Unexplained chronic leukopenia treated with oral iron supplements

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Abstract: **Case Summary A 67-year-old woman with iron deficiency anemia and unexplained persistent chronic leukopenia was treated at our medical center for approximately 16 years. During this time she was carefully evaluated and diagnosed with chronic idiopathic neutropenia. (also known as chronic benign neutropenia). His iron deficiency was attributed to dietary factors and he was non-compliant with his oral iron supplements. prolonged hospitalization after an acute ischemic stroke.**

A surprising result was that in addition to treating his iron deficiency anemia, his longstanding unexplained neutropenia was also corrected. as yet undescribed form of neutropenia induced by iron deficiency.

Keywords: **Anemia, Iron deficiency, Leukopenia, Neutropenia, Patient adherence.**

I. INTRODUCTION

It is not uncommon for general practitioner to find elderly patients not adhering to their iron supplements due to side effects such as constipation. When it comes to dietary supplements, patients often self-medicate and are less adherent to the prescribed dose and frequency of dosing for many reasons [1]. The main objective of this article is to demonstrate a clinical observation on the use of iron supplements to treat iron deficiency anemia in a patient who also has unexplained chronic leukopenia. Leukopenia is an abnormal reduction in the number of circulating white blood cells, ie granulocytes.

Neutropenia is a more specific term that refers to the abnormal reduction in the number of circulating neutrophils [2], which is the focus of our case report here. Neutropenia occurs when the number of neutrophils produced decreases, or as a result of their further destruction, or both. infection,

Case description

A 67-year-old woman was diagnosed with diabetes mellitus, hypertension, hypercholesterolemia, iron deficiency anemia, and unexplained chronic leucopenia. He is also morbidly obese with a body mass index (BMI) of 43.4 kg/m2. This woman was an intensively evaluated patient at our medical center for approximately 16 years between 1995 and 2011. Since early

July 2011, she has been on the following medications: metformin 850 mg/day, aspirin 100 mg/day, amlodipine 5 mg/day, simvastatin 20 mg/day ,ferrous fumarate 100 mg/day, omeprazole 20 mg/day.

The patient was considered relatively compliant with her medications, with the exception of her iron treatment, where she received one 100 mg tablet once or twice a week instead of daily. This has been attributed to the attendant side effects he complained of when receiving the iron treatment. These side effects included bloating, upper abdominal pain, and constipation. The patient refused to receive intravenous iron against medical advice.

During her 16-year follow-up, this patient was consistently diagnosed with unexplained persistent leucopenia. There was no family history of similar disorders and no medical history of recurrent infections. He agreed to take his daily aspirin pill. but had no history of using other NSAIDs. His white blood cell count (WBC) was consistently in the range of 1,600 to 3,300 cells/l (reference range of 4,500 to 11,000 cells/l). With over 80 separately documented large blood counts

CBC tests done over this 16 year period, his WBC was mostly around 2000 cells/lL.) was consistently at the low end of the normal range, ranging from 9.0 to 12.0 g/dL and never exceeding 12 g/dL (normal reference range for women:(12.0-15.0 g/dL). Her mean corpuscular volume (MCV) was generally between 70 and 85 lm3 (reference range 80-100 lm3) and her ferritin levels were consistently below 15 ng/ml (reference range 20-100 lm3). 300ng/ml). His platelet count was consistently between 200 9 103 and 400 9 103 cells/L (reference range 150-450 9 103 cells/L.

While being cared for by our center, he had three documented visits to two different haematologists. After undergoing several tests, his leukopenia remained unexplained. Blood smear showed microcytic hypochromic anemia with moderate neutropenia. In order to better understand the patient's condition, many examinations and laboratory tests were carried out, which always gave normal values. Parameters evaluated included blood lead levels, vitamin B-12 levels, folate levels, ESR, RF, ANA, Hb electrophoresis, serum creatinine, BUN, total bilirubin, direct bilirubin, LDH, ALP, ALT, and AST. An abdominal ultrasound was normal apart from some evidence of mild splenomegaly.

Because the patient's documented test results showed the same level of leukopenia for many years without significant infection, it was decided not to perform a bone marrow biopsy. the most likely diagnosis of Feltey syndrome is possible remote diagnosis. He underwent two gastroscopies and three colonoscopies during this 16-year period with no significant findings other than mild antral gastritis. His iron deficiency anemia has been attributed to dietary factors without good adherence to iron treatment. On July, 17th, 2011 our patient suffered an acute ischemiccerebrovascular accident (CVA). She developed mild left sided muscle weakness and dysarthria and was admitted tohospital for two and a half months. Her hospital stay was prolonged because her condition required daily physiotherapy, and because her swallowing ability was diminished, she was on many occasions fed using a nasogastric (N/G) tube.She received the same previous oral medications through the N/G tube for her entire hospital stay.

The only difference was that she was given oral ferrous sulfate 325 mg tablets twice daily for the whole two and a half months inpatient period. This was the first time our patient had ever received a full course of a proper dose of oral iron treatment which was monitored and administered by the hospital inpatient nursing staff. Strangely enough, she did not complain of constipation and gastric upset while takingthe oral iron supplements during her long hospital stay, so we were for the first time able to observe the consequence of adequate iron supplementation treatment.

The patient was discharged early October, 2011. Shehad regained muscle strength and was able to swallowagain. The biggest surprise was that her WBC count had returned to normal and was now 7,806 cells/lL, and her Hblevel had also normalized at 13.7 g/dL.

Other CBC indices were within normal range and ferritin level was 122 ng/ml.Patient continued to have normal blood indices for up to7 months following hospital discharge. Unfortunately,there was lack of follow-up after that. Table 1 below summarizes the ordered laboratory parameters and their values before and after inpatient stay.

II. DISCUSSION

The persistently low serum ferritin level in recent years reflects his chronic iron deficiency. The iron deficiency anemia that our patient suffered from was evident from low Hb, low MCV, low MCH, low MCHC, and low serum iron. , high transferrin concentration, low transferrin saturation and low ferritin level. Other causes of hypochromic microcytic anemia, such as thalassemia and lead poisoning, were ruled out by the other tests, such as normal Hb electrophoresis and normal lead levels, respectively.

Table 1: Patients laboratory parameters

Measured parameter	Unit	Before admission and iron Rx. (July/10/2011)	After discharge and iron Rx. (Oct/11/2011)	Reference range
Hb	g/dL	11.2	13.7	12.0–15.5
WBC	Cells/1L	2,213	7,806	4–11,000
Neutrophil	%	42	54	52–68
Lymphocyte	%	39	37	24–44
Monocyte	%	5	4	3–6
Eosinophil	%	2	1	0–3
Basophil	%	1	1	0–1
Absolute neutrophil count (ANC)	Cells/1L	924	4,212	⫞1,500
Platelet	Cells/1L	384 9 10^3	226 9 10^3	100–450 9 10^3
MCV	fL	73	88	78–96
MCH	pg	22	28	26–34
MCHC	g/dL	28	31	31–37
Ferritin	ng/mL	15	122	20–300
Corrected reticulocyte count (RPI)	%	0.66	1.76	1.0–2.0
Transferrin concentration	mg/dL	442	317	204–360
Transferrin saturation	%	8	35	15–50
Serum iron	Mcg/dL	33	112	60–170

Neutropenia, described as having an absolute neutrophil count (ANC) underneath 1,500 cells/lL, may be as a result of more than one ailment processes. It is usually visible inside the scientific putting in sufferers struggling nutrition B-12 deficiency, sufferers with bone marrow melancholy secondary to chemotherapy, and really usually however in a temporary fashion, with sufferers tormented by not unusual place self-proscribing higher breathing tract virus illnesses [4]. Table 2 lists the class of neutropenia.[5]

Vitamin B12 and folate deficiency had been dominated out as a motive for neutropenia in our case due to the regular serum levels (Table 1). Congenital reasons and temporary publish infectious reasons had been now no longer applicable to our case due to documented earlier regular CBC profile while the affected person turned into in her past due thirties. Also, publish infectious neutropenia turned into excluded as a motive due to the fact it's far with the aid of using definition temporary with a self-restrained path opposite to the persistent nature of our case [4, 6]. Aplastic anemia and myelodysplastic syn- drome are normally irreversible and healthy neither the scientific picture, on the subject of the lengthy sub scientific history (sixteen years), nor the blood indices findings and blood movie results. Post-chemotherapy and drug triggered neutropenia's also are dominated out with the aid of using the affected person's scientific history. Clinically applicable reasons of neutropenia that must be taken into consideration in our case are autoimmune neutropenia and persistent idiopathic neutropenia. Unfortunately, our affected person did now no longer have checking out for anti-neutrophil antibodies (Abs) to rule out autoimmune neutropenia, however the absence of different recognized autoimmune illnesses makes us greater assured that this situation may be categorized as persistent idiopathic neutropenia. This disease specially influences middle-elderly ladies with a female: male ratio of 3–6:1 and a mean age at prognosis of 50.five years. Chronic idiopathic neutropenia normally per- sists during existence without most important complications [7].

Table 2: Classification of neutropenia

Congenital Severe infantile agranulocytosis (Kostmann's syndrome), Shwachman–Diamond–Oski syndrome,Myelokathexis/neutropenia with tetraploid nuclei, Cyclic neutropenia, Chediak–Higashi syndrome, Reticular dysgenesis, Dyskeratosis congenita

Acquired   Postinfectious neutropenia

Drug-induced neutropenia

    Complement activation (haemodialysis,leukapheresis, ARDS)

    Immune neutropenia

    Isoimmune neonatal neutropenia, Alloimmuneneutropenia (transfusion reaction), Autoimmune neutropenia (primary), Autoimmune neutropenia (secondary)

    Chronic idiopathic neutropeniaHypersplenism

    Nutritional deficiency (vitamin B12 or folatedeficiency)

    Diseases affecting the bone marrow

    Postchemotherapy, Aplastic anaemia, Fanconi anaemia, Myelodysplastic syndrome, Acute andchronic leukaemia

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Adapted from Capsoni et al. [5]

a female:male ratio of 3-6:1 and a median age at diagnosis of 50.5 years. Chronic idiopathic neutropenia is usually lifelong without major complications [7]. The significant improvement in Hb levels, white blood cell counts and ANC (13.7 g/dl, 7806 cells/ll and 4212 cells/ll respectively) after correction of their iron stores status lead us to believe that the treatment of chronic iron Deficiency anemia with oral iron supplementation also treated his documented chronic idiopathic illness of 16 years in duration. Neutropenia.

Although many diseases have been associated with neutropenia, none clearly implicate iron deficiency anemia as a cause. One study found that 2.1% of adult patients with incident neutropenia also had iron deficiency anemia. These patients had improved neutrophil counts when treated with a variety of drugs, including iron supplements [8]. Another study in India reported a case of an adolescent with severe iron deficiency anemia with a clinical picture of

Pancytopenia [9]. A possible effect of iron could be its influence on the bone marrow microenvironment that regulates myeloid hematopoiesis [10].

III.   CONCLUSION

As our case suggests, some patients diagnosed with chronic idiopathic neutropenia who present clinically with unexplained chronic neutropenia may have a form of iron deficiency-induced neutropenia that has not yet been described. Our results also suggest iron supplementation therapy as a possible treatment for this form of neutropenia.

Conflicts of interest: Each author states no conflict of interest.

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