Investigation of the mechanisms for the development of hypophosphatemia following administration of intravenous iron in patients with severe anaemia

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Introduction

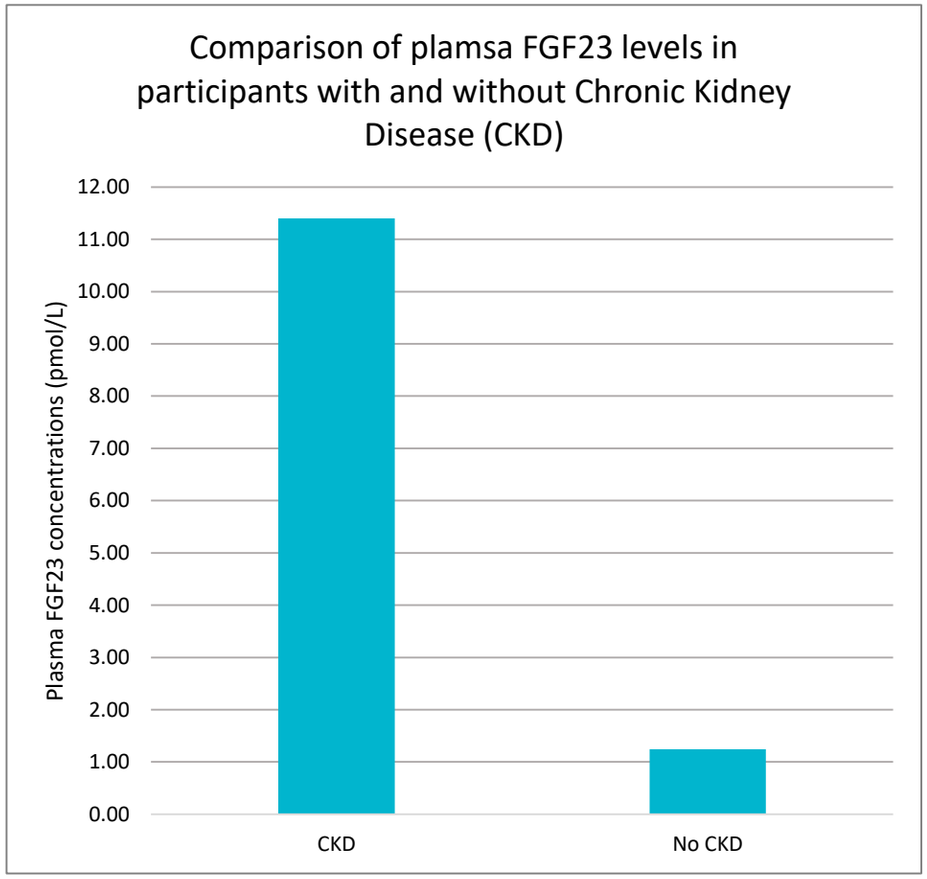
Administration of intravenous iron has been associated with the development of hypophosphataemia, which can be severe and symptomatic. Fibroblast Growth Factor 23 (FGF23), which is involved in phosphate homeostasis, has been implicated in this phenomenon. Patients with Chronic Kidney Disease (CKD) reportedly have increased levels of FGF23, which is thought to be an adaptation to hyperphosphataemia that develops in the later stages of CKD. The project aimed to compare FGF23 levels in healthy individuals and those with CKD, and compare FGF23 levels in CKD patients before and after administering intravenous iron.

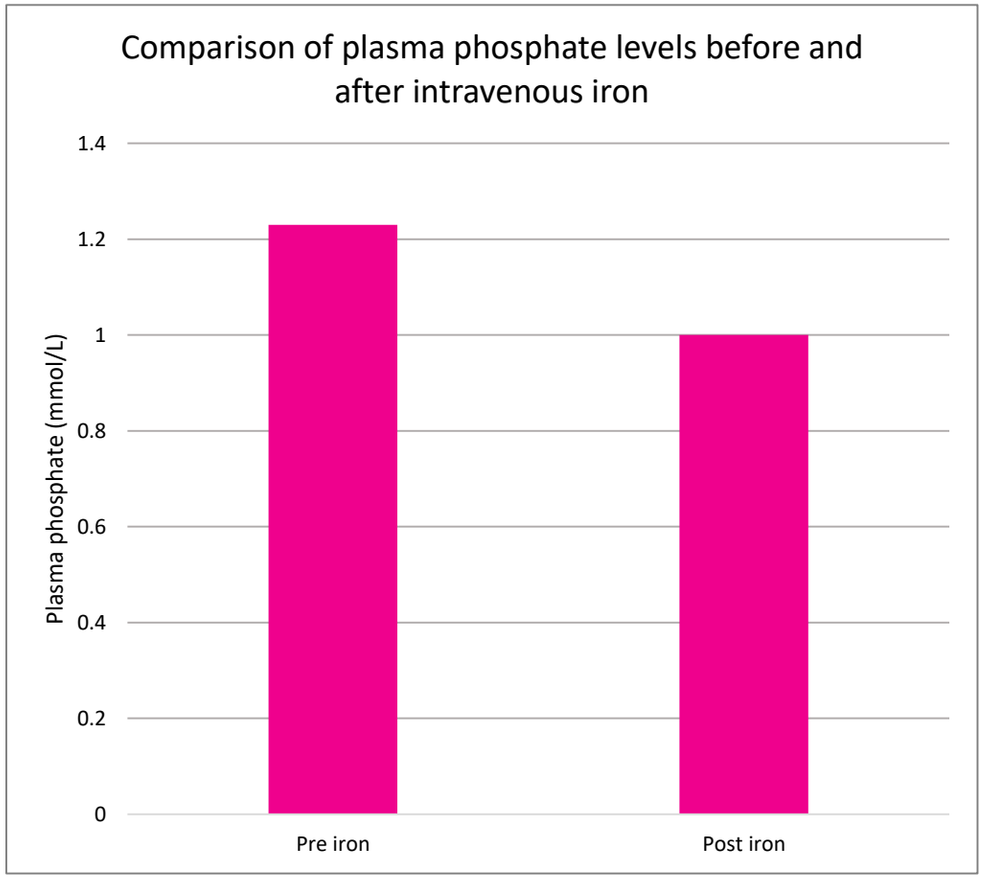
Methods

Patients, who had previously been diagnosed with CKD, and healthy volunteers were recruited to the study. Patients with CKD were recruited through the local renal unit. Healthy volunteers were recruited from laboratory staff. All participants provided written informed consent. Samples were collected from healthy volunteers at a time agreed with them. CKD patients provided samples prior to the administration of intravenous iron, and again at their next outpatient appointment (mean time between appointments: 28 days, range 15-42 days). Urea and electrolytes, and phosphate levels were determined using standard laboratory techniques. FGF23 levels were determined using a commercially available ELISA (Biomedica, Vienna, Austria), measuring the C-terminal portion of FGF23.

Results

A total of 28 participants were recruited: eleven patients with CKD and seventeen healthy volunteers. Plasma FGF23 levels were found to be significantly higher in CKD patients when compared to those without CKD (median [IQR]: 11.4 [16.2] vs 1.24 [0.49]; *P*=0.007). No significant difference was observed in FGF23 following intravenous iron (*P*=0.201), although phosphate levels were lower after intravenous iron and this difference approached statistical significance (median [IQR]: 1.23 [0.14] vs 1.00 [0.25]; *P*=0.063).





Conclusion

FGF23 was significantly elevated in patients with CKD compared to healthy individuals, and intravenous iron appeared to have no long-term effect on FGF23 levels in CKD patients. Phosphate levels decreased slightly following intravenous iron but not significantly.

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