

# Hyperpigmentation in Vitamin B12 Deficiency: A Case Report

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## ABSTRACT

**Introduction:** Vitamin B12 plays an important role in nucleic acid synthesis and erythrocyte production. Dietary deficiency of vitamin B12 may occur in strict vegetarians as plants contain an inadequate amount of vitamin B12.

**Case report:** A case of vitamin B12 deficiency presenting with mucocutaneous hyperpigmentation was reported to the department of Dermatology, Venereology and Leprology, GMC, Jammu. Its manifestations may present in its early stages and the diagnosis may be overlooked.

**Conclusion:** The presentation of vitamin B12 deficiency varies from being asymptomatic to affecting multiple organ systems. Cutaneous manifestations are rare and may present as generalized hyperpigmentation of skin, mucous membranes and nails.

**Keywords:** Hyperpigmentation, Vitamin B12

## INTRODUCTION

The etiological factors of acquired hyperpigmentation are many, both cutaneous and systemic. Vitamin B12 deficiency may be a rare cause of hyperpigmentation. A common cause of vitamin B12 deficiency includes malabsorption usually due to lack of intrinsic factor in pernicious anaemia and gastric resection. Dietary deficiency may occur in strict vegetarians and may manifest with variable presentations. Its haematological manifestations include macrocytic anaemia, pancytopenia and neurological manifestations such as paraesthesias, subacute combined degeneration of cord, orthostatic hypotension, optic atrophy and dementia.<sup>1</sup> Cutaneous manifestations are rare and include generalized hyperpigmentation of skin, mucous membranes and nails, especially involving the flexural regions, palmar creases, knuckles, soles and oral cavity. Glossitis with a beefy red atrophic tongue may also occur.

## CASE REPORT

A 19 year old male patient reported to the department of Dermatology, Venereology and Leprology, GMC, Jammu, presented with progressive pigmentation of both hands involving dorsal aspect of interphalangeal joints, distal phalanges, palmar creases, face, lips and buccal mucosa for 2 years [Figure 1, 2]. Also spotty pigmentation was present all over the palms [Figure 3]. He was unmarried, strict vegetarian by diet, non-alcoholic and non smoker. There were no other systemic complaints present in the patient. On physical examination, the only significant finding was pallor.

Investigations included complete blood counts, LFT, RFT, 8 a.m. plasma cortisol levels, serum folic acid and vitamin B12 levels Table 1. His Hb was 9.3 gm% and peripheral blood smear showed Macrocytosis and Anisocytosis. 8 a.m. serum cortisol levels were 8.8 µg/dL (5-25 µg/dL) which ruled out hypocortisolemia. Serum folic acid levels were 8.9 ng/mL (3-15 ng/mL). His serum vitamin B12 levels were 108.00 pg/mL (211 – 911 pg/mL). Other investigations were normal. Hence

a diagnosis of vitamin B12 deficiency was made and the patient was prescribed intramuscular injections of vitamin B12 (1000 mg) for ten days, then weekly for one month and then monthly for two months. Subsequently the patient received a multivitamin tablet daily containing vitamin B12 (1 mg) and showed improvement in his presentation.

## DISCUSSION

The main source of vitamin B12 in humans is the consumption of animal products. Prevalence of B12 deficiency varies from 5% to 20% among people older than 65 years.<sup>2</sup> Inadequate consumption of animal source foods and pernicious anaemia in younger adults and malabsorption in part due to gastric atrophy in older persons are the main cause of low serum vitamin B12 levels and likely the main cause in poor populations worldwide.<sup>1,3</sup> In the present case, the cause of Vitamin B12 deficiency was dietary as the patient was a strict vegetarian. Mucocutaneous hyperpigmentation has rarely been reported as a presenting manifestation of Vitamin B12 deficiency as reported in our patient. In the past there have been two such Indian reports.<sup>4,5</sup> Hyperpigmentation of the extremities especially over the dorsum of hands and feet, with accentuation over the inter-phalangeal joints and terminal phalanges along with pigmentation of oral mucosa is characteristic of vitamin B12 deficiency.<sup>6</sup> A similar pigmentation was seen in our patient as well. The pathophysiology of hyperpigmentation in vitamin B12 deficiency involves a decrease in the reduced glutathione level which increases the tyrosinase activity thereby causing hyperpigmentation. It is also suggested that increased biopterin levels in vitamin B12 deficiency increases hydroxylated phenylalanine and thus leads to hyperpigmentation. Also defect in the melanin transfer between melanocytes and keratinocytes, resulting in pigmentary incontinence may be the cause of hyperpigmentation.<sup>7</sup>

Haemoglobin	9.3 gm%
Total leucocyte count	9800/cm <sup>3</sup>
Peripheral smear	Macrocytosis, Anisocytosis
Mean Corpuscular volume	108.8 (88-101)
Serum Vitamin B12	108.00 pg/mL (211-911 pg/mL)
Serum Iron	105 µg/dL (50-175 µg/dL)
Serum Folic Acid	8.9 ng/mL (3-15 ng/mL)
Serum Cortisol 8 a.m.	8.8 µg/dL (5-25 µg/dL)
<b>Table-1: Biochemical Profile of the Patient</b>	

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**Figure-1:** Hyperpigmentation over interphalangeal joints.



**Figure-2:** Hyperpigmentation over lips.



**Figure-3:** Spotty pigmentation over palms.

## CONCLUSION

Skin hyperpigmentation can present as an early manifestation of vitamin B12 deficiency and such patients should be diagnosed and treated early to prevent the haematological and neurological complications associated with the deficiency.

## REFERENCES

1. Oh R, Brown DL. Vitamin B12 deficiency. *Am Fam Physician*. 2003;67: 979-86.
2. Gupta A, Damji A, Uppaluri A. Vitamin B12 deficiency.

Prevalence among South Asians in Toronto clinic. *Can Fam Physician*. 2004;50:743-7.

3. Washington DC: National Academy Press; 1998. Institute of Medicine. Food and Nutrition Board. Dietary Reference Intakes: Thiamine, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin and Choline.
4. Ahuja SR, Sharma RA. Reversible cutaneous hyperpigmentation in vitamin B12 deficiency. *Indian Pediatr*. 2003;40:170-1.
5. Srivastava N, Chand S, Bansal M, Srivastava K, Singh SJ. Reversible hyperpigmentation as the first manifestation of dietary vitamin B12 deficiency. *Indian J Dermatol Venereol Leprol*. 2006;72:389-90.
6. Aaron S, Kumar S, Vijayan J, Jacob J, Alexander M, Gnanamuthu C. Clinical and laboratory features and response to treatment in patients presenting with vitamin B12 deficiency-related neurological syndromes. *Neurol India*. 2005; 53:55-8.
7. Mori K, Ando I, Kukita A. Generalized hyperpigmentation of the skin due to vitamin B12 deficiency. *J Dermatol*. 2001;28:282-5.

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