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Case Report

Glycemic profile assessment during betamethasone administration in women with gestational diabetes mellitus

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ABSTRACT

Aim: Betamethasone's effect on glucose homeostasis in the presence of gestational diabetes has not been adequately investigated.
Materials-methods: We assessed the glycemic profile of 99 women with gestational diabetes (52 on insulin, 47 on medical nutrition therapy) who were given betamethasone during hospitalization for at risk pregnancies.
Results: In insulin-treated women the increase in total daily insulin dose significantly linked to betamethasone dose ($p = 0.014$). In women on diet, the need for insulin was positively related to betamethasone dose, age and gestational age >34th week (all $p < 0.05$).
Conclusion: Parsimonious betamethasone use might still be beneficial with a milder effect on glycemia.

1. Introduction

Antenatal corticosteroid (usually betamethasone, BM) administration in pregnancy is widely used, and is related to the reduction of incidence and severity of neonatal respiratory distress syndrome, intraventricular hemorrhage and mortality. One or two doses of 12 mg of BM are given intramuscularly, 24 h apart, in pregnant women at 23–34 weeks who are at increased risk of preterm delivery within the next seven days, due to preeclampsia, or when premature rupture of membranes is established and tocolysis therapy is administered [1–3]. However, corticosteroid administration in the presence of Gestational Diabetes Mellitus (GDM) and its effect on glucose homeostasis has not been adequately investigated. Therefore, most authors recommend close monitoring of these patients, especially when they are insulin - treated [4,5].

2. Material and methods

We closely monitored and assessed the glycemic profile of 99 GDM women with singleton pregnancies (mean age±SD: 33.9 ± 5.7 years; mean gestational age±SD: 33.5 ± 3.9 weeks of pregnancy, 43 women were before the 34th gestational week and 56 after the 34th week) who were given BM during their hospitalization for at risk pregnancies, from August 2016 to December 2017. Fifty two women were on insulin and 47 on medical nutrition therapy (MNT). Their mean ± SD weight gain till the time of BM administration was 8.9 ± 5.6 kg. The evaluation of the glycemic profile was based on six to seven capillary plasma blood glucose measurements per day (pre and 1 h postprandial, plus an overnight measurement) with point of care (POC) devices (in patients who had their own device, they continued to use it so the measurements where closely enough standardized to out-patient environment), and the intervention for correction of hyperglycemia was in accordance with ADA and EASD guidelines for GDM [6,7]. Care was taken to ensure most glucose measurements within the target range of 90–140 mg/dL. We used analysis of covariance to assess total daily insulin dose before and after BM therapy, with age, gestational week, weight gain in pregnancy and BM dosage as variables.

3. Results

As expected, a significant change in the glycemic profile in the majority of patients was noted during the first 24 h of BM administration [8], lasting on average approximately 1.7 days (2.1 days in insulin-treated and 1.4 days in MNT-treated women). In insulin-

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treated women the mean increase in total daily dose of insulin was of 61.4%. The increase in insulin dose was significantly linked to BM dosage ($p = 0.014$), especially in women that received two 12 mg BM doses (33/52 women; total daily insulin dose needed to be increased by 23.8 ± 3.5 units on average), versus a single 12 mg BM dose (19/52 women; with an average increase of 5.3 ± 6.2 units of insulin). The increment of insulin needs was not related to age ($p = 0.669$), gestational age ($p = 0.958$) and weight gain ($p = 0.745$). In the group on MNT, 35/47 women (74,5%) were treated eventually with insulin in order to maintain blood glucose profile within the target range of 90–140 mg/dL. The need for insulin treatment was positively related to BM dosage ($p = 0.001$). 31/47 women received two 12 mg BM doses. The average insulin daily dosage was 17.6 ± 2.0 units versus women on single 12 mg BM dose (16/47 with an average insulin daily dosage of 4.3 ± 2.9 units). For the women on MNT the need for insulin was related to age ($p = 0.015$) and gestational age after 34th week ($p = 0.048$) but not weight gain ($p = 0.054$).

4. Conclusions

Our observational study on pregnant women with GDM that received BM therapy, pointed out that in insulin-treated women the mean increase in total daily dose was higher than the recommended 30%–40% increase in the literature, and it was related to BM dosage. Furthermore, we noticed a significant need for insulin treatment within the group of women on MNT, related to BM dosage, age and gestational age. By design there were limitations in the study, regarding the heterogeneity and variations of the factors and conditions leading to a pregnancy at risk. Furthermore we utilized POC devices rather than continuous glucose monitoring (CGM) which could have been more accurate in glucose profiling. Nevertheless, depicting a more realistic out-patient environment and clinical practice, our study demonstrates at most the need for individualized monitoring and treatment with an increased level of caution, not only for women already on insulin but also on MNT. On addition, our data suggest that a more conservative BM use might still be beneficial and have a milder effect on glycemia, in accordance to recent literature [2,3,7,9,10]. However, further relevant research is essential.

Authors contribution

All authors contributed to the concept, design of the manuscript, as well as drafting and revision of the manuscript.

All authors approve the final submitted version of the manuscript.

Conflicts of interest

No conflicts of interest.

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