Hypophosphatemia after treatment of iron deficiency with ferric carboxylmaltose (FCM) infusion in paediatric inflammatory bowel disease in a tertiary paediatric gastroenterology centre

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Background;
Anaemia is the most common extra intestinal manifestation in paediatric Inflammatory Bowel Disease (pIBD) needing monitoring and supplementation. Intravenous iron is often needed in moderate to severe disease or intolerance to oral iron. Ferric Carboxymaltose (FCM) infusion has been used in our centre. While the risk of hypophosphatemia (HP) associated with FCM is known, (Medicines and Healthcare Products Regulation Agency alert), it is not been quantified in clinical practice.

Aims and Objectives;
Primary objective;
- report incidence and severity of HP after infusion of FCM in pIBD
- assess time to recovery from HP with interventions.

Secondary objectives;
- review patient characteristics and biochemical markers to identify risk factors for FCM infusions associated HP

Design study;
Retrospective electronic records review of pIBD patients who received FCM infusion from Nov 19-Nov 20.

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Results;
24 patients (13 M) received 26 infusions, with patient demographics shown in Table 1. All patients had normal renal function; median(IQR) urea 2.9(2.32-3.35) and creatinine 50.5(37-61.7). Pre-transfusion Vitamin D (n=19) median was 38.5(27.5-53.5), with levels being deficient in 13(68.3%) and no association to recovery time.

The biochemical markers are shown in Table 2, with the change shown as delta change. The delta change was found to be statistically significant for serum phosphate levels.

Table 1; Patient demographics (n=24)

Age (median)		14.5 (12.6-15.9)
Diagnosis	Ulcerative Colitis (UC)	7 (29.2%)
	Crohn's Disease (CD)	16 (66.7%)
	IBD-Unclassified (IBD-U)	1 (4.2%)
Reason for admission	New diagnosis of p-IBD	10 (41.7%)
	Flare of p-IBD	9 (37.5%)
	Elective admission	5 (20.8%)
FCM infusion dose [median (IQR)] mg		1000 (500-1000)
Pre infusion [median (IQR)]	Haemoglobin	107.5 (92.7-119.2)
	MCV	81 (74.7-83.2)
	Iron	3.4 (2.1-5.5)
	Ferritin	73.1 (33.2-115.7)
	Transferrin saturation	4.85 (3.6-10.0)
Treatment	IV phosphate infusion	6 (25%)
	PO phosphate supplement	12 (50%)
	PO calcium supplement	15 (62.5%)
	vitamin D supplements	17 (70.8%)

There were no statistically significant association, on univariate analysis, between delta change in serum phosphate levels and features of patient demographics or biochemical markers.

Biochemical markers	Baseline	Post-infusion	Delta change	P
Serum phosphate	1.19 ± 0.26	0.71 ± 0.40	-0.48 ± 0.35	p<0.0005*
Ionzied calcium	2.35 ± 0.09	2.37 ± 0.11	0.02 ± 0.09	p<0.284
Serum potassium	4.03 ± 0.52	4.21 ± 0.37	0.17 ± 0.62	P<0.177
Serum magnesium	0.82 ± 0.08	0.77 ± 0.18	-0.01 ± 0.07	P<0.221

Table 2; Mean (SD) of biochemical markers pre and post FCM infusion, and statistical difference of change in mean

All 24 patients had reduction in phosphate level post FCM infusion as seen in Fig. A. In 14/24(58.3%), phosphate levels dropped to moderate-severe range; 10/14(71.4%) HP was moderate (< 0.65mmol/L) and in 4/14(28.5%) HP was severe (< 0.32mmol/L). The median time of recovery from hypophosphatemia was 14(4-26) days. Those that took longer than 14 days to normalise phosphate (9,37.5%) had no features attributable to it. No serious sequelae of hypophosphatemia were seen.

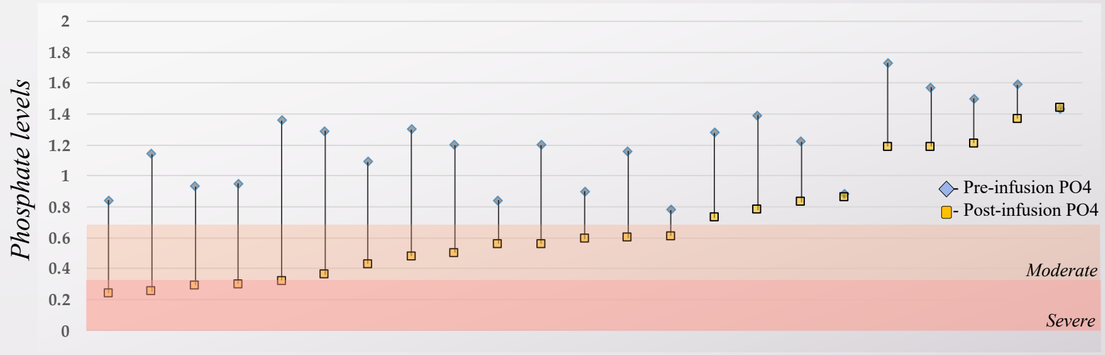

Figure A; Pre and post infusion phosphate level for each patient

Conclusion;
HP is frequently seen with FCM infusion. The fall in phosphate post FCM infusion was found to be clinically and statistically significant; though none of the patient demographic features or serological markers were found to be associated with the delta change in phosphate to predict high risk patients. The median recovery time of 14 days is less than what is reported in adult reviews. FCM infusions need pre-assessment, counselling and post infusion monitoring to assess effectiveness and recovery.