Maternal and neonatal outcomes of diabetes in pregnancy in urban women of Sri Lanka: a retrospective cohort study

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Abstract

Introduction: Maternal diabetes has been recognised for adverse maternal and perinatal outcomes. Aims of this study were to the mode of delivery, maternal morbidity, neonatal morbidity and mortality in pregnant diabetes (DM) women with normal pregnant women.

Methods: This was a retrospective cohort study. Data has been gathered from medical records of diabetes (DM) delivered in ward 5, Castle Street Hospital (CSHW), during six months period from 15th May 2012. Patients with compare previously known DM and Gestational DM (GDM) delivered in this unit were included. Parity matched control sample was selected by convenient samling to compare the outcomes.

Results: A total of 270 mothers were enrolled. There were 135 women in each group. Polyhydramnios and pregnancy induced hypertension was found in significantly higher proportion of women in the DM group (p<0.05). Induction of labour rate was significantly higher in the DM group compared to the controls. Elective caesarean section rate was significantly higher in the DM group but there was no difference in the emergency caesarean rates in the two groups. Rates of prematurity, low birth weight, macrosomia, intrauterine growth restriction, still births and neonatal deaths were not significantly different in the two groups. Neonatal pyrexia and neonatal hypoglycaemia were significantly higher in the DM group compared to the controls (p<0.05). From the DM group there were more admissions (n=5) to neonatal unit with prematurity than the control group (n=1).

Conclusion: As expected induction of labour rates and elective caesarean rates were higher among mothers with gestational diabetes. However, there was no significant difference of macrosomia but increased neonatal hypoglycaemia and pyrexia among GDM was noted in this study.

Key words: Diabetes in pregnancy, South Asian women, perinatal outcomes in diabetes mothers.

INTRODUCTION

Diabetes is the commonest endocrine disorder in pregnancy. The prevalence of Diabetes is rising in South Asian countries during the last couple of decades¹. Hyperglycaemia during pregnancy can increase foetal and neonatal morbidity and mortality. Australian Carbohydrate Intolerance Study in Pregnant Women (ACHOIS) reported, treatment of GDM significantly reduce perinatal morbidity, including rates of macrosomia, shoulder dystocia, Caesarean section and hypertensive disorders².

Diagnosing and treating GDM will prevent maternal, perinatal and long term complications to both mother and the offspring³. High prevalence of type II DM and GDM in Sri Lankan⁴ women of South Asian origin makes them susceptible to adverse effects of hyperglycaemia if remained undiagnosed during pregnancy. Maternal hyperglycaemia in early pregnancy increases the risk of birth defects and miscarriage in type I or II diabetes⁵. In Gestational diabetes hyperglycaemia occurs in the second half of the pregnancy, increase the risks of accelerated foetal growth, late stillbirth, birth trauma and neonatal hypoglycaemia⁶. The risk of late unexpected stillbirth among women with diabetes is approximately fourfold higher when untreated compared to non-diabetic pregnant women after 40 weeks of period of amenorrhoea⁷.

Diabetic women are at increased risk of pregnancy induced hypertension and preeclampsia⁸. Women who had been diabetic for years before pregnancy are at higher risk of micro vascular disease such as hypertension, nephropathy and retinopathy⁹. Micro albuminuria or proteinuria indicates renal micro vascular involvement with increased risk of placental insufficiency, pre eclampsia and preterm delivery¹⁰.

This study was designed to compare the maternal and neonatal outcomes (during the hospital stay) of women with diabetes and non-diabetes in pregnancy among urban women in Sri Lanka.

MATERIALS AND METHODS

Data collected from medical records of diabetes (DM) delivered in labour room C, CSHW, during six months period starting from 15th May 2012. Inclusion criteria: previously known DM and GDM delivered in this unit. Parity matched control sample to compare the outcomes was selected by convenient sampling. The study design was a retrospective cohort study. All women selected for cases and controls have had a 75g oral glucose tolerant test (OGTT) during their pregnancy.

New values for 75g OGTT recommended by the International Association of Diabetes and Pregnancy Study Group (IADPSG) were taken as standards for inclusion criteria. IADPSG criteria for diagnosing GDM is as follows: fasting blood glucose (FBS) 5.1mmol/L (92mg /dl), 1 hour plasma glucose 10mmol/L (180mg /
without protein urea was the second
Pregnancy induced hypertension
(2.9%) in the control group (p<0.01).

16 (11.8%) women and only four
pregnancy in the DM women with
commonest maternal complication in
DM was 1.2%.

The percentage of DM in pregnancy
diagnosed as GDM during pregnancy.
diagnosed as type II DM and 120
There were 15 women previously
matched normal pregnant women.
Total sample size 270 women with
six months study period was 1264.
Total number of deliveries during the
RESULTS

Phenotypic data were directly
entered into an electronic database
and manually verified for errors. In
the analysis, summary values are
presented as the mean [standard
deviation (SD)] when data were
normally distributed, and as the
median (inter quartile range) when
not distributed normally. Student’s
t-test was used to test for differences
between groups where the data were
normally distributed, Chi square test
and Fisher’s exact test were used to
compare frequencies and proportions
when categorical data are presented as
percentage distributions. P value <0.05
was taken as the level of significance.

RESULTS
Total number of deliveries during the
six months study period was 1264.
Total sample size 270 women with
135 diabetic women and 135 parity
matched normal pregnant women.
There were 15 women previously
diagnosed as type II DM and 120
diagnosed as GDM during pregnancy.
The percentage of DM in pregnancy
in this study was 10.6%. Percentage
of GDM was 9.4% and pre-pregnancy
DM was 1.2%.

Polyhydramnios at term was the
commonest maternal complication in
pregnancy in the DM women with
16 (11.8%) women and only four
(2.9%) in the control group (p<0.01).

Polyhydramnios was detected in four women in the DM
group versus six women in the control
group (p=0.3).

There were 16 (11.8%) women with
high Fasting (>110mg/dl) or 2hour
postprandial blood glucose (>140mg/
dl) in the GDM group 48 hours
after delivery. Primary postpartum
haemorrhage was the commonest
postpartum complication found in the
group with four women and only one in the DM group (p=0.1).

Comparison of mean, standard
development of birth weight and the
period of amenorrhoea at delivery is
given in table 1. Comparison of onset
of labour and induction of labour,
mode of delivery in the two groups
and neonatal out comes are given in
table 2, 3, 4 respectively. Shoulder

Table 3: comparison of mode of delivery

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th>DM n (%)</th>
<th>Controls n (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal vaginal delivery</td>
<td>57 (42%)</td>
<td>71 (53%)</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>Forceps delivery</td>
<td>00</td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>Elective LSCS</td>
<td>59 (44%)</td>
<td>42 (31%)</td>
<td>&lt;0.05*</td>
</tr>
<tr>
<td>Emergency LSCS</td>
<td>19 (14%)</td>
<td>21 (16%)</td>
<td>0.73</td>
</tr>
</tbody>
</table>

DISCUSSION

Diabetes in pregnancy has adverse
maternal and perinatal outcomes
compared to normal pregnancy[9].
This study found that in women
with DM in pregnancy had a
significantly higher frequency of
polyhydramnios and pregnancy
induced hypertension compared to
controls. Polyhydramnios was defined
as amniotic fluid index of 20cm or
more. This is a common complication
in GDM women when glycaemic

Table 2: comparison of onset of labour and induction of Labour (IOL)

<table>
<thead>
<tr>
<th>Onset of labour</th>
<th>DM n (%)</th>
<th>Controls n (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>spontaneous</td>
<td>13 (10%)</td>
<td>66 (49%)</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>Induction</td>
<td>58 (43%)</td>
<td>21 (16%)</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>Emergency LSCS after IOL</td>
<td>13 (22%)</td>
<td>7 (33%)</td>
<td>0.32</td>
</tr>
</tbody>
</table>

Table 1: comparison of mean, standard deviation (SD) of birth weight (BW) and
period of amenorrhoea (POA) at delivery

<table>
<thead>
<tr>
<th>BW (Kg)</th>
<th>Delivery POA (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>controls</td>
</tr>
<tr>
<td>Mean</td>
<td>2.95</td>
</tr>
<tr>
<td>SD</td>
<td>0.52</td>
</tr>
<tr>
<td>P value</td>
<td>0.10</td>
</tr>
</tbody>
</table>

* indicates the two groups are significantly different.

Table 3: comparison of mode of delivery
control is sub optimal. However there was no increase perinatal morbidity or mortality in these women. Although pregnancy induced hypertension was significantly higher in the DM group this was not associated with per eclampsia. The presence of type II DM was 1.2% and none of these women had micro vascular disease detected during the current pregnancy, the duration of disease ranged from 0.5 years to 7 years prior to present pregnancy.

The mean delivery POA in the DM group was 37 weeks and two days (SD=1.2), this was significantly low compared to the 38 weeks and four days (SD=3.4) in the controls (table 1). This difference can be attributed to the higher rate of induction of labour in the DM group 43% compared to the 38 weeks and four days in controls (table 2). Also the significantly high elective caesarean rate (44%) in the DM group compared to 31% in the controls too may contribute to the lower mean POA at delivery in the DM (table 3). No significant different of the mean BWs were found, the lower mean POA at delivery of DM mothers may have been a contributory factor (table 1).

Neonatal complications such as macrosomia (BW ≥3.5 Kg), prematurity, intra uterine growth restriction, still births and neonatal deaths were not statistically different in DM compared with controls (table 4). These findings could be attributed to the good treatment compliance of the DM mothers, an optimal glycaemic control during the pregnancy and timely delivery. Although there was no statistical significant increase of prematurity in the DM group of the five premature infants needing intensive care admissions, only two had preterm labour, two emergency sections for pre eclampsia and fetal distress, the other was an elective delivery (table 5). The elective delivery of DM with a normal glycaemic control should be delayed up to 39 completed weeks as evidence show respiratory morbidity in neonates, requiring admission to the neonatal intensive care is more if delivered early by elective caesarean section11.

Hypoglycaemia (plasma glucose ≤50mg/dl) a known complication of neonates of DM mothers was significantly higher in DM group compared to controls with in the first 24hours of delivery (table 4). Neonatal hypoglycaemia is a consequence of persistent fetal hyper-insulinaemia occurring after birth when the maternal transfer of glucose has ceased. This study also found neonatal pyrexia to be significantly higher in the DM group compared to controls (table 4).

Sixteen (11%) women had high fasting and post prandial blood glucose 48 hours after delivery; they were not previously known type II DM. Majority of the GDM women will subsequently become type II DM2. Life style changes to minimize weight gain with physical activity and diet had shown to slow the progression to type II DM in these women11.

Maternal diabetes with suboptimal glycaemic control can influence aspects of fetal metabolic programming and an increased risk of type 2 diabetes in adult life3. Therefore diagnosing DM and optimal glycaemic control during pregnancy will minimise the short term and long term complications to the offspring of DM mothers.

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REFERENCES


