Mauriac Syndrome: Case Report

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Abstract

Mauriac syndrome (MS) is considered a glycogenic hepatopathy characterized by growth failure, delayed puberty, hepatomegaly with abnormal liver enzymes, hypercholesterolemia. These features were attributed mainly to insulin deficiency and sub-optimal diabetic management.

Our case is a known case of Type 1 diabetes mellitus (T1DM) on premixed insulin presented with delayed puberty, short stature, hepatomegaly and elevated liver enzymes. The patient's condition improved after shifting to basal- bolus insulin regimen and control of his blood sugar.

Conclusion: In spite of advancement in diabetic management, MS as a rare complication in poorly controlled T1DM still exists. A high index of suspicion is needed in T1DM with delayed growth and puberty since good metabolic control could reverse this rare condition.

Introduction

Patients with poorly controlled T1DM may develop MS which is considered a glycogenic hepatopathy and characterized by growth failure, delayed puberty, cushingoid appearance, hepatomegaly with abnormal liver enzymes, and hypercholesterolemia.

Mauriac syndrome occurs in males and females equally and is most common in adolescence
and is considered rare in the modern era of long-acting insulin therapy but is occasionally reported.

Hepatic glycogenosis can be caused by either persistent hyperglycemia due to insulin deficiency or excess insulin, leading to excess glucose administration to control hypoglycemia as glucose is eventually converted in hepatocytes into glycogen.

The secretion of the antagonistic hormone cortisol increases in T1DM patients with poor glycemic control. Excess cortisol inhibits hepatic glycogenolysis and increases fatty acid synthesis in the liver, causing hepatomegaly. Hypercortisolism can result in cushingoid features and delay in bone maturation, which in turn leads to delayed growth and puberty.

Patients with Mauriac syndrome also exhibit resistance to growth hormones which is caused by a decrease in IGF-1 bioactivity, IGF-1 receptor defects and circulating IGF-1 inhibitors.

Delayed puberty can manifest because of insulin deficiency, hyperglycemia itself, or decreased_LH and FSH secretion_caused by the gonadotropin-releasing hormone due to stress hormone secretion after poor glycemic control.

Liver biopsy in the setting of MS demonstrates steatosis and glycogen deposition.

This syndrome may be associated with autoimmune disorders, more commonly celiac, Addison's, autoimmune gastritis and thyroiditis.

Catch-up growth generally occurs if diabetic control is restored, however, individuals who are quickly restored to euglycemia may have a paradoxical worsening of retinopathy and should be followed closely.

Mauriac syndrome is a condition with a good prognosis, although it has potential for relapse, unlike NASH and NAFLD, which may progress to liver fibrosis or cirrhosis.

Case presentation:

A.K.A., 18 years old male, a university student, single with no special habits of medical importance. He presented complaining of short stature and delayed puberty.

The patient was born by normal vaginal delivery full-term, with normal mental and developmental milestones. He has been known to be diabetic since the age of 6, and he was on a premixed insulin regimen.

At the age of 15, the patient started to notice that he is shorter than his mates but didn't seek medical advice then. 7 months before presentation, there was a history of gradual progressive increase in abdominal girth associated with right hypochondrial dragging pain not associated with jaundice, fever, upper or lower GI symptoms, or lower limb edema. He sought medical advice, investigations were done and showed elevated liver enzymes (5-fold), hepatic virology and autoimmune profile were negative apart from positive ANA, serum cortisol 9 am: 17 ug/dl with normal ACTH, abdominal ultrasound revealed hepatomegaly 18 cm.

The patient sought medical advice at Kasr-Alainy Endocrinology clinic due to short stature, absent secondary sexual characteristics and failure of erection.
Family history: the father has T2DM, and the mother is hypertensive.

On examination

The patient was underbuilt. Height: 145 cm proportionate (below the 3rd percentile), BMI: 19.9 kg/m2, Mid-parental height: 168 cm. Vital signs are normal.
No beard or moustache or receding hair line. No pallor, jaundice or thyroid swelling.
Abdominal examination: soft hepatomegaly (right lobe span 18 cm).
Neurological examination: peripheral neuropathy
Normal chest, cardiac examination.
External genitalia examination: No pubic hair, infantile external genitalia. Bilaterally palpable small testis about 1.5 cm in length, no masses and micropenis (Tanner stage I)**.**
Musculoskeletal examination: Dupuytren's contracture of both hands.

Investigations

Normal CBC, Urea: 37 mg/dl, Creatinine: 0.8 mg/dl, serum albumin: 3.9 mg/dl
AIT: **235** U/L, AST: **239** U/L, Total bilirubin: 0.3 mg/dl, Direct bilirubin: 0.07 mg/dl, Na: 136 mmol/L, K:5 mmol/L, Ca: 10 mg/dl, PO4: 5 mg/dl, elevated ALK P 490 and normal PTH (27), low 25-hydroxy vitamin D 5.2 ng/ml
Viral markers are negative
ANA: 29 (up to 10 IU/Ml) with negative Anti-DNA, Anti-LKM–LKM and AMA
Normal Ceruloplasmin (32 mg/dl) and 24-hour urinary copper (54 µg/day)
FBS: 316, 2hr pp: 229, HbA1C: 8.8 %, A/C ratio: 500 mg/g
Hormonal profile showed normal thyroid profile, normal cortisol and ACTH 8 am
Hypogonadotropic hypogonadism: LH: **0.22** Mu/ML (0.8 -7.6), FSH: **1.9 Mu/mL (**0.7-11), Total testosterone: **< 0.025** ng/mL (2.5-8.4)

The bone age of the left wrist was 13 years old.
Abdominal ultrasound showed an enlarged Liver (longest span of right lobe 22 cm with uniform soft fatty echo pattern.
Fundus examination: Mild bilateral dot hemorrhage
Echocardiography: normal

Follow up 4 months after shifting to a basal-bolus insulin regimen and vitamin D replacement

Height: 157 cm
Pubic and axillary hair: Tanner III
ALT: 54 U/L, AST: 40 U/L, ALK P: 292 U/L
LH: **0.22** Mu/ML (0.8 -7.6), FSH: **1.9** Mu/ml (0.7 -11), Total testosterone: **< 0.025** ng/ml (2.5 -8.4)

Discussion

Our case is 18 years 18-year-old diagnosed as T1DM at the age of 6, but he was falsely prescribed a premixed insulin regimen with poor control of his blood sugar. He presented with short stature (below 3rd percentile), delayed puberty (Tanner 1), hepatomegaly and elevated liver enzymes, along with diabetic microvascular and musculoskeletal complications.

His hormonal profile showed hypogonadotropic hypogonadism and there was no evidence of viral hepatitis, autoimmune liver disease, or associated metabolic liver disease.
Accordingly, the patient was diagnosed with MS and he was advised to shift to a basal-bolus insulin regimen.

Unlike MASLD, MS is a reversible condition, so after 4 months of treatment and control of the patient's blood sugar, the patient's condition improved regarding his height, pubic and axillary hair appeared (tanner stage III), the liver enzymes normalized and his hormonal profile improved.

References

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