Ferric-induced hypophosphatemia ironed out with electrolyte replacement: a case report

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1.Introduction

- Phosphate is integral to cell membranes, bones, and nucleic acids as a vital component of the adenosine triphosphate molecule (ATP) (1).

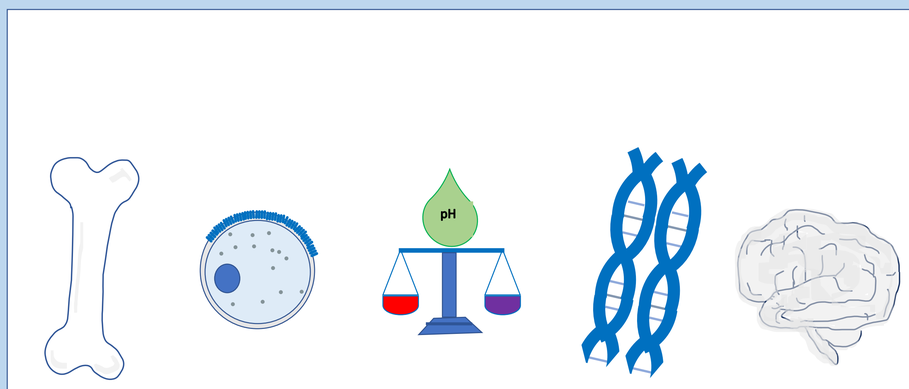


Figure 1: *Functions of phosphate.*

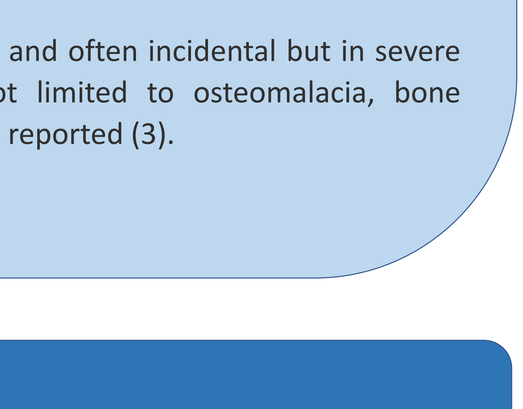
- Hypophosphatemia can be caused by any disruption to the phosphate homeostasis, due to reduced or inadequate phosphate intake, increased renal excretion of phosphate, and increased intracellular shift of phosphate (2).

- Biochemically, hypophosphatemia is defined as serum phosphate level lower than 2.5 mg/dl (0.81 mmol/L).

- Hypophosphatemia is commonly asymptomatic and often incidental but in severe cases serious complications including but not limited to osteomalacia, bone fractures, heart failure, seizures, and coma were reported (3).

2.Case study

- A 57-year-old lady known for iron deficiency anaemia secondary to heavy uterine bleeding who developed hypophosphatemia following parenteral iron transfusion (Ferinject-Ferric Carboxymaltose).
- The patient presented to the medical assessment unit with worsening frontal headache associated with vomiting, blurred vision, and a metallic taste over a 10-day period after having an iron infusion.
- She was active, independent and had received 2-3 iron transfusions in the past.
- She was on hormone replacement therapy (Evorel Sequi patches), and had two doses of COVID vaccine, otherwise, her past medical and social history was unremarkable.



- On admission, her serum phosphate was 0.41 mmol/L and calcium was 2.25 mmol/L. Routine blood tests, inflammatory markers, bone profile, and CT-head were all normal.
- Dramatic symptomatic improvement was achieved following treatment with 3 doses of phosphate infusion (Phosphate Polyfusor), each dose administered as 50mmol/500mL over 24 hours.

3.Discussion

- Iron transfusion is becoming increasingly recognised as a cause of hypophosphatemia but the mechanism is unknown.

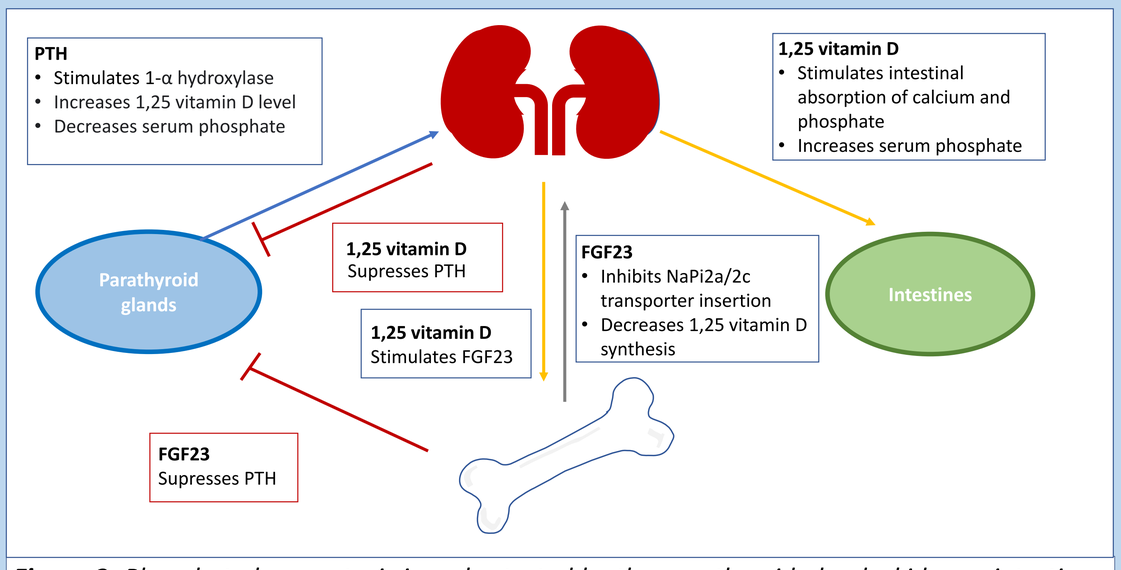


Figure 2: *Phosphate homeostasis is orchestrated by the parathyroid glands, kidneys, intestines, and bones (Adapted from Leung J, Crook M. Disorders of phosphate metabolism. Journal of Clinical Pathology 2019;* ***72:741****-747).*

- FGF23 level is elevated in iron deficiency leading to increased urinary loss of phosphate. Additionally, the carbohydrate component in some iron formulations increases FGF23. Altogether, would further reduce serum phosphate concentration and eventually hypophosphatemia becomes clinically evident (4).

- Hypophosphatemia can occur following a single or multiple iron transfusions.

- Symptoms can vary from asymptomatic to life-threatening depending on the level of phosphate, the dosage of parenteral iron, the frequency of iron treatments, and presence of underlying conditions.

- The decrease in serum phosphate is usually evident around 2-3 weeks after iron infusion and may remain low up to two years in some cases.

- Symptoms of mild hypophosphatemia following iron transfusion are usually attributed to iron deficiency anaemia which delays the diagnosis of hypophosphatemia (5).

In conclusion, awareness of this potential complication is paramount to guide clinical practice and to ensure that patients requiring iron transfusions are well-informed of the risks of hypophosphatemia.

References

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