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A Swedish Cost-Utility Analysis of Ferric Derisomaltose versus Ferric Carboxymaltose in the Treatment of Iron Deficiency Anemia in Patients with Inflammatory Bowel Disease

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Background

Anemia is a frequent extraintestinal manifestation in inflammatory bowel disease (IBD), with iron deficiency described as 'a very common cause' according to the European Crohn's and Colitis Organisation (ECCO) guidelines on extraintestinal manifestations in IBD.[1] In Sweden specifically, the mean annual age-adjusted standardised incidence rate for IBD is 32.1 per 100,000 person-years.[2] Furthermore, anemia prevalence in IBD patients in Sweden is reported to be 22.6% with a mean annual incidence rate of 15.9 per 100 person-years.[3]

Intravenous iron (IV) formulations have shown to be more effective than oral iron preparations in multiple studies. Subsequently the ECCO guidelines recommend IV iron as first-line treatment for patients with clinically active IBD with a previous intolerance to oral iron.[1] Two such IV iron preparations available in Sweden include ferric carboxymaltose (FCM) and ferric derisomaltose (FDI). FCM is associated with a significantly higher incidence of hypophosphatemia after treatment in comparison to FDI. This is supported by results from the PHOSPHARE-IBD randomised controlled trial (RCT; ClinicalTrials.gov ID NCT03466983).[4]

The objective of this study was to assess the cost-utility of FDI and FCM in the treatment of patients with IBD and IDA in Sweden.

Methods

The cost-utility of FDI versus FCM in patients with IBD and IDA was evaluated using a previously-published patient-level simulation model. The model incorporated patient-level heterogeneity, first-order uncertainty and stochastic variation at the parameter level. Based on the results of the PHOSPHARE-IBD RCT, no differences in hematological response were modeled.[4]

Iron need, phosphate monitoring, and disease-related quality of life (QoL) were modelled in line with the PHOSPHARE-IBD RCT trial.[4] The differences in QoL between the two groups were evaluated using SF-6D utility values. Each patient was assigned baseline values for hemoglobin, age and body weight which were used to calculate the average iron need and number of treatment courses needed per patient per cycle. The number of infusions administered per cycle was used to determine the costs of IV iron administration and QoL utilities related to IV administration of FCM and FDI. Hypophosphatemia treatment (phosphate replenishment) was conservatively excluded from the base case analysis.

This analysis was conducted from the Swedish national payer perspective with costs reported in 2023 Swedish Krona (SEK). A discount rate of 3.00% was applied to future cost and effectiveness outcomes, and a willingness-to-pay (WTP) threshold of SEK 25,000 per QALY was adopted. The base case analysis was conducted over a five-year time horizon to capture multiple courses of iron treatment given the chronic underlying etiology of IDA.

Results

Base case results

The base case analysis found that overall, patients treated with FDI required 1.52 fewer iron infusions than those treated with FCM (0.38 fewer infusions per treatment course). The reduced number of infusions resulted in cost savings of SEK 6,424 over five years (SEK 30,426 with FCM versus SEK 24,002 with FDI). Phosphate monitoring in patients treated with FCM cost SEK 1,543 over five years versus no monitoring costs with FDI. Total cost savings with FDI were therefore SEK 7,967. FDI also resulted in a 0.075 quality-adjusted life year (QALY) improvement versus FCM driven primarily by the QoL improvements reported in PHOSPHARE-IBD.

Table 1. Health economic results from the base case analysis

	Life expectancy (years)	Quality-adjusted life expectancy (QALYs)	Cost (2023 Swedish Krona)
Base case (Swedish national payer perspective)			
Ferric carboxymaltose	4.940	2.595	31,969
Ferric derisomaltose	4.940	2.670	24,002
Incremental (ferric derisomaltose)	**±0.00**	**+0.075**	**-7,967**

Sensitivity analyses

A series of one-way sensitivity analyses (OWSAs) were conducted to determine the most impactful parameters on the base case incremental cost-utility ratio (ICUR). Results from the OWSAs are presented in Figure 1 as a tornado diagram. Baseline bodyweight had the greatest impact with a lower bodyweight of 72.18 kg increasing the ICUR by SEK 23,599 per QALY and a higher bodyweight of 88.22 kg reducing the ICUR by SEK 27,804 per QALY. Baseline hemoglobin also had a substantial impact on the ICUR; a value of 9.45 g/dL increased the ICUR by SEK 23,295 per QALY, while a value of 11.55 g/dL reduced the ICUR by SEK 18,224 per QALY.

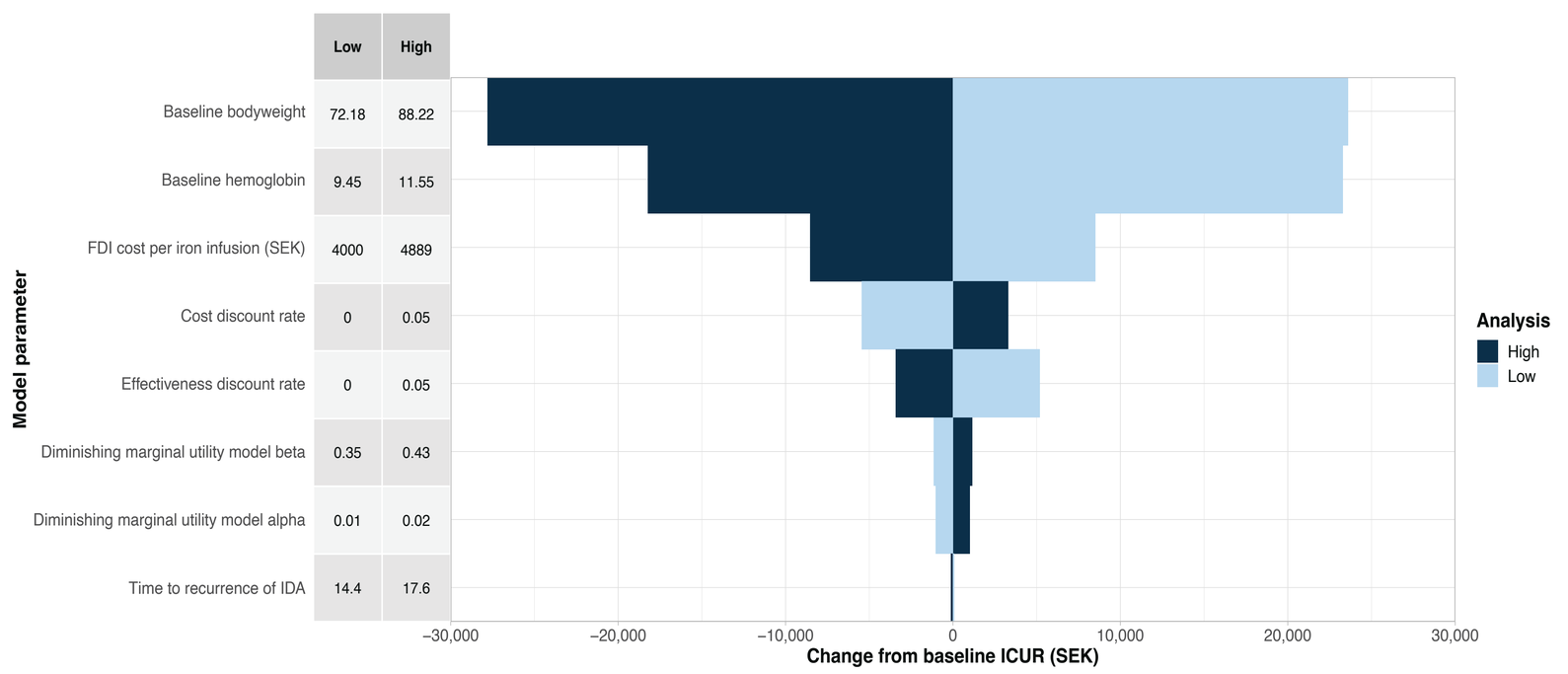
In probabilistic sensitivity analysis, all ICURs fell within the south-eastern quadrant of the cost-utility plane (representing QALY gains and reduced costs), showing consistent dominance for FDI (see Figure 2). At all WTP thresholds between SEK 0 and SEK 50,000 per QALY gained, FDI was 100% likely to be cost-effective.

Table 2. Treatment characteristics and costs

Category	FCM	FDI
Total iron treatment courses	3.96	3.96
Total iron infusions per patient	7.20	5.68
Calculated iron need per patient (mg)	6,112.0	6,126.0
Mean infusions per treatment course	1.82	1.43
Iron administration costs (SEK)	30,426	24,002
Phosphate monitoring costs (SEK)	1,543	0.00

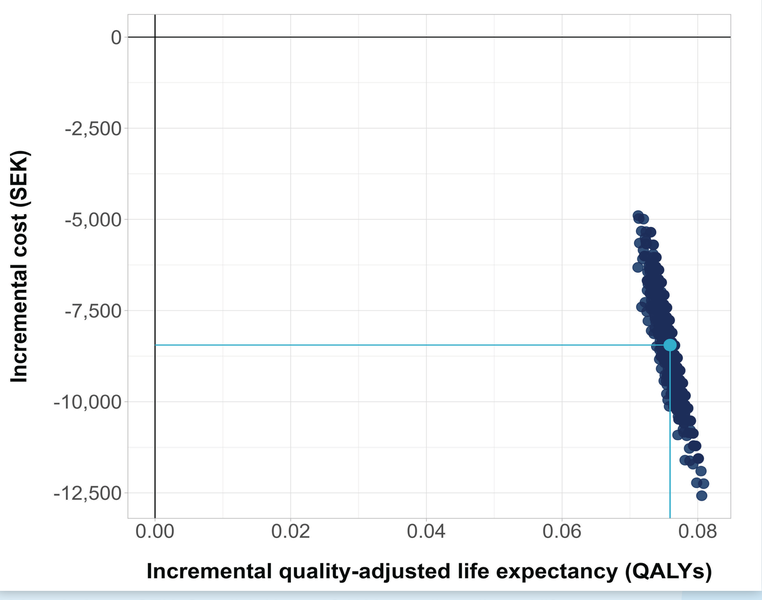
Abbreviations: FCM, ferric carboxymaltose; FDI, ferric derisomaltose; mg, milligrams; SEK, Swedish Krona.

Figure 1. Tornado plot of one-way sensitivity analysis results



Abbreviations: FCM, ferric carboxymaltose; FDI, ferric derisomaltose; ICUR, incremental cost-utility ratio; IDA, iron deficiency anemia; SEK, Swedish Krona.

Figure 2. Results from probabilistic sensitivity analysis



Abbreviations: SEK, Swedish Krona; QALYs, quality-adjusted life years.

Conclusions

Relative to FCM, FDI resulted in a reduction in the number of iron infusions required by patients with IDA and IBD in Sweden.

Furthermore, the lack of requirement for phosphate monitoring wth FDI versus FCM led to additional cost savings. Costs of hypophosphatemia treatment were conservatively omitted, but would likely lead to further cost savings with FDI versus FCM.

Overall, FDI was cost saving while leading to QoL improvements compared with FCM. FDI was therefore the dominant IV iron treatment option for patients with IDA and IBD in Sweden.

References

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