

Vitamin B12 deficiency presenting
as pancytopenia in a young
adolescent boy : A novel causative
agent !

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A seventeen year old developmentally normal adolescent boy presented with 2 month history of ,

- ❖ Easy fatigability
- ❖ Loss of appetite
- ❖ Loss of weight

Last 10 days ,

- ❖ Fever – low grade , on and off
- ❖ Yellow discolouration of the eyes
- ❖ Blurring of vision

Child had initially gone to a private practitioner , in view of pallor , baseline investigations was done revealed a hemoglobin of 3.1mg/dl hence referred here.

- Antenatal , Natal And Postnatal History : Uneventful
- Developmentally normal child studying 12th standard .
- Immunised till date according to universal immunisation programme .
- Family history : First born of non consanguineous marriage. Nil similar complaints.
- Dietary history : Mixed diet

Conscious
Oriented

Pallor

Icterus

No cyanosis / clubbing / generalised lymphadenopathy / pedal edema

Afebrile

PR : 86/ mint

BP : 110 / 70 mm of Hg

RR : 18 / mint

Cardiovascular System : first and second heart sounds heard . Grade 2/6
Ejection systolic murmur in pulmonary area - hemic murmur

Respiratory System : Bilateral Normal Vesicular Breath Sounds

Central Nervous System : Visual acuity 6/36 , 6/24 .No focal neurological deficits.

Per Abdomen : Soft , Liver 3 cm below right costal margin and spleen 4 cm below the left costal margin , bowel sounds heard.

Provisional Diagnosis

- ❖ Infective Cause
- ❖ Hemolytic Anemia
- ❖ Malignancy

Investigations

Hemoglobin	4.1 mg/dl
Total Count	2100 cells/cu mm
Platelet	88000
Mean Corpuscular Volume	105.5 fl (70 – 90 fl)

Peripheral Smear : microcytic hypochromic to macrocytic normochromic , with anisopoikilocytosis and schistocytes with associated leucopenia and thrombocytopenia.

Liver Function Tests: Total bilirubin 3.2 mg/dl and direct bilirubin of 0.5 mg/dl , rest were within normal limits.

- Infective Work Up were all negative for malaria, dengue, scrub typhus, enteric fever, leptospirosis and viral hepatitis. His cultures were also sterile.

- Hemolytic Anaemia Work up :

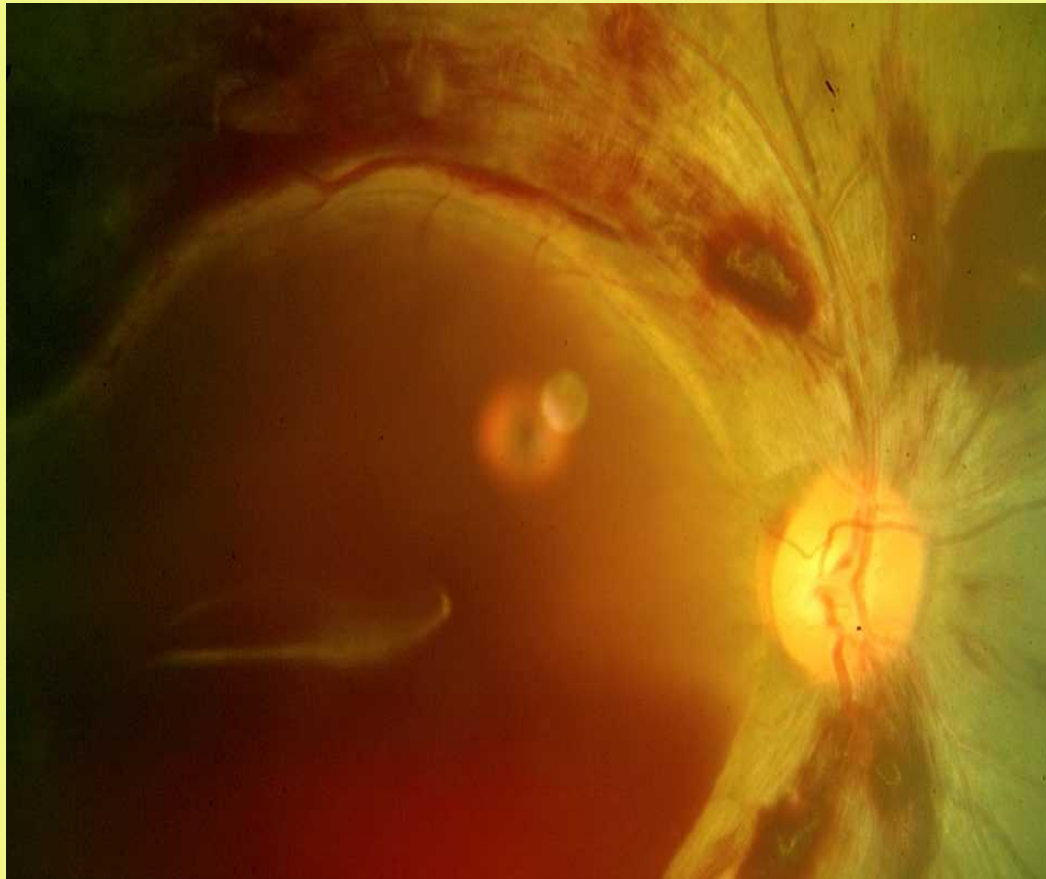
Direct Coomb's Test – Negative

Reticulocyte count – 1.2 %

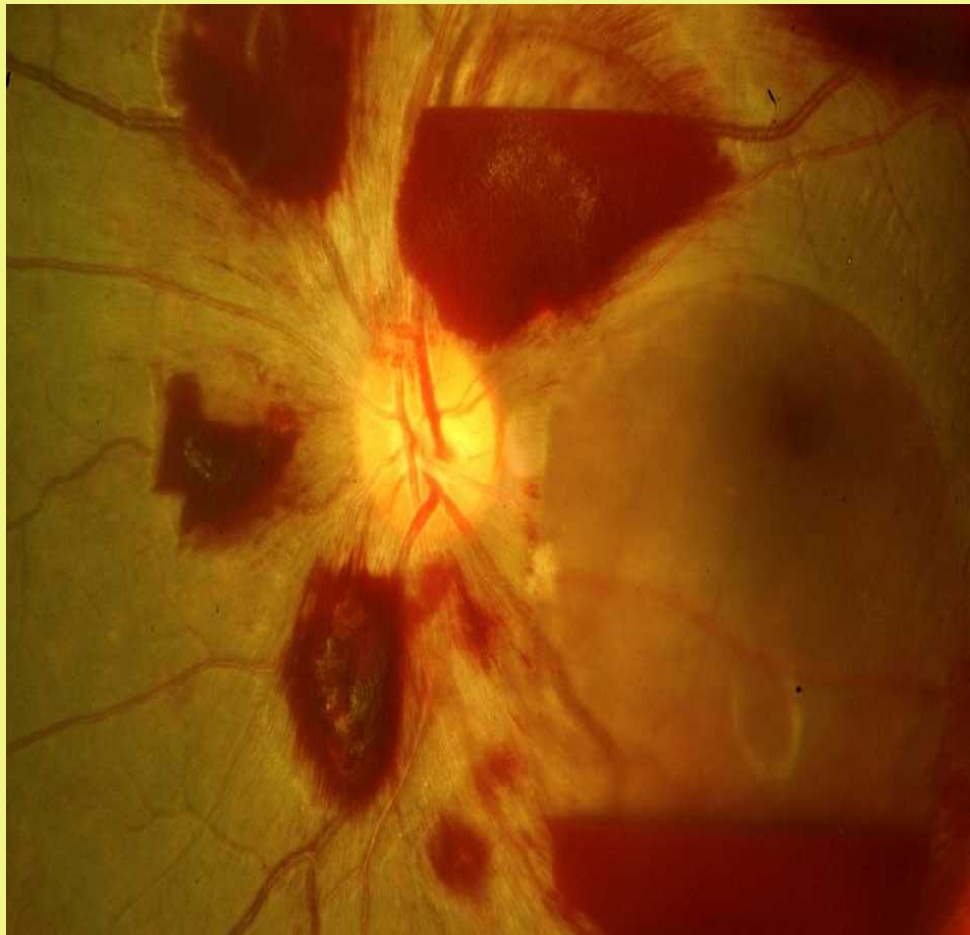
- LDH – 5712 IU (0 -450 IU)

- Serum Ferritin – 321 ng/ dl (23 – 336 ng/dl)

Ophthalm Evaluation



Right eye Fundoscopic view:
clear media and healthy disc
with multiple splinter
haemorrhages, more around
the disc and few white
centred haemorrhages.
Extensive subhyaloid
haemorrhages overlying the
macula extending more than
10DD with a characteristic
fluid level.



Left Eye Fundoscopic view: clear media and healthy disc with multiple splinters and blot shaped haemorrhages, with few white centred haemorrhages in all four quadrants, more around the disc. Subhyaloid haemorrhages overlying the macula and superior quadrant with a characteristic fluid level

❖ Pancytopenia

❖ Increased Mean corpuscular volume

❖ Peripheral Smear – Macrocytic Red Blood Cells

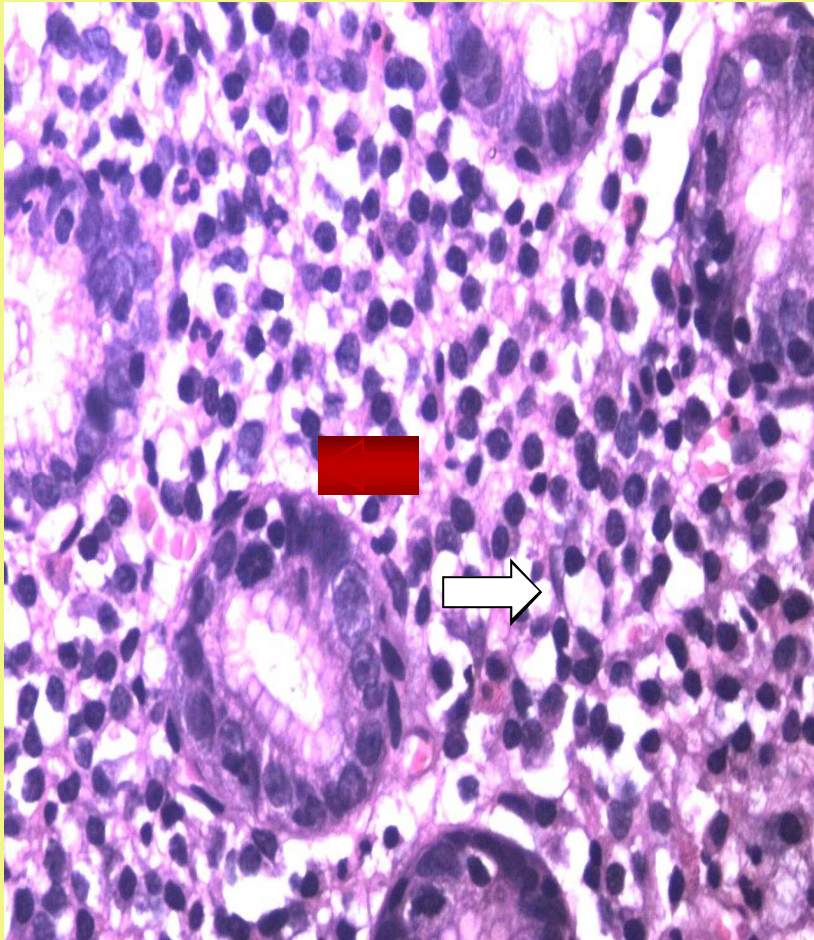
- Vitamin B 12 level - < 60 pg/dl (normal 180 – 300 pg/dl).
- Serum Folate Levels – 3.78 ng/dl (2-20ng/dl)
- Serum homocystine levels were elevated (30micromoles/ litre).
- Qualitative urine analysis for methyl malonic acid was positive.
- Due to logistic issue we were unable to do a quantitative methyl malonic assay.
- Bone marrow Aspiration : Revealed erythroid hyperplasia with megaloblastic maturation with suppressed megakaryocytes and leucopoiesis.

VITAMIN B12 DEFICIENCY !!

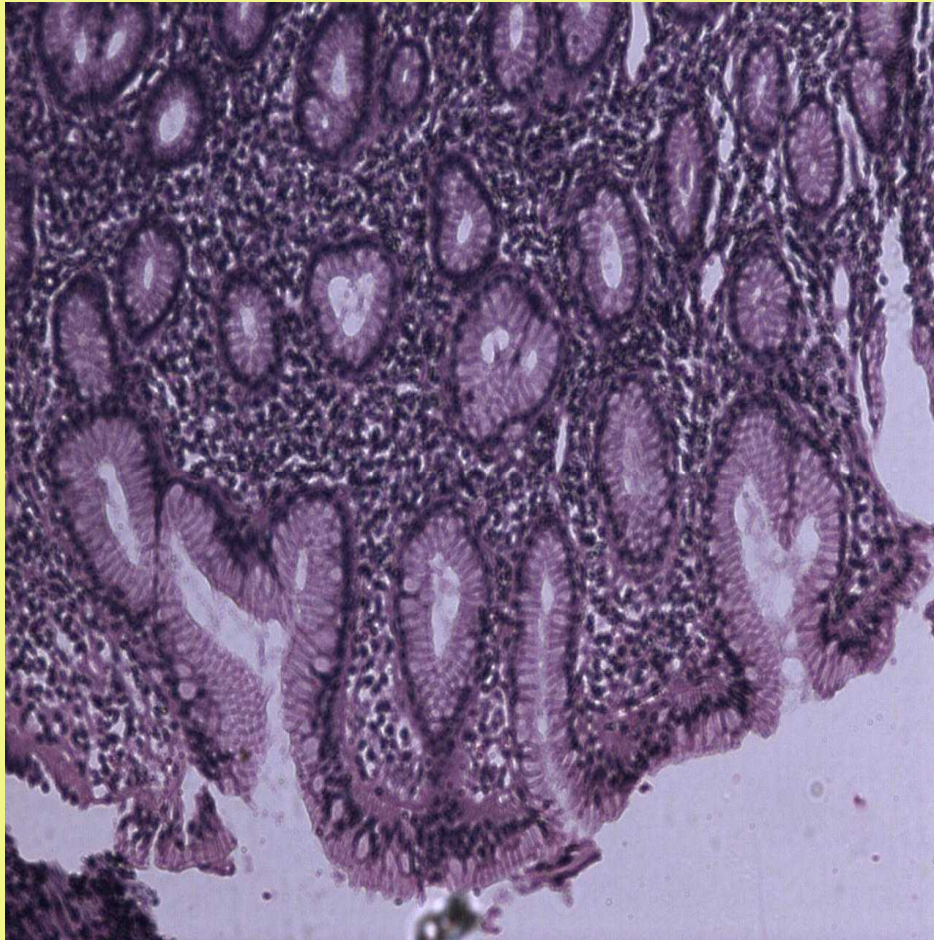
CAUSES....

- ❖ His dietary intake of vitamin B 12 was normal.
- ❖ Anti-parietal cell and anti intrinsic factor were negative – ruled out pernicious anaemia.
- ❖ Upper GI endoscopy revealed

Erythematous gastropathy and gastric biopsy revealed *Helicobacter pylori* induced chronic gastritis.



Antral Biopsy high power view:
Slender comma shaped *Helicobacter pylori* seen. Architectural disarray of glands with no activity .



Antral Biopsy high power view:
Architectural disarray of glands with
no activity with bifidding of glands.

MANAGEMENT

- ❖ The child was started on Injection vitamin B12 1000mcg weekly for 4 weeks.
- ❖ Then monthly for 3 months and once in 3 months for 6 months.
- ❖ He was given pantoprazole 40mg, amoxicillin 750mg and clarithromycin 500mg once a day for 4weeks.
- ❖ Due to the severity of anaemia we could not exactly prove a temporal relationship by treating only the H. pylori infection.

FOLLOW UP

	Hemoglobin mg/dl	Total Count per cu mm	Platelet in lakhs /cu mm
2 weeks	6	4040	1.05
2 months	12	6700	2

Liver function test , vitamin B12 levels, urine methylmalonic acid and homocystine levels were within the normal range.

Review of Literature

- A prospective cohort study was done involving 138 patients who had anemia and vitamin B12 deficiency. An upper gastrointestinal endoscopy was performed to assess the severity of atrophic gastritis and biopsy specimens for *Campylobacter-like organisms* tests and histological examination for *H.pylori* were obtained at the time of diagnosis. The diagnosis of *H.pylori* prompted a combination treatment.
- Results: *Helicobacter pylori* was detected in 77 (56 %) of 138 patients with vitamin B12 deficiency and eradication of *H.pylori* infection successfully improved anemia and serum vitamin B12 levels in 31 (40 %) of 77 infected patients.

Ku"rs, ad Kaptan, MD; Cengiz Beyan, MD; Ali Ug ur Ural, MD; Tu"rker C, etin, MD; Ferit Avcu, MD; Mustafa Gu"ls, en, MD; Ri"fkı" Finci, MD; Atilla Yalc, i"n, MD Helicobacter pylori—Is It a Novel Causative Agent in Vitamin B12 Deficiency? Arch Intern Med. 2000;160:1349-1353

A 13-year-old-boy was very low serum hemoglobin level. His dietary history revealed that he was consuming meat products up to 2 times weekly and consuming eggs up to 4 times weekly. His medical history did not reveal any significant health problem. He complained of weakness, dizziness, and dull abdominal pain in the last 4 weeks. He had pallor on physical examination and his blood test showed the following: hemoglobin (Hb): 5.3 g/dL; mean corpuscular volume (MCV): 106 fL; red cell distribution width (RDW): 20; reticulocyte count: 0.56%; white blood cell count (WBC): 2230/mm³; platelet count: 56000/mm³; total bilirubin: 1.39 mg/dL; and direct bilirubin: 0.2 mg/dL. Additionally at peripheral blood smear, neutrophil hypersegmentation was detected. Megaloblastic changes in normoblasts, giant metamyelocytes, and heterogeneity were seen in bone marrow aspiration. Serum ferritin and folate levels were normal.

However, his VitB12 level was 50 pg/mL (180–300 pg/mL) and antiparietal cell antibody was negative. His urea breath test was positive for H. pylori infection. treatment against H. pylori (amoxicillin and clarithromycin for 15 days and lansoprazole for 4 weeks) and parenteral VitB12 (1000 µg/day for 2 weeks, followed by monthly 500 µg for 6 months) at the same time.

Ali Bay, MD, 1 Enes Coskun, MD, 1 Goksel Leblebisatan, MD, 2 and Ali Seckin Yalcin, MD 3 Helicobacter Pylori Infection–Related Pancytopenia in a Young Boy Pediatric Hematology and Oncology, Early Online: 1–3, 2011

❖ In a study conducted in Birzeit university , 60 patients suffering from gastric disease due to H.pylori infection were evaluated. Endoscopy was done and gastric biopsies taken. H.pylori was present in 71.7% of the patients tested. Vitamin B12 deficiency was seen in 67.4% of patient tested positive for H.pylori.

Abdel salam sarari, Helicobacter pylori, a causative agent of vitamin B12 deficiency, journal of infection in developing countries, vol 2 no.5.

Thank You