role.[1]

CASE REPORT

A 47-year-old woman was referred for a three-year history of generalized pruritus associated to scratching lesions of the trunk that had recently become more severe. She had been treated with several antihistamine drugs, with slight benefit. There was no familial or personal history of atopy. The skin was normal except for some scratch marks, the rest of the physical examination was unremarkable. Laboratory examinations were all in the normal range, except for low haemoglobin (9.6 g/dl), serum iron (14 mg/dl) and ferritin (3.19 ng/ml) levels. Her personal history was positive for atrophic gastritis without Helicobacter pylori infection. A thorough search was made to determine the cause for iron deficiency anemia: peripheral blood smear showed microcythemia and hypochromia; autoimmunity screening and gastroesophageal endoscopy evaluation were negative for celiac disease; also a bone marrow examination did not show abnormalities due to iron deficiency. In addition, we performed examinations to exclude diseases inducing generalized itching. The total serum IgE levels were normal; repeated test for occult blood and parasitic infestation produced negative results; liver and renal function tests, thyroid enzymes, copper serum and

immunoglobulin levels were in the normal range and patch test to exclude contact allergy dermatitis was negative.

Treatment was started with administration of iron-complex supplements alone (5 ml/day for ten days); after only two days of treatment, the patient referred an improvement of hitching that completely disappeared at the end of iron therapy.

DISCUSSION

Iron deficiency is reported to produce symptoms unrelated to anemia, including headache, irritability, exercise intolerance, hair thinning, soreness or burning of the tongue, angular cheilitis, koilonychia, pica, disturbances of gastrointestinal function, dysphagia, chronic fatigue and muscular weakness.[2]

Iron deficiency appear also to be associated with an abnormal T lymphocytes composition and therefore an increased susceptibility to infection.[3,4]

The association of iron deficiency and pruritus has been observed and studied as early as the 60s and in 1974 Vickers described the relationship of iron deficiency generalized pruritus in 87 patients, but few data in literature are reported to explain how low serum iron levels can cause itching.[5,6]

It is well known that iron is a major constituent of several tissue compounds, usually classified in: haem iron compounds (contained in cytochromes, myoglobin, catalase and peroxidase); iron-sulphur proteins and metalloproteins; compounds requiring iron as a cofactor.[7]

Finally, there are some enzymes that are presumed to contain iron, such as ribonucleotide reductase, involved in DNA synthesis. Recently, it was also demonstrated that iron deficiency had a pronounced negative effect on elastic fibers development, downregulating the expression of genes encoding fibrillin 1 and 3 that are essential for the normal elastic fibers assembly.[3,8]

CONCLUSION

These data induced us to hypothesize that iron deficiency could lead to a decreased synthesis of DNA with consequent reduction of cutaneous cell turnover and thinning of the skin. In addition, low iron serum levels could affect the correct assembly of dermal elastic fibers, with a consequent reduced skin elasticity. These features can presumably be the basis of cutaneous xerosis, which is already a well-known cause of itching symptoms.

We reported this interesting case to highlight how the itching is a symptom that has not to be underestimated because it can be light of underlying systemic diseases.

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REFERENCES

1. Polat M, Oztas P, Ilhan MN, Yalçin B, Alli N. Generalized pruritus: a prospective study concerning etiology. Am J Clin Dermatol. 2008;9(1):39-44.
2. Rector WG Jr, Fortuin NJ, Conley CL. Non-hematologic effects of chronic iron deficiency. A study of patients with polycythemia vera treated solely with venesections. Medicine (Baltimore). 1982;61(6):382-9.
3. Hoffbrand AV, Ganeshaguru K, Hooton JW, Tattersall MH. Effect of iron deficiency and desferrioxamine on DNA synthesis in human cells. Br J Haematol. 1976;33(4):517-26.
4. Pearson HA, Robinson JE. The role of iron in host resistance. Adv Pediatr. 1976;23:1-33.
5. Sneddon IB, Garrets M. The significance of low serum iron levels in the causation of itching. Proc 12th Int Congress Dermatol, Munich. 1967;2:1061-3.
6. Vickers CFH. Nutrition and the skin: Iron deficiency in dermatology. Proceedings of Tenth Symposium on Advanced Medicine. Royal College of Physicians, London; 1974: 311-315.
7. Dallman PR, Beutler E, Finch CA. Effects of iron deficiency exclusive of anemia. Br J Haematol. 1978;40(2):179-84.
8. Hill CH, Ashwell CM, Nolin SJ, Keeley F, Billingham C, Hinek A, Starcher B Dietary iron deficiency compromises normal development of elastic fibers in the aorta and lungs of chicks. J Nutr. 2007;137(8):1895-900.

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