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Atrophic glossitis in pernicious anemia patients can be treated to normal in two weeks by intramuscular injection of vitamin B12

KEYWORDS
Atrophic glossitis;
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Pernicious anemia (PA) is defined as having anemia (hemoglobin concentration $<$ 13 g/dL for men and $<$12 g/dL for women), an mean corpuscular volume (MCV) $\geq$ 100 fL, a serum vitamin B12 level $<$ 200 pg/mL, and the presence of serum gastric parietal cell antibody (GPCA) and/or anti-intrinsic factor antibody positivities.[1] Our previous studies found PA in 22 (2.1%) of 1064 atrophic glossitis patients,[2] in 15 (1.7%) of 884 burning mouth syndrome patients,[3] in 6 (1.7%) of 352 oral lichen planus patients,[4] and in 4 (1.1%) of 355 recurrent aphthous stomatitis patients.[5] Patients with PA usually have complete or partial atrophic glossitis and concomitant sensitivity to spicy or hot food, burning and numbness of the tongue, and loss of taste sensation that finally result in difficulty in eating or swallowing of food. In our experience, atrophic glossitis was trouble for PA patients, but it could be treated to normal in two weeks by intramuscular injection of vitamin B12 (hydroxocobalamin 2 mg in 2 cc of distilled water for intramuscular injection every two days) (Figs. 1A, B, C and D). The oral symptoms and signs usually disappeared after 2-week treatment of vitamin B12 injection and this in turn allowed patients to have a comfortable feeling when eating. In addition, for PA patients with a permanent decrease in the ability to absorb dietary vitamin B12, lifelong treatment with intramuscular injection of vitamin B12 once per month is necessary. Although it is not an established treatment, recently it has been reported that oral treatment is also effective, because 1%–5% of vitamin B12 absorption in the terminal ileum is by passive diffusion, which does not involve intrinsic factor.[1] However, PA patients are at high risk of developing gastric adenocarcinoma and carcinoid tumors. Thus, periodic stomach examinations are recommended for PA patients.[1]

PA is a type of macrocytic anemia. Macrocytic anemias are generally classified into megaloblastic or non-megaloblastic anemia. Megaloblastic anemia is caused by deficiency or impaired utilization of vitamin B12 and/or folic acid, whereas nonmegaloblastic macrocytic anemia is caused by various diseases such as myelodysplastic syndrome, liver dysfunction, alcoholism, hypothyroidism, and certain drugs. Vitamin B12 deficiency is the most common cause of megaloblastic anemia and is caused by insufficient dietary intake, malabsorption due to the absence of intrinsic factor caused by PA or following gastric surgery, or transcobalamin II deficiency.[1] Folic acid deficiency is caused by nutritional deficiency, malabsorption, increased requirements, or medication (e.g., methotrexate, trimethoprim, phenytoin).[1] Patients with myelodysplastic syndrome may present with pancytopenia including anemia, thrombocytopenia, and neutropenia.[1] Alcoholism is a well-known cause of macrocytic anemia, because chronic consumption of more than 80 g of alcohol per day has adverse effects on the hematologic system.[1] Hypothyroidism may cause normocytic or macrocytic anemia, because

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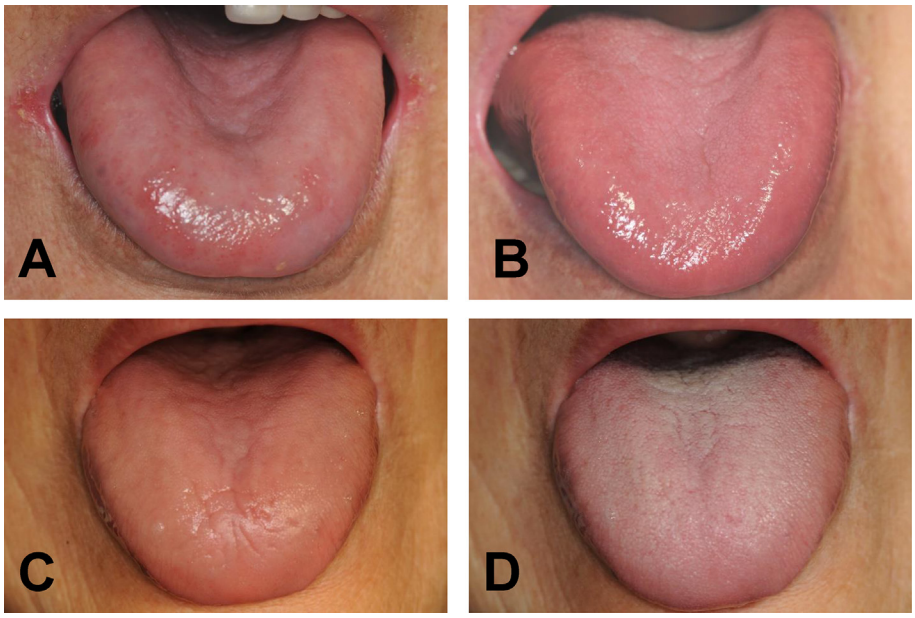

Figure 1 Clinical photographs of atrophic glossitis in two patients with pernicious anemia (PA) before and after treatment with intramuscular injection of 2 mg of vitamin B12 every two days for 2 weeks. (A) Atrophic glossitis in a PA patient before treatment. (B) Complete regression of atrophic glossitis after 2-week treatment of vitamin B12 injection. (C) Atrophic glossitis in another PA patient before treatment. (D) Complete regression of atrophic glossitis after 2-week treatment of vitamin B12 injection.

thyroid hormone can stimulate the production of erythropoietin and affects hematopoiesis. Many drugs cause megaloblastic anemia by impairing the cellular availability or the utilization of folic acid or vitamin B12. Common drugs that cause macrocytosis are hydroxyurea, methotrexate, zidovudine, azathioprine, antiretroviral agents, valproic acid, and phenytoin. Thus, differential diagnoses of macrocytic anemia are usually necessary before giving the PA patients with intramuscular injection of vitamin B12.

Declaration of Competing Interest

The authors have no conflicts of interest relevant to this article.

References

1. Nagao T, Hirokawa M. Diagnosis and treatment of macrocytic anemias in adults. *J Gen Fam Med* 2017;18:200—4.
2. Chiang CP, Chang JYF, Wang YP, Wu YC, Wu YH, Sun A. Significantly higher frequencies of anemia, hematinic deficiencies, hyperhomocysteinemia, and serum gastric parietal cell antibody positivity in atrophic glossitis patients. *J Formos Med Assoc* 2018;117:1065—71.
3. Chiang CP, Wu YH, Wu YC, Chang JYF, Wang YP, Sun A. Anemia, hematinic deficiencies, hyperhomocysteinemia, and serum gastric parietal cell antibody positivity in 884 patients with burning mouth syndrome. *J Formos Med Assoc* 2020;119:813—20.
4. Chen HM, Wang YP, Chang JYF, Wu YC, Cheng SJ, Sun A. Significant association of deficiencies of hemoglobin, iron, folic acid, and vitamin B12 and high homocysteine level with oral lichen planus. *J Formos Med Assoc* 2015;114:124—9.
5. Wu YC, Wu YH, Wang YP, Chang JYF, Chen HM, Sun A. Hematinic deficiencies and anemia statuses in recurrent aphthous stomatitis patients with or without atrophic glossitis. *J Formos Med Assoc* 2016;115:1061—8.

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