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Improvements in Health Utility Scores after Administration of Ferric Derisomaltose versus Ferric Carboxymaltose in Patients with Inflammatory Bowel Disease and Iron Deficiency Anemia

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Background

Inflammatory bowel disease (IBD) is a chronic inflammatory disease of the gastrointestinal tract that commonly results in iron deficiency anemia (IDA) due to impaired iron absorption and chronic blood loss. Patients with IBD experience reduced health-related quality of life, with fatigue playing a key role.[1]

The PHOSPHARE trial program comprises three randomized controlled trials (RCTs) comparing the incidence of hypophosphatemia (defined as serum phosphate levels <2.0 mg/dL) after administration of ferric derisomaltose (Monofer®, formerly known as iron isomaltoside 1000; Pharmacosmos A/S, Holbaek, Denmark) and ferric carboxymaltose (Ferinject®; Vifor France, Paris, France) in patients with iron deficiency anemia (IDA).[2,3] In the third PHOSPHARE trial (PHOSPHARE-IBD; clinicaltrials.gov ID: NCT03466983), 97 patients with IDA and inflammatory bowel disease (IBD) were randomly assigned to receive ferric derisomaltose (FDI) or ferric carboxymaltose (FCM).

The primary endpoint of the PHOSPHARE-IBD trial was incidence of hypophosphatemia (serum phosphate <2 mg/dL) at any time between baseline and day 35, but patient reported outcome (PRO) data were also recorded in the trial, including the SF-36v2, from which the SF-6Dv2 health utility score can be derived.

The aim of the present study was to calculate health state utility values from the SF-36v2 data collected in the PHOSPHARE-IBD trial.

Methods

SF-6Dv2 HSUVs were derived from responses to the SF-36v2 from patients enrolled in PHOSPHARE-IBD, a double-blinded RCT comparing equivalent dosing regimens of ferric derisomaltose (FDI) versus ferric carboxymaltose (FCM) in the treatment of IDA in patients (N=97) with IBD. Of the 97 patients enrolled in PHOSPHARE-IBD, 48 received FDI and 49 received FCM. Mean age was 42.1 years; 52.6% of patients were female; 39.2% had Crohn's disease; and 60.8% had ulcerative colitis (Table 1).

The SF-6Dv2 score was derived from ten SF-36v2 items. The responses to the ten items were combined to form six dimensions of health, with 5-6 health levels within each dimension. These health levels were weighted using country-specific utility weights to derive SF-6Dv2 health state utility values; country-specific weights from the United Kingdom were used. The total SF-6Dv2 score was derived by simple summation of the weighted score on each dimension. All weights are negative and thus detract from the initial score of 1. A further decrement was included if the worst score is encountered on any dimension.[4] The weighted score has a maximum of 1 which represents full health. A score of 0 is equivalent to being dead, but negative scores are possible, indicating states regarded as worse than death.

A mixed model analysis was conducted of health state utility values over time.

Results

The mean SF-6Dv2 score at baseline differed between the two treatment groups, with the FCM group having a score 0.059 points higher than the FDI group (Table 2). While both groups showed improved utility scores over time, a larger improvement was seen in the FDI group (Figure 1).

In the FDI group, health state utility values increased significantly from baseline by a maximum of 0.25 points (p=0.0001) at day 49 and 0.20 points (p=0.0021) at end-of-trial (day 70). In the FCM arm, health state utility values increased by 0.12 points at day 49 to a maximum of 0.13 at day 70, but the changes were not significant (p=0.078 and p=0.056, respectively).

The mixed model analysis showed health state utility values were 0.13 and 0.07 points higher in the FDI arm at day 49 and 70, respectively (Table 2), although the differences were not statistically significant at either time point (p=0.18 and p=0.48, respectively), and a comparison over all follow-up time points also showed no significant difference between the two treatment arms (p=0.058).

Figure 1. Mean change in SF-6Dv2 score (bottom) at each time point, stratified by treatment

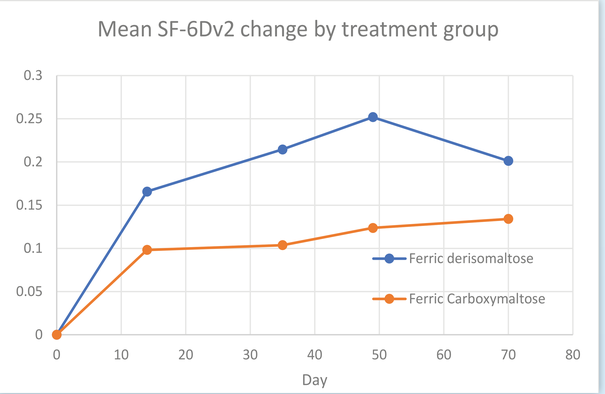

Table 1. Baseline characteristics in the ferric derisomaltose (FDI) and ferric carboxymaltose (FCM) arms of the PHOSPHARE-IBD trial

Characteristics	FDI	FCM
Age (years), mean (SD)	42.3 (14.1)	41.9 (14.7)
Female, n (%)	26 (54.2)	25 (51.0)
Inflammatory bowel disease diagnosis, n (%)		
Crohn's disease	16 (33.3)	22 (44.9)
Ulcerative colitis	32 (66.7)	27 (55.1)
C-reactive protein (mg/L), mean (SD)	9.5 (13.5)	13.3 (30.8)
Hb (g/dL), mean (SD)	10.5 (1.5)	10.4 (1.4)
s-Ferritin (ng/mL), mean (SD)	9.5 (9.6)	14.6 (28.7)

Table 2. Parameter estimates from a mixed model with SF-6Dv2 score as the dependent variable

Effect	Treatment	Day	Estimate	SE	Pr > |t|
Intercept			0.480	0.046	<.0001
Treatment	Ferric derisomaltose		0		
Treatment	Ferric carboxymaltose		0.059	0.065	0.366
Day		0	0		
Day		14	0.166	0.067	0.014
Day		35	0.215	0.067	0.001
Day		49	0.252	0.068	0.000
Day		70	0.201	0.067	0.003
Treatment × day	Ferric carboxymaltose	14	-0.068	0.094	0.472
Treatment × day	Ferric carboxymaltose	35	-0.111	0.094	0.239
Treatment × day	Ferric carboxymaltose	49	-0.128	0.096	0.180
Treatment × day	Ferric carboxymaltose	70	-0.067	0.095	0.481

Discussion

The analysis showed improvements in health state utility values after administration of FDI and FCM in patients with IBD and IDA. The improvements from baseline were significant after administration of FDI, but not after administration of FCM, although a mixed model analysis showed that the difference between treatments was not significant.

These health state utility values could be used to inform future cost-utility analyses of IV irons in the treatment of IDA in patients with IBD, in addition to informing treatment decisions by clinicians and healthcare payers.

Conclusions

The analysis reports the first health state utility values derived from a randomized trial of FCM and FDI in patients with IDA and IBD. Patients in the FDI group experienced significant improvements in SF-6Dv2 health utility scores from baseline, while improvements from baseline in the FCM group were not significant.

References

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