

Metformin Therapy in A lean Adolescent girl with prediabetes dysglycemia treated: Good Response.

Nada Alaaraj, Ashraf Soliman, Noor Hamad, Shayma Osman
Department of Pediatrics, Hamad General Hospital, Doha, Qatar

Introduction

The diagnosis of Diabetes Mellitus (DM) is reached based on measuring fasting and 2h plasma glucose (BG) after oral glucose load (OGTT) and/or glycated haemoglobin (HbA1c).

However, abnormalities involving the fasting and/or postprandial plasma glucose level that do not reach the diagnostic cut-off values (pre-diabetes dysglycemia) may increase the risk for developing type 2 DM (T2DM).

Metformin (dimethylbiguanide) is the most widely prescribed treatment for T2DM diabetes. Long term controlled studies are still required to assess its effect on prediabetes dysglycemia in children

Case Report

A 13-year-old lean adolescent girl presented to PEC with a day history of difficult breathing associated with dry cough.

She had a 10 months' history of excessive water drinking, polyuria and mild weight loss. She had a family history of bronchial asthma and T2DM (both parents' families)

Physical examination revealed: temp 36.6 C, RR= 34 /min, HR= 123b/min, BP 130/80 mmHg, BMI 20kg/m².

She did not have acanthosis nigricans or goiter. She had intercostal retractions and wheeze bilaterally.

Chest x-ray showed mild hyperinflation. The diagnosis of atypical pneumonia was entertained and she received salbutamol nebulizer, clarithromycin, a dose of oral prednisolone and IV fluid with Dextrose 5%.

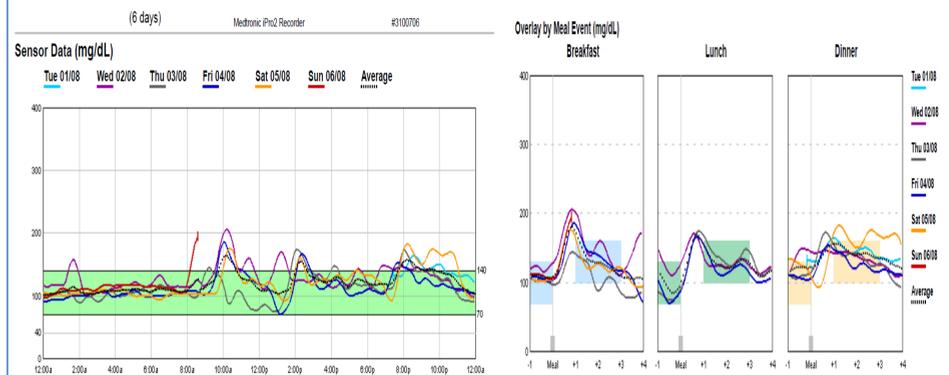
Initial lab showed hyperglycemia, BG = 16.2mmol/L, PH = 7.35, HCO₃= 19.7 mmol/L. Repeated lab revealed: Blood glucose 28.5 mmol/L, PH 7.19, HCO₃ = 11 mmol/L and PCO₂ = 28.7mmol/L.

She was started on insulin infusion therapy and IVF therapy as per DKA protocol. Further labs showed HbA1C=5.7%, plasma insulin = 239 uU/mL (High), C-peptide = 14.68 ng/mL (High). Acidosis and glycemia was corrected in 12 hours.

Follow up of her blood glucose readings for 3 days, without insulin therapy, were: (Before breakfast = (4.7- 5.3 mmol/L), before lunch (7.8- 8.7 mmol/L) and before dinner (7.4 – 8.2 mmol/L).

SBGM showed postprandial hyperglycemia (7.7- 9.4 mmol/L). OGTT (using 75 g Dextrose) showed fasting BG = 5.4mmol/L, and 2hrs BG = 7.9mmol/L with fasting insulin level = 15.2mU/mL. HOMA-IR was 3.7. Anti-GAD antibodies were undetectable.

Continuous glucose monitoring (CGMS) tracing showed glucose peaks up to 201 mg/dL 1hour after meals. 18% of the time her glucose was > 140mg/dL and 82% of the readings were between 70-140mg/dL.



Patient was started on Metformin 500mg BID with lunch and dinner. The mean BG readings decreased by 11- 30 mg/dl (mean 20 mg/dl) after Metformin therapy.

| Mean BG reading | Fasting | After 2hrs | Before lunch | After 2hrs | Before dinner | After 2hrs |
|------------------|---------|------------|--------------|------------|---------------|------------|
| Before Metformin | 100 | 133 | 109 | 123 | 123 | 147 |
| After Metformin | 88 | 109 | 120 | 98 | 104 | 117 |
| Difference | -12 | -24 | -11 | -25 | -19 | -30 |

Conclusions

Adolescents during their pubertal growth spurt have higher insulin resistance compared to other periods in life. The use of Metformin in our lean adolescents with prediabetes dysglycemia appears successful to maintain normal glycemia. However, long term controlled studies are still required to assess the degree and duration of effectiveness and safety of using Metformin in these diseases.

Contact

Ashraf Soliman MD PhD FRCP
Department of Pediatrics
Hamad General Hospital
Doha, Qatar,
Atsoliman@yahoo.com