Introduction

Cushing Syndrome is a rare disorder with only 10% of reported cases seen in children, resulting from abnormally high blood levels of cortisol and other glucocorticoids. Glucocorticoids affect renal function by their effect on glomeruli and renal tubules, enhance renin-angiotensin system and vasoactive substances but depress vasodilatory system, this can result in renal failure. Renal failure can alter glucocorticoid metabolism creating diagnostic dilemma in Cushing Syndrome.

Case Report

The patient is OM, a 16-year-old girl who was referred from Ahmadu Bello University Medical Centre, Samaru Zaria with history of excessive weight gain for 7 years, recurrent abdominal pain for a year, vomiting for 3 weeks duration and headache for a day duration. She was apparently well until 7 years prior to presentation when she was noticed to have started gaining weight excessively, weight gain more around the abdomen and upper part of the body, has no regular records of previous weight, however said to have weighed 90 kg at 13 years of age, weight gain progressively worsened and persisted until presentation. She was born at term with a birth weight of 4.1kg with no abnormal face noticed at birth. She was noticed to have been comparatively bigger than her peers while growing up, however this worsened significantly over the past 7 years. Her mother is not a known diabetic and no history of gestational diabetes during her pregnancy. There is maternal family history of obesity and diabetes mellitus.

Abstract: Cushing Syndrome, a rare condition with increased glucocorticoid production can affect renal function directly by its effect on glomerular and tubular functions or indirectly through the cardiovascular system. The aim is to report a case of Cushing Syndrome complicated by End Stage Renal Failure. The authors present symptoms, clinical course and laboratory findings of a 16-year-old girl with a diagnosis of Cushing syndrome complicated by end stage renal failure. She presented with excessive weight gain of 7-years, recurrent abdominal pain of 1-year, vomiting of 3-weeks and headache of a day duration. She had moon face, striae, buffalo hump and hypertension.

Keywords: Cushing Syndrome, Renal Failure, Hypertension.
symptoms, a day prior to presentation, she presented to the same hospital where there was an incidental finding of elevated blood pressure which necessitated her referral to this hospital.

Pregnancy, delivery and neonatal histories were not contributory, however, were not adversely eventful. She is fully vaccinated for age.

She is in senior secondary school (SS3) and performance is very good. She is the only child of both parents. Mother is a 50-year-old administrative staff of department of veterinary medicine (faculty secretary) with tertiary education, father is a 55-year-old staff of NAERLS with a master’s degree (ABU). Marriage setting is monogamous, non-consanguineous.

On examination: Looks big for age, has moon face, supraclavicular pad of fat and a buffalo hump. Has widespread striae more in the arms, abdomen and thighs, has patchy hyperpigmentation of the skin of the face, neck, forearms and knuckles. Has excess hair growth on the face, forearms, abdomen and the legs.

Weight= 103kg - 95th percentile for age and sex. Height= 162cm - 55th percentile for age and sex. Body mass index= 39.2kg/m² - grade II obesity. Waist circumference= 131cm Hip circumference= 114cm Waist hip ratio= 1.15: 1

Respiratory system: RR= 20 cycles/minute, symmetrical chest wall, equal chest expansion, central trachea, resonance percussion notes, vesicular breath sounds, no added sounds.

Cardiovascular system: HR= 102 beats/minutes, regular, full volume, synchronous with other peripheral pulses, no radio-femoral delay. Blood pressure is 200/130mmhg (supine) > 99th percentile for age and sex, 180/120mmhg (sitting) > 99th percentile for age and sex (fig 2). Apex beat=5LICS MCL and heart sounds S1 and S2 only, no murmur.

Abdomen: Protuberant, moves with respiration, soft, mild tenderness in the epigastric region, no palpably enlarged abdominal organs, bowel sounds present and normo-active, sexual maturity rating = 5.

Other systems (central nervous, respiratory, musculoskeletal and ear, nose and throat) are essentially normal.

Diagnosis: Cushing syndrome with complications-hypertension, peptic ulcer disease and chronic kidney disease

Investigation results includes:

urinalysis-proteinuria ++,
serum cortisol (ug/dl): LNSC- 16.4 (RR- < 4.4), LDDST - 20.0 (RR < 5.0)
Blood glucose level within normal (RBS 5.0- 8.3 mmols/L).
Abdominal ultrasound- Normal
Full blood count: HCT- 26.2% (Anaemia)
HIV test- Negative; HBsAg- Negative; HCVab- Negative
Urine output was within normal (0.7- 1.05mls/kg/min)
Serial serum Urea, electrolytes, creatinine and estimated glomerular filtration rate (eGFR) as shown in table I:

| Parameter          | Day 1   | Day3   | Day 6  |
|--------------------|---------|--------|--------|
| Urea (mmols/L)     | 52.9    | 48.6   | 44.2   |
| Sodium (mmols/L)   | 130     | 141    | 136    |
| Potassium (mmols/L)| 6.6     | 7.2    | 4.9    |
| Chloride (mmols/L) | 97      | 102    | 98     |
| Bicarbonate (mmols/L)| 20      | 16     | <10    |
| Creatinine (micromoles/L) | 2144 | 1755 | 1349 |
| eGFR mls/min/1.73² | 3.01    | 3.67   | 4.78   |

Key: eGFR—Estimated Glomerular Filtration Rate
Discussion

The diagnosis of Cushing syndrome is one of the most difficult problems in endocrinology and is even more so in the presence of renal failure.2,5 Clinical features are due to cortisol excess which leads to excessive protein catabolism due to transamination of amino groups of amino acids in the liver, increased production of carbohydrates, fat deposition, potassium loss and enhanced vascular responsiveness to pressor agents.6,7 The clinical features are related to both the degree and duration of excessive cortisol secretion. The cardinal features encountered by decreasing frequency are: 1) hypertension, obesity predominant on the trunk and neck, moon-like face in 90-95% of cases. 2) disturbance of glucose metabolism, purple striae, hirsutism, osteoporosis, hypogonadism in 70-75% of cases and 3) Muscular weakness in 60% and susceptibility to ecchymoses and infections.7,8,9 Any of the four cardinal symptoms of Cushing syndrome in children – growth failure, obesity, hirsutism and hypertension is highly suggestive of adrenal hyperfunction.8,9 In this patient the diagnosis was made based on clinical and laboratory findings. Distinguishing features including dorsocervical and supraclavicular fat accumulation, temporal fullness, violaceous striae and proximal weakness, hypertension and hirsutism are strongly suggestive of Cushing syndrome. These features were prominent in our patient.

Her Late night salivary cortisol (LNSC) level was 16.4μg/dl (RR < 4.4μg/dl) and Low dose Dexamethasone Suppression Test (LDDST) done showed no suppression with a value of 20.0μg/dl (RR < 5.0μg/dl).

Conclusion

Cushing Syndrome is a debilitating condition which is often times missed due to similar presentation with more common metabolic problems like obesity. There is a need for detailed evaluation of obesity for complications, co-morbidities as well as rare causes other than poor nutrition. Patients presenting with Cushing syndrome should be evaluated for possible renal involvement.

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