Children with primary AI, treated with HC underwent continuous glucose monitoring for 7 days using the Dexcom G6 device, blinded to participants. Data were interpreted using published data from 57 healthy children, in whom 97% (interquartile range age 6 - <12yrs: 94 to 97, age 12 - 18yrs: 95 to 98) of readings were between 3.9 and 7.8mmol/L, 0.0% (0.0 to 0.2 and 0.0 to 0.4) were <3mmol/L and 0.0% (0.0 – 0.1 and 0.0 to 0.0) were >10mmol/L.[1] Average glucose by age was 5.5mmol/L and 5.4mmol/L respectively [1]

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GLUCOSE REGULATION IN CHILDREN WITH PRIMARY ADRENAL INSUFFICIENCY: PRELIMINARY DATA

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INTRODUCTION

During treatment of adrenal insufficiency (AI) with hydrocortisone (HC), cortisol concentrations are supra-physiological following doses, and low before doses.

We speculated that this cortisol profile may result in periods of hyperglycaemia and hypoglycaemia.

We describe glucose profiles in the first 18 children recruited to a study of metabolic and cardiovascular profiles in AI.

AIM

Primary outcome:

Number of patients with glucose measurement <3mmol/L for more than 2% of the time

METHODS

Children with primary AI, treated with HC were recruited

Continuous glucose monitoring systems (Dexcom G6 device) blinded to participants were inserted and worn for 7 days

Data was downloaded via clarity and interpreted using published data from 57 healthy children as a reference (see table for reference data divided into those aged 6-12 years and those aged 12-18 years)

RESULTS

Table 1 showing patient characteristics (n=26)

Demographics	N = 26
Male: female	15:11
Adrenal diagnosis	4 Addison's, 21 CAH, 1 unknown
Age, *years* (mean ± SD)	9.4 ± 5.1
Hydrocortisone dose, *mg/m²/day* (mean ± SD)	11 ± 4.4
Height SDS (mean ± SD)	-0.04 ± 1.21
BMI SDS (mean ± SD)	0.89 ± 1.36

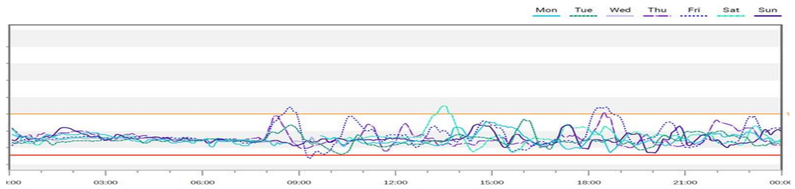

Figure 1. Example AGP of young person who takes hydrocortisone tablets at 8am, 1pm and 6pm

Figure 2. Example of data derived from Dexcom Clarity showing evidence of hypo and hyperglycaemia (Very high: >14mmol/L, High: >10mmol/L, low: <4mmol/L, very low: <3mmol/L)

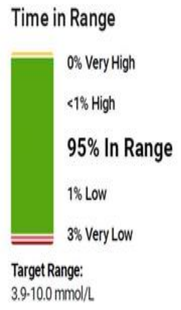

Table 2. Glucose data comparing the results from this data (GRACE study) to normative data[1]
** One set of data was unsuitable for analysis*

Parameter	GRACE study (n = 25)*	Reference data 6 to <12 years (n = 27)	Reference data 12 to <18 years (n = 30)
Mean glucose (± 1SD)	**6.02 (± 0.54)**	5.50 (± 0.39)	5.40 (± 0.39)
Standard deviation of measurements (± 1SD)	**0.96 (± 0.20)**	0.89 (± 0.39)	0.83 (±0.33)
Percent (%) of time glucose <3 mmol/L (median, IQR)	**0.00 (0.00-0.33)**	0.00 (0.00-0.20)	0.00 (0.00-0.40)
Percent (%) of time glucose >10mmol/L	**0.00 (0.00-0.43)**	0.00 (0.00-0.10)	0.00 (0.00-0.00)

CONCLUSIONS

First data describing glucose profiles in children with primary AI.

These preliminary data suggest both hypoglycaemia and hyperglycaemia may occur more commonly than in healthy children, with an overall trend for higher mean glucose concentrations.

Disturbance in glucose metabolism may contribute to differences in cognitive function reported in childhood (hypoglycaemia), and impaired quality of life, metabolic and cardiovascular disease reported in adults (hyperglycaemia, increased glycaemic excursions).

REFERENCES

1. **Shah, V.N., et al., *Continuous Glucose Monitoring Profiles in Healthy Nondiabetic Participants: A Multicenter Prospective Study.* J Clin Endocrinol Metab, 2019. 104(10): p. 4356-4364.**

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