Original Research Article

The effect of prophylactic betamethasone for fetal lung maturity on glycemic status of diabetic and non-diabetic pregnant women

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Abstract

This is a prospective study done to find out the effect of administration of antenatal corticosteroids for fetal lung maturity on blood sugar levels in non GDM, GDM and PGDM patients. Baseline blood sugar values are measured. From the day after steroid administration blood sugars are measured before and after every meal. The premeal values more than 95mg% and post meal values more than 120mg% are noted. The number of patients whose carbohydrate intolerance became unmasked after steroid administration were 3(12%). The number of GDM patients whose treatment plan changed from medical nutrition therapy to insulin were 4(22.2%) and GDM, PGDM patients whose insulin requirement increased were 2(28.5%). Hence the need for intense glycemic monitoring of antenatal patients during steroid therapy.
Key Word: antenatal corticosteroids ,glycemic profile ,medical nutrition therapy ,insulin

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INTRODUCTION

Antenatal corticosteroids are given for fetal lung maturity in patients at risk of preterm delivery between 24 to 34 weeks. National institute of health consensus statement in 1994 strongly recommends administration of prophylactic steroids between 24 and 34 weeks of gestation[1]. Current recommendations by greentop guidelines and ACOG, support administration of steroids for elective deliveries before 39 weeks of gestation[2]. Two doses of betamethasone are given 24 hours apart by intramuscular injection. It is known that corticosteroids induce hyperglycemia ,increases blood sugar level apart from the other effects on lipid metabolism. The magnitude, duration and effect of this transient hyperglycemia in diabetic and nondiabetic mothers is studied. This transient hyperglycemia has both adverse maternal and fetal effects and hence has to be treated. This study was done to determine the magnitude and duration of hyperglycemia.

MATERIALS AND METHODS

This was a prospective comparative study done in antenatal patients, OBG department, Chettinad hospital and research institute, Kelambakkam, who were given betamethasone prophylaxis for fetal lung maturity. 25 low risk nondiabetic patients who were administered prophylactic corticosteroids were included in group A. Another 25 gestational and pre gestational DM patients who were given prophylactic corticosteroids were included in group B. All these patients were admitted and glycemic profile started-pre breakfast, post breakfast, prelunch, post lunch, predinner, post dinner capillary blood glucose values were checked from day 2 of steroid administration. The magnitude and timing of increase in blood glucose levels and the need for insulin to control blood glucose studied in each arm. The data was collected and appropriate statistical analysis carried out.

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RESULTS

The various indications for steroid administration in group A were listed in table 1 The number of patients with D2 pre meal blood sugar<95mg% were 4(16%).>95mg were 21(84%). Post meal blood sugar <120mg% were 7(28%), >120mg% were 18(72%) Out of 25 patients 3(12%) continued to have increased blood sugar values even after day 3 requiring medical nutrition therapy. The various indications for steroid prophylaxis in group B were listed in table 2 Out of 25 patients 18(64%) were under medical nutrition therapy and 7(28%) were on insulin.D2 pre meal<95mg% were 1(12%),>95mg% were 22(88%), Post meal <120mg% were13 (52%).>120mg% were 12(48%). D3,pre meal<95mg% were 18(72%).>95mg% were 7(28%) Out of 18 patients on meal plan 12(66.6%) required insulin during the three days of follow up and 4 (22.2%)continued to require insulin. All patients on insulin needed increase in dosage during steroid therapy and 2(28.5%) patients continued to require augmented dosage after steroid therapy.

Table 1: Indications for steroid prophylaxis in group A

INDICATIONS	NUMBER	PERCENTAGE
IUGR	3	12%
PRETERM LABOUR	6	28%
PPROM	4	16%
PIH	2	8%
OLIGOHYDRAMNIOS	7	28%
BOH	1	4%
OBSTETRIC CHOLESTASIS	1	4%
DECREASED FETAL MOVEMENTS	1	4%

Table 2: Indications for steroid prophylaxis in group B

INDICATIONS	NUMBER	PERCENTAGE
PRETERM LABOUR	12	48%
PLACENTA PREVIA	1	4%
PIH	4	16%
PROM	5	2%
IUGR	3	12%

DISCUSSION

Antenatal corticosteroids are administered for patients at risk of preterm delivery for augmenting lung maturity . This was initially recommended between 24 and 34 weeks as per 1994 NIH consensus[3]. Recent RCOG guidelines recommend corticosteroid administration in late preterm and also early term pregnancies until 38+6 weeks for elective deliveries and until 37+6 weeks for deliveries with spontaneous labour onset[4]. Steroids are not contraindicated in patients with GDM and PGDM. There is a rise in the incidence of diabetic pregnant patients requiring antenatal corticosteroids for various indications.[5]The test followed in our hospital to screen and diagnose GDM is 75g glucose challenge test irrespective of meal as per DIPSI guidelines. 3 of group A patients had their carbohydrate intolerance unmasked after steroid administration and continued as GDM requiring meal plan. This suggests the need for glycemic monitoring after steroid administration in low risk patients also. The effect of steroids on blood glucose levels begins about 12 hours after first dose and lasts upto 5 days[6]. It is better to screen patients effectively for GDM before antenatal steroid administration beyond routine recommendations[7]. Blood glucose has to be estimated just before steroid administration. This will help us to plan further maternal monitoring, the need for meal plan or insulin therapy. GDM and PGDM patients on insulin require an increase in dosage after corticosteroid administration[8]. NICE guidelines suggested there will be 20% increase in insulin requirement after steroid therapy[9]. In patient monitoring and better fetomaternal surveillance needs to be carried out atleast 3 days after steroid therapy. A study by Sanjaykaha *et al* suggests surveillance for 5 days.[10] with 3 pre meal and 3 post meal estimates of blood glucose. All these patients can be provided with medical nutrition therapy irrespective of glycemic status. Few patients with higher values of blood glucose required insulin for a short period. Most GDM patients on meal plan require insulin during antenatal corticosteroid therapy and a few continued to achieve glycemic control only with insulin.

CONCLUSION

The study concludes there is a significant rise in blood sugar values during steroid therapy in antenatal patients. A few non GDM continue as GDM and some GDM patients on meal plan turn to require insulin and those on insulin require augmented dosage. There is a definite need for intense monitoring of blood sugar in antenatal patients during steroid therapy. Further studies are required to see the long term effects.

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