Hepcidin is not an appropriate indicator of iron status in paediatric type 1 diabetes patients

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Background and aim

Hepcidin is the key regulator of iron homeostasis. Inflammation increases hepcidin expression leading to reduced circulating iron resulting in functional iron deficiency (ID). Paediatric type 1 diabetes patients are likely predisposed for developing functional ID because of their chronic low-grade inflammatory state. Studies on hepcidin levels in these patients are non-existing. We evaluated whether hepcidin is an useful indicator of iron status in paediatric type 1 diabetes patients.

Methods

This was a multicentre cross-sectional study. Absolute ID was defined as low ferritin levels. Functional ID was defined as normal ferritin levels with an elevated zinc protoporphyrin/haem ratio and/or red blood cell distribution width, in absence of acute infection (high-sensitivity CRP<10 mg/l). Normal iron status was defined as no absolute or functional ID and/or no anaemia. Serum hepcidin measurements were performed by using mass spectrometry.

Conclusion
Hepcidin is suppressed in paediatric type 1 diabetes patients with absolute ID. No difference in hepcidin levels was found in patients with normal iron status and functional ID. Single measurements of hepcidin levels are not useful in diagnosing functional ID in paediatric type 1 diabetes patients.

	All (N=215)	Normal iron status (N=103)	Absolute ID (N=11)	Functional ID (N=100)	P ₁	P ₂
Age (years)	13.7 (10.1-16.3)	14.2 (9.9-16.4)	14.0 (±2.2)	12.9 (9.6-16.0)	0.451	0.263
Sex (male)	109 (51%)	55 (53%)	1 (9%)	53 (53%)	0.005*	0.955
Caucasian ethnicity	92 (43%)	45 (44%)	4 (36%)	43 (43%)	0.429	0.376
Disease duration (years)	4.3 (2.2-7.6)	4.5 (2.3-7.4)	7.2 (±3.8)	4.0 (2.0-7.2)	0.136	0.578
SES-score	0.52 (-0.85;1.29)	0.70 (-0.45;1.41)	-1.9 (±1.3)	0.47 (-1.42;1.18)	0.160	0.150
BMI-SD	0.78 (±0.98)	0.67 (±0.99)	0.75 (±0.74)	0.90 (±0.99)	0.863	0.146
HbA1c (mmol/ml)	62.0 (56.0-73.0)	62.0 (55.0-71.0)	60.1 (±11.9)	62.0 (56.0-75.8)	0.505	0.567
hsCRP (mg/l)	0.5 (0.2-1.3)	0.5 (0.2-1.2)	0.3 (0.1-0.7)	0.5 (0.3-1.8)	0.290	0.313
Hepcidin (nmol/l)	1.6 (0.7-3.3)	1.8 (0.9-3.3)	0.4 (0.4-0.4)	1.6 (0.7-3.5)	0.000*	0.709

Data are expressed as median (with 25th and 75th percentile) or numbers (with percentages), unless otherwise noted. In case of normal distribution, we report the mean (with ± SD). Abbreviations: *SES-score* Socioeconomic status score, *BMI* Body-mass index, *SD* standard deviation, *HbA1c* haemoglobin A1c, *hsCRP* high-sensitivity C-reactive protein. *P₁* denotes p-value regarding comparisons between 'normal iron status' and 'absolute ID', *P₂* denotes p-value regarding comparisons between 'normal iron status' and 'functional ID'. * Statistically significant with P<0.05.