Case report: the importance of oral manifestations in diagnosing iron deficiency in childhood

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ABSTRACT. Aim The aim of this article is to report a case of iron deficiency diagnosed in a child after routine oral examination. Case report A 5-year-old male child of African descent was brought to the paediatric dental clinic of a public university in Rio de Janeiro, Brazil. His mother’s main complaint was her child’s decayed teeth and sensitivity in the tongue every time he ate spicy or hot food. Anamnesis revealed chronic respiratory problems due to allergy, two previous episodes of anaemia and hospitalization about 15 months before the dental visit because of severe primary herpetic gingivostomatitis. Soft tissue examination revealed his tongue had various patches of atrophic mucosa characterizing absence of papillae in these areas. The child’s dietary assessment indicated that he never ate meat or vegetables. Haematological investigation showed that the child probably had an iron deficiency, although the full blood count was not totally compatible with anaemia. A rapid initial recovery was quite noticeable after the beginning of oral therapy with ferrous sulphate, as remission of tongue sensitivity as well as papillae neoformation were observed.

KEYWORDS: Iron deficiency diagnosis, Tongue pathology, Child, Preschool.

Introduction

Many systemic diseases have oral manifestations that must be properly recognized if the patient is to receive appropriate diagnosis and referral for treatment [Long et al., 1998]. These diseases frequently include many types of anaemia that are widely recognized by their oral lesions [Neville et al., 1995; Drossy and Raghavendra, 2003]. Anaemia results from a decrease in the normal amount of circulating haemoglobin. A variety of factors can cause this condition, including iron deficiency, haemolysis, deficit in red blood cell production, vitamin B12 and folic acid deficiency, or a combination of these factors [Derosi and Raghavendra, 2003].

Iron deficiency is the most common cause of anaemia throughout the world [Massey, 1992; Neville et al., 1995]. It affects approximately 30% of the world population and accounts for up to 500 million cases worldwide [Derosi and Raghavendra, 2003]. In infancy, the major causes of iron deficiency anaemia are a dilution of body iron by rapid growth and an iron poor diet [Behrman and Kliegman, 1994], and its progression is usually insidious [Farley and Foland, 1990].

Oral manifestations of iron deficiency anaemia include angular cheilitis and atrophic glossitis or generalized oral mucosal atrophy [Neville et al., 1995]. The atrophic tongue is a result of depapillation and loss of filliform and fungiform papillae. Moreover, glossodynia is a common complaint [Derosi and Raghavendra, 2003]. The aim of this article is to report a case of iron deficiency diagnosed in a child after routine oral examination.

Case report

A 5-year-old male child of African descent was brought to the paediatric dental clinic of a public university in Rio de Janeiro, Brazil. His mother’s main complaint was the presence of decayed teeth. Anamnesis revealed chronic respiratory problems due to allergy, two previous episodes of anaemia and...
hospitalization about 15 months before the dental visit because of severe primary herpetic gingivostomatitis. His mother also reported that he stayed in hospital for approximately 14 days in order to receive parenteral nutrition because of numerous oral ulcers, including lesions on the tongue, oropharynx and others in the oesophagus, which did not allow food to be ingested.

Intraoral clinical examination revealed dental caries in some primary teeth as well as poor oral hygiene. During soft tissue examination, it was observed that the tongue showed various patches of atrophic mucosa characterizing absence of papillae in these areas. Along with the depapillated areas there were two hyper-pigmented flat lesions measuring about 5 mm in diameter, resembling two macules (Figs. 1a, 1b). The mother said that the macules appeared during patient’s recovery from gingivostomatitis and had never changed in colour or size since then. She also seemed to believe that the atrophic tongue was due to the cicatrisation process of the ulcerations present during the herpetic infection that had occurred about a year before.

In order to discard the possibility of vascular lesions, the hyper-pigmented lesions were submitted to diascopy, which presented a negative response (Fig. 2). In consultation with an oral pathologist, it was decided to watch whether they showed any change in colour or size, in which case a biopsy would be performed. It was suggested that the patient should undergo a haematological investigation, consisting of a full blood and serum vitamin B12 count. Furthermore, the mother was asked about the patient’s diet and revealed that he never ate meat or vegetables and that feeding the child was always quite an annoying task for her. She added that he had also been complaining about sensitivity in the tongue every time he ate spicy or hot food.

The haematological investigation results showed that the serum level of vitamin B12 was in the normal range (392.0 pg/mL: 174.0-878.0), and the haemoglobin level was at the lowest limit (11.6 g/dL, normal > 11.5 g/dL) along with microcytic hypochromic cells on a peripheral blood smear. Red cell distribution width (RDW) was 13.8% (6.5-14.5%), haematocrit 35.7% (> 34%), and mean corpuscular volume 77.6 fl (82 fl). These values showed that the child probably had an iron deficiency, although the full blood count was not totally compatible with anaemia. The child was then referred to his paediatrician, who also suspected iron deficiency and started a therapeutic trial of iron (ferrous sulphate - 3 mg/kg/day) in order to confirm the diagnosis without submitting the child to an invasive examination again. After 14 days of therapy, the tongue had already begun to show areas of papillae neoformation (Figs. 3a, 3b) and the patient’s mother reported that he had no longer complained about tongue sensitivity during the past week.

One month after starting iron therapy, the child showed continuous neoformation and maturation of papillae but, when compared with changes observed in the beginning of the treatment, the process seemed to be slower. For this reason, it was decided to
perform an exfoliative cytological examination of the depapillated tongue areas to check if there was concomitant Candidal infection in these regions. Cytopathology did not reveal Candida species, showing oral smears with predominance of intermediate squamous cells, which was compatible with atrophic mucosa (Fig. 4). It is noteworthy to report that hyper-pigmented macules continued to remain unchanged up to this examination.

After eliminating the possibility of candidiasis associated with the atrophic mucosa, iron therapy was maintained, as it was the only possible treatment for the condition that seemed to be solely due to iron deficiency.

Follow-up. The patient continued to follow a schedule of appointments in order to finish his dental treatment and to check the condition of his tongue. After 12 months of follow-up the tongue still presented areas of depapillation and, according to the patient’s mother, he had not improved his diet. For this reason, the paediatrician continued to maintain the ferrous sulphate intake.

**Discussion**

It is worthwhile considering that iron deficiency occurs on a sequential basis in three stages of progression. The first one is a negative oral balance, in which the demands for iron (or iron losses) exceed the body’s ability to absorb iron from the diet. As long as iron stores are present, and can be mobilized, red cell morphology and indices are normal in this phase. The next stages are the iron deficient erythropoiesis, characterized by the first appearance of microcytic cells on peripheral blood smear, and the iron-deficiency anaemia itself, presenting as low levels of haemoglobin and haematocrit [Braunwald et al., 2001]. In the case reported here, the child seemed to be in the second phase, because although his blood smear presented microcytic and hypochromic cells, there was no evidence of marked alterations in haemoglobin level or haematocrit. So, even in the absence of anaemia, iron deficiency was sufficient to promote oral manifestations.

Glossitis is significantly more common in anaemic patients than in healthy ones, especially in those individuals who are deficient in vitamin B12 and folate. Thus, it is suggested that glossitis remains a valuable sign of vitamin-B12 and folate deficiency [Dawson et al., 1969]. With regard to this, the first approach in the reported case was based only on an initial suspicion of vitamin B12 deficiency. However, haematological investigation results ruled out the possibility of this type of deficiency.

Iron deficiency glossitis has been described as a diffuse or patchy atrophy of the dorsal tongue papillae, often accompanied by tenderness or a burning sensation. As such findings are also evident in oral candidiasis, some investigators have suggested that iron deficiency predisposes the patient to candidal infection, which results in the changes seen at the corners of the mouth and on the tongue [Neville et al., 1995]. For this reason, it was decided...
to perform the exfoliative cytological examination of the depapillated areas, especially because of the patient’s complaint about tongue sensitivity during the ingestion of some types of food. Presence of Candida would also involve an antifungal therapy to treat the condition [Neville et al., 1995].

To diagnose iron deficiency anaemia, serum ferritin levels can be evaluated along with the haemoglobin level in routine blood counts [Derossi and Raghavendra, 2003]. However, as ferritin is an acute phase reactant, it is known to be unreliable as a sole marker of iron deficiency. Ferritin may be elevated in individuals affected at the time of giving blood and therefore these individuals may have ferritin in the normal range in spite of being iron deficient (false negatives) [Fawcett et al., 1998]. On the other hand, the red cell distribution width (RDW) is a measure of iron deficiency that retains its diagnostic usefulness when inflammation is present. It measures the heterogeneity of red cell size distribution and it is increased in iron deficiency, but not in thalassaemia trait nor in chronic inflammatory illness. Thus an elevated RDW is the earliest haematological manifestation of iron deficiency [Wilson et al., 1999] and a full blood count alone is probably the screening test of choice for iron deficiency anaemia [Crampton et al., 1994]. With regard to the present case, serum ferritin was not initially evaluated because it was thought that the patient had vitamin B12 deficiency and not iron deficiency. As a full blood count showed a way into the latter condition, presenting microcytic and hypochromic red cells and RDW values close to the highest acceptable, the patient’s paediatrician decided to confirm diagnosis with a therapeutic trial of iron, preventing the child from being submitted to another blood test.

Therapeutic trial of iron is indicated to establish the diagnosis of iron deficiency if the suspicion index is high and laboratory results are equivocal [Reeves et al., 1983]. In the reported case a therapeutic trial could be justified, as dietary history suggested iron deficiency.


References


Increasing evidence has shown that mild iron deficiency in infancy may be associated with later cognitive deficits [Behrman and Kliegman, 1994]. Therefore, diagnosis of this condition is especially important in children, because it has profound effects on the central nervous system and has been associated with impaired mental and motor development [Derossi and Raghavendra, 2003]. In the case reported here, the dentist had an important role in diagnosing this condition by observing the atrophic tongue.

Conclusion

Some systemic conditions have oral manifestations that dentists must be able to recognize, especially in children, who need to be in good health for ideal development. Early and proper diagnosis of these problems could make a difference to the prognosis of many conditions and, to a greater extent, to the child’s life.