



Vitamin B 12 Deficiency- Clinical Indicators And Characteristics

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Abstract

Anemia is a common clinical state noticeable in individuals attending to Medical OPD and inpatient settings. These individuals were subjected for,detailed history,examination and work up for different pattern of anemia.Among these, 30 individuals showing features of megaloblastic anemia were included for study. The data Analysis showed slight female preponderance(56.6%),middle aged individuals (53.3%) dominance, The clinical presentations noted in these included, the features of anemia(50%), nonspecific to sensory neuropathic features (16.66) each. Haematological features like, moderate to severe anemia(69.9%),pancytopenia(13.3%), megaloblastic anemia(20%). ,Dimorphic anemia(20%) were noticeable features.The serum vitamin B 12 assay showed moderate deficiency of 73.33%(83-187 pg/ml) and severe deficiency of 26.66%(< 83 pg/ml).The combination several risk factors(vegetarian diet,diabetes mellitus,long term PPI use and Alcohol) may responsible for Vitamin B 12 deficiency.Early recognition ,etiological assessment and adequate replacement of Vitamin b 12 are the essential steps of approach and management.

Keywords: Vitamin B 12, Megaloblastic anemia

Abbreviations PPI -proton pump inhibitors GIT-Gastro intestinal YRS- years

Introduction

Anemia is a common clinical state noticeable in many individuals , who come for Medical OPD and inpatients group.Among the causes for anemia , the nutritional deficiencies of iron ,folic acid,vitamin B12 and pyridoxine accounts for many.Megaloblastic anemias are increasingly recognized as important cause for anemia at present next to Iron deficiency .The spectrum of Vitamin B 12 deficiency include ,Subclinical/Atypical^{4,10},defined illness to nonspecific nature and multisystem disease^{1,8,11}.We also witnessed, many cases of anemia related to Vitamin b 12 deficiency here.The etiological factors of Vitamin b 12 deficiency variable from predominant vegetarian diet,GIT causes(atrophic gastritis,malabsorptive states), drugs like prolonged

use of PPI and metformin . The etiology may not be definable in many individuals. Hence a clinical recognition and Spectrum of illness related to vitamin b 12 deficiency was taken up.

Aims:To assess the clinical characteristics and spectrum of presentation of Vitamin b 12 deficiency

Source of Data: The Individual showing features of anemia from OPD and inpatients sections were subjected for,detailed history, ,dietary habits and examination for different system involvement. These individuals were worked up for different pattern of anemia and , probable etiological factors . Among these, 30 patients who showed the features of megaloblastic anemia(clinical and laboratory) were included for the study.

The patients data was collected in form of history,gastro intestinal(GI) symptoms ~~blood loss~~, dietary habits, current and past medications . Also a thorough general physical and systemic examination was done .Investigations included were complete

hemogram, iron studies, vitamin b 12 assay,ultrasound abdomen and relevant individual case based investigations(upper GI endoscopy).All these parameters were entered in excel sheet and data was analysed using frequency of distribution.

Results

Sex distribution

	Number	percentage(%)
male	13	43.33
female	17	56.66

Age group pattern

Age group(yrs)	Number	percentage(%)
15-30 years	4	13.33
31 to 60	16	53.33
61 and above	10	33.33

CLINICAL CHARECTERISTICS

symptoms	Number	percentage(%)
nonspecific	10	13.33
Anaemic symptoms	15	50
fever	3	10
Neurological features	5	16.66
GI/ liver disturbances	3	10
dermatological	3	10
psychiatric	2	6.66
asymptomatic	5	16.66

Comorbid illness

<u>Disease</u>	Number	percentage(%)
<u>Diabetes mellitus</u>	4	13.33
Hypertension	2	6.66
IHD	2	6.66
Alcohol abuse	3	10

Thyroid dysfunction	2	6.66
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Dietary pattern

	Number	Percentage(%)
Veg	18	60
Mixed diet	12	40

Lab parameters(hematological)

	Number	percentage(%)
Severe anemia(< 6 g %)	11	36.66
moderate anemia(<u>-7-10 g%</u>)- <u>6%</u>	10	33.33
Platelets	Total numbers	(%)
< 1,50000 c/cmm	11	33.33
Pancytopenia	4	13.33
MCV <u>(90 – 99)</u>	9	30
MCV > 100	6	20
Dimorphic anemia	6	20
Megaloblastic anemia	6	20
Microcytic anemia	5	16.66

Serum Vitamin B 12 Assay

Vit B 12 levels(pg/ml)	no	(%)
< 83	8	26.66
84- 187	22	73.33

Discussion

Results from our study group, showed slight predominance deficiency of Vitamin b 12 in

Females(56 %).The spectrum of Vitamin B 12deficiency presentations, included nonspecific, features of Anemia,asymptomatic to multisystem involvement.Hematological features (50%) like Anemia, bicytopenia and pancytopenia were noted in our study. Severe anemia accounted for 40 percentage of presenting symptom. Neurological(sensory symptoms) and cortical venous thrombosis and nonspecific(fatiguess,myalgia) presentations were next common mode(16.66%) of presenting features.Dermatological features included pigmentation on hands, oral mucosa and vitiligo.

Peripheral smear showed megaloblastic features(20%). Dimorphic anemia(20%) and Microcytic anemia (16.66).

The serum vitamin B 12 assay varied from 83 to 187(moderate deficiency-26.66%)to less than 83 pg/ml(severe deficiency-73.33%)

The presentation of Vitamin b12 deficiency state can be variable,multifaceted¹¹ and atypical¹⁰.

The etiological risk factors of vitamin B 12 deficiency were inconclusive in our study . The Probable risk factors are , Predominant Vegetarian diet ,diabetes mellitus,aging^{3,5} , drugs⁷(Proton pump inhibitors,metformin),autoimmune^{11,12} and alcohol. In Many cases ,we were unable find out the exact etiology for Vitamin B12 deficiency. The combination of several risk factors and multifactors^{2,3,4} predisposes for Vitamin B 12 deficiency. Screening for Vitamin b12 deficiency is advisable,with presence of one or more risk factors⁶.Also it is further suggested to estimate serum ,methyl malonic acid and homocysteine levels, which have been shown to be more sensitive in the diagnosis of vitamin B₁₂ deficiency^{1,8,10} .

Limitation our study included GIT etiological assessments like Endoscopy, Biopsy of gastric mucosa and autoimmune work were not done for assessment of etiological risk.

Conclusions

Vitamin B 12 deficiency presents with spectrum of manifestations varying from subclinical to multisystem disease. Symptoms of Anemia,sensory neuropathy,GIT disturbances and nonspecific illness are the common mode of presentation. Early

recognition ,etiological assessment and adequate replacement of Vitamin b 12 are the essential steps of approach and management .

References

1. Bruce H.R. Wolffenbuttel, MD, PhD,^{a,*} Hanneke J.C.M. Wouters, BSc,^{a,b} M. Rebecca Heiner-Fokkema et al . The Many Faces of Cobalamin (Vitamin B₁₂) Deficiency.*Mayo Clin Proc Innov Qual Outcomes*. 2019 Jun; 3(2): 200–214.
2. Luciana Hannibal,^{*} Vegard Lysne,Anne-Lise Bjørke-Monsen, ET AL Biomarkers and Algorithms for the Diagnosis of Vitamin B₁₂ Deficiency .*Front Mol Biosci*. 2016; 3: 27.
3. ROBERT C. LANGAN, MD, FAAFP, and ANDREW J. GOODBRED, MD.Vitamin B12 Deficiency: Recognition and Management (Am Fam Physician. 2017;96(6):384-389.
4. Green, R., Allen, L., Bjørke-Monsen, AL. *et al*. Vitamin B₁₂ deficiency.*Nat Rev Dis Primers* 3, 17040 (2017). <https://doi.org/10.1038/nrdp.2017.40>
5. William K. Silverstein, Matthew C. Cheung and Yulia Lin **Vitamin B₁₂ deficiency** .*CMAJ* June 20, 2022 194 (24) E843; DOI: <https://doi.org/10.1503/cmaj.220306>
6. Robert C Langan¹, Andrew J Goodbred .Vitamin B12 Deficiency: Recognition and Management .*Am Fam Physician*. 2017 Sep 15;96(6):384-389.
7. Chong RQ, Gelissen I, Chaar B, Penm J, Cheung JM, Harnett JE. Do medicines commonly used by older adults impact their nutrient status? *Explor Res Clin Soc*
8. *Pharm*. 2021 Sep 3;3:100067. doi: 10.1016/j.rcsop.2021.100067. PMID: 35480616; PMCID: PMC9031754.
9. ROBERT C. OH and DAVID L. BROWN. Vitamin B12 Deficiency .*Am Fam Physician* 2003;67:979-86,993-4.
10. Ruth Dobson¹, DebieAlvares. A difficult case The difficulties with vitamin B12 . <http://dx.doi.org/10.1136/practneurol-2015-001344>
11. Ralph Green · Vitamin B₁₂ deficiency from the perspective of a practicing hematologist .*Review.Blood*.. 2017 May 11;129(19):2603-2611..doi: 10.1182/blood-2016-10-569186.
12. Gianluca Esposito¹, Ludovica Dottori¹, Giulia Pivetta et al.Pernicious Anemia: The

Hematological Presentation of a Multifaceted Disorder Caused by Cobalamin Deficiency Nutrients. 2022 Apr 17;14(8):1672.. doi: 10.3390/nu14081672.

13. Ammouri W, Tazi ZM, Harmouche H, Maamar M, Adnaoui M. Venous thromboembolism and

hyperhomocysteinemia as first manifestation of pernicious anemia: a case series. J Med Case Rep. 2017 Sep 2;11(1):250. doi: 10.1186/s13256-017-1415-z. PMID: 28863787; PMCID: PMC5581415.