

The Unusual Culprit: A Rare Case of Severe Anemia Secondary to Hypocupremia

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Rare etiology of dietary deficiency is more common in the elderly

INTRODUCTION:

- **Rare** due to low daily requirements [1].
- Pancytopenia, neuropathy, cognitive decline [2,3].
- Our case: Severe symptomatic anemia from copper deficiency in the absence of common risk factors (figure 1).

CASE DESCRIPTION:

- 84-year-old female with atrial fibrillation
- One-month history of worsening fatigue, weakness and dyspnea.
- Malnourished, pale with labs as in table 1
- Medication: Xarelto (discontinued). Multiple blood transfusions.
- Endoscopic studies were unremarkable for bleeding.
- **History of denture use: Test for zinc and copper levels**
- Treatment: High dose oral iron for 2 weeks. IV copper gluconate and discharged on oral formulations.

Figure 1: Risk factors [4]



Table 1: Patient's laboratory results before and after treatment

DESCRIPTION	REF.	DAY 0	2 WEEKS	6 WEEKS
Hemoglobin (g/dl)	12-15	4	6.7	8.5
MCV (fL)	80-95	111.5	99.6	95
Platelets (10 ³ /mcL)	150-450	144	137	190
WBC (10 ³ /mcL)	4.5-11	2.86	2.86	4
Ferritin (ug/dl)	15-150	22	44	50
Iron (mcg/dL)	60-180	24	24	70
TIBC (mcg/dL)	250-450	360	374	386
Copper (mcg/dL)	80-158	NP	46	50
Ceruloplasmin (mg/dL)	16-45	NP	14	NP
Zinc (mcg/dL)	44-115	NP	60	NP

NP: Not performed; REF: Reference values

DISCUSSION:

- Rare entity with unknown etiology for deficiency [3,5].
- Neurological symptoms lead to evaluation.
- Neurological and anemia symptoms have similar incidence; 38% vs. 46% [6].
- **Our patient:**
 - Low copper diet and absorption,
 - Low serum copper and ceruloplasmin levels
 - Responsiveness to oral supplementation
- **Diet-induced hypocupremia:** Rarely reported. More prevalent than thought, especially in elderly.
- Treatment: Copper supplementation. Remove any identifiable offending/precipitating agent.
- Treatment protocol is not well established. [2,3]
- Evaluate uncommon causes prior to invasive testing.

References:

1. Stauder R, et.al (2014) Anemia in the elderly. doi: 10.3324/haematol.2014.109967
2. Jamal R, et.al (2021) Hypocupraemia-induced anaemia, sensory ataxia and cognitive impairment secondary to zinc-containing dental adhesive. doi: 10.1136/bcr-2020-239375
3. Kumar Net.al (2003) Myelopathy due to copper deficiency GAA expansion size and age at onset of Friedreich 's ataxia. Neurology 61:273-274
4. Shibazaki S, et.al (2017) Copper deficiency caused by excessive alcohol consumption. doi: 10.1136/bcr-2017-220921
5. Collins JF, et.al (2010) Metabolic crossroads of iron and copper. doi: :10.1111/j.1753-4887.2010.00271.x
6. Doherty K , et.al (2011) Zinc-containing denture adhesive: A potential source of excess zinc resulting in copper deficiency myelopathy. doi: 10.1038/sj.bdj.2011.428