

## General Medicine and Nutrition quiz

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### CASE

A 53-year-old woman goes to her general practitioner (GP) complaining of increasing exercise intolerance. This health condition began three months ago and gradually got worse. She denies orthopnea, edema or other signs of heart failure. She regularly uses non steroidal anti-inflammatory drugs (NSAD)(diclofenac) for low back pain. Apart from that she has no significant previous medical illnesses and takes no drugs. Before this health problem she was active and she used to walk for about 5 kilometers a day. She does not smoke and drinks a beer or two every day. She is a bank clerk and lives alone.

On clinical examination she is alert and talkative. She is afebrile and her blood pressure is 125/75 mm Hg. Her chest is clear to auscultation as no murmur was detected. Additional heart sounds also are not detected. Her heart rhythm is regular without tachycardia (92 bpm) with a non displaced apical impulse. The lungs are clearer but her pulse is weak. Her abdomen has no tenderness and the bowel sounds are hypoactive. She is thin and she has no peripheral edema or skin rushes. She is weak but moves all of her extremities well. Her reflexes are brisk and symmetric. She is unable to fully extend the knee but that is due to an old accident. She has obvious pallor of the conjunctiva and skin. Other examinations are normal. The basic investigations are shown at table 1. What is the diagnosis in this case and what treatment do you suggest?

		Normal
<b>Hematocrit</b>	28%	36%
<b>Haemoglobin</b>	9.3g/dL	11.7–15.7g/dL
<b>Mean corpuscular volume (MCV)</b>	74fL	80–99fL
<b>White cell count</b>	3.6*10 <sup>9</sup> /L	3.5–11.0*10 <sup>9</sup> /L
<b>Platelets</b>	155*10 <sup>9</sup> /L	150–440*10 <sup>9</sup> /L
<b>Sodium</b>	141mmol/L	135–145mmol/L
<b>Potassium</b>	3.8mmol/L	3.5–5.0mmol/L
<b>Urea</b>	4.7mmol/L	2.5–6.7mmol/L
<b>Creatinine</b>	86μmol/L	70–120μmol/L
<b>Glucose</b>	5.1mmol/L	4.0–6.0mmol/L
<b>Bilirubin</b>	8mmol/L	3–17mmol/L
<b>Alanine transaminase</b>	29IU/L	5–35IU/L
<b>Alkaline phosphatase</b>	257IU/L	30–300IU/L
<b>Urinalysis: no protein; no blood; no glucose</b>		
<b>Chest X-ray: normal findings, with a normal cardiac silhouette and no pulmonary infiltrates or effusions</b>		

**Table 1.** Basic investigations

## COMMENT

Fatigue can be vague and a frustrating problem to assess [1]. Fatigue provoked by minimal exertion shows lack of energy, which may be cardiac (e.g., coronary artery disease, aortic valve dysfunction, cardiomyopathy, or myocarditis) or may occur secondary to a neurologic, muscular, metabolic, or pulmonary pathologic condition. The causes of fatigue are shown in table 2 [2,3]. In this particular case the most possible etiology is anemia because of the coexistence of pallor [4]. The clue that she often takes NSAID makes this idea even stronger.

The diagnosis is easy with the above laboratory findings. The World Health Organization defines anemia as a level of Hb below 13.0 g/dL in male adults, below 12.0 g/dL in female adults who are not pregnant, and below 11.0 g/dL in pregnant women (table 3) [5].

All patients with iron deficiency anemia should have iron supplementation both to correct anemia and replenish body stores. Parenteral iron can be used when oral preparations are not

tolerated. Blood transfusions should be reserved for patients with or at risk of cardiovascular instability depending on the degree of their anemia [6]. In this situation oral supplementation is adequate unless there is iron allergy or oral iron is not tolerated.

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### ***Lifestyle***

Diet

Inadequate sleep

Prolonged physical activity

### ***Psychiatric disorders***

Depression

Anxiety, emotional stress

Bipolar disorder

Alcoholism

Somatoform disorders

### ***Medical conditions***

Anemia

Hypothyroidism

Medication side effects ( $\beta$ -blockers, anxiolytics etc)

Viral or bacterial infections

Sleep apnea syndrome

Renal failure

Congestive heart failure (CHF),

Chronic obstructive pulmonary disease (COPD)

liver disease

Obesity

Malignancy

Fibromyalgia

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**Table 2.** Differential diagnosis of fatigue

Age or sex group	Hemoglobin (g/dL)	below:	Hematocrit (%)	below:
Children 6 months to 5 years	11.0		33	
Children 5-11 years	11.5		34	
Children 12-13 years	12.0		36	
Non pregnant women	12.0		36	
Pregnant women	11.0		33	
Men	13.0		39	

**Table 3.** Hemoglobin and hematocrit cutoffs used to define anemia in people living at sea level [9].

## QUESTIONS

Answer the following questions related to iron-deficiency anemia

**1. Iron deficiency is the most common form of malnutrition in the world.**

- A) It is true
- B) It is false
- C) Iron deficiency has not clinical significance

**2. Which group is the most likely to develop iron-deficiency anemia?**

- A) Men
- B) Women
- C) There is no difference between men and women

**3. Which is the most common cause of excessive lack of body iron?**

- A) Hemolysis
- B) Malabsorption
- C) Malnutrition

**4. Which of the following laboratory examinations is NOT part of screening for iron-deficiency anemia?**

- A) Transferrin saturation
- B) Ferritin
- C) Renin

**5. Which of the following is a better source of iron?**

- A) Beef
- B) Spinach
- C) Orange

**6. In which case the absorption of iron decreases?**

- A) When we use lemon with food
- B) When we drink orange juice with the meals
- C) When we take iron tablet with full stomach

**7. What substances of the following does NOT affect negatively the absorption of iron?**

- A) Phytates
- B) Carbohydrates
- C) Polyphenols

**ANSWERS**

1. The correct answer is **A**.

Iron deficiency is the most common form of malnutrition in the world, affecting more than 2 billion people globally [7]

2. The correct answer is **B**.

Women are more likely to develop iron deficiency anemia [8].

3. The correct answer is **C**.

It is generally assumed that 50% of the cases of anemia are due to iron deficiency [9].

4. The correct answer is **C**

Ferritin is the cellular storage protein for iron and Transferrin transports circulating iron molecules. Renin is an enzyme secreted by the kidneys that participates in the body's renin-angiotensin-aldosterone system irrelevant with iron deficiency anemia [10].

5. The correct answer is **A**

Red meat has a great amount of iron. Vegetables and fruits have less amount of iron.

6. The correct answer is **C**

Lemon and orange juice are sources of ascorbic acid that increases the absorption of iron[9].

7. The correct answer is **B**

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