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FETAL MACROSOMIA;
ITS MATERNAL AND NEONATAL COMPLICATIONS

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ABSTRACT… Objective: To review the deliveries of macrocosmic babies and their obstetrical and neonatal outcomes. **Methods:** A prospective case control study involving a total of 3700 deliveries at term of macrocosmic babies between Jan 2011 to Dec 2012 in Ziauddin Hospital Kemari Campus. The study concerned risk factors, mode of delivery and the incidence of maternal and perinatal complications. Results: Macrosomia occurred in 5.2% of all deliveries. The main risk factors of macrosomia identified in our study were multiparty and diabetes mellitus. The significant maternal complications were caesarean section, postpartum hemorrhage and perineal tear. Significantly male gender, shoulder dystocia and admission to NICU were noted in macrosomic group compared to controls. **Conclusions:** Macrosomia is potentially dangerous for the mother and the neonate. It is important to identify the suspected fetal macrosomia to prevent its risk factors and complications. There is a need to provide all delivery facilities and care services to prevent and reduce the maternal and neonatal complications.

Key word: Macrosomia, Risk factors, Complications, Pakistan

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INTRODUCTION

Macrosomia is diagnosed when the birth weight exceeds an established limit of either 4000 or 4500 g .The incidence of neonates with birth weight 4 kg was quoted as 10% and with birth weight of 4.5 kg as 1.5%[1] by an American study while it is said to be 1-1.5% by Henriksen[2]. Pregnancies with macrosomic fetus is considered as a high risk pregnancy.

There a number of risk factors associated with fetal macrosomia such as diabetes a strongest association, (macrosomia was detected in 70% to 80% of pregnancies that are complicated by diabetes mellitus)[3], maternal obesity and excessive weight gain during pregnancy and multiparty. Genetics, racial and ethical factors also contribute.

Fetal macrosomia is also associated with a range of maternal and fetal complications such as shoulder dystocia, birth asphyxia, nerve injuries, clavicular and humerus fractures in neonates, admission to the intensive-care nursery, and increased perinatal mortality for the newborn[5], while there is increased risk of caesarean section, vaginal and perineal trauma and postpartum hemorrhage to the mother[6].

Beside the maternal and fetal complications associated with a good size babies the management of labour of mothers with macrosomic babies is still a query. One can find variations in the management of these pregnancies. Different protocols are being followed varying from planned intervention such as induction of labor followed by normal vaginal delivery or elective caesarean section based on estimates of fetal weight. Systemic review[7] have not shown any benefit of induction. A cost analysis suggests that the option of elective cesarean delivery is undesirable[8].

Various studies have shown reduction in brachial

plexus injuries in women undergoing elective caesarean section without compromising maternal morbidity compared to women who delivered vaginally[9,10].There is also problem in diagnosing a macrosomic fetus in the antenatal period either clinically mean error 300 g or by ultrasound with a mean error ranging from 300-550g[11].

A prospective case–control study of the outcomes of delivery for macrosomic and normal weight infants at Ziauddin Hospital was conducted with the aim to determine the prevalence of macrosomia and its complications.

METHODS

The study was carried out at Ziauddin hospital Kemari campus Karachi .196 women who delivered a baby weighing 4kg or more and 200 women taken as control delivered during the period from January 2011 to December 2012 were included in the study. Those women who delivered a baby with a birth weight of = 4000 g formed the case group and 200 women taken as control delivering babies with birth weight 3000 to 3500 kg.

Pregnancies with multiple gestations and those with prenatal or postnatal diagnosis of fetal structural and chromosomal abnormalities were excluded from the study.

DATA COLLECTION

Obstetrics and neonatal records were obtained from the labor ward register. Maternal information collected was age parity, and diabetes mellitus.

Labor and delivery events analyzed were gestational age at delivery, induction of labor, mode of delivery that is caesarean section emergency or elective or spontaneous vaginal deliveries.

Maternal complications taken into consideration were perineal trauma, postpartum hemorrhage and shoulder dystocia.

The neonatal information collected were weight of the baby, sex of the baby apgar score at 5 minute, and neonatal complication such as admission to NICU hypoglycemia, and nerve injuries. The primary outcome variables were the incidence of maternal and neonatal complications. Maternal complications were caesarean section, shoulder dystocia, and perineal trauma. Neonatal complications were hypoglycemia, nerve injuries and admission to neonatal intensive care unit.

STATISTICAL ANALYSIS

Data were analyzed using statistical package for social sciences SPSS VERSION 18. The entire test was 2 sided significant at the level of 0.05 by estimating power of 95%.

Binary Logistic regression analysis was carried out to examine the association of macrosomia with different explanatory and confounding variable.

RESULT

A total of 3700 women delivered at our centre during the study period, 196 delivered babies weighing more than 4 kg giving a rate of 5.2% the mean birth weight of macrocosmic babies was 4170.0±239.02 standard deviation.While the mean birth weight of the control group was 2982 with standard deviation of. ±377.34. In the univariate analysis parity and gestational diabetes were associated with macrosomic deliveries, about 79% of macrosomic neonates were delivered from multiparity mothers.

The percentage of women with macrocosmic babies who delivered vaginally were 42.8% while 67.5% delivered by cesarean section compared to 57.2% and 32.5% in the control group with a significant p value . This indicates that macrosomia increases the risk of Cesarean section.

Among women who had a vaginal delivery, shoulder dystocia occurred in 6 women while no case of shoulder dystocia occurred in the control group. Significant association was noted regarding diabetes mellitus among women with fetuses more than 4 kg. We also found significant associations between macrosomia and postpartum hemorrhage.

There were significantly more male infants in the macrosomic group (p- value 0.025) than among controls. No significant difference noted in the admission to NICU while more cases of hypoglycemia and nerve injuries recorded among macrosomic babies compared with controls. One case of Erb's palsy occurred in macrosomic spontaneous vaginal deliveries complicated by shoulder dystocia.

Logistic regression analyses of the total 196 cases shows male infants were more likely to be macrosomic when compared with female infants (OR1.20, 95% CI 1.35–3.12), women who delivered macrosomic infants were 3 times more likely (95% CI2.90-62.64) to deliver by caesarean section and also Macrocosmic infants were more likely to be hypoglycemic than controls. No other significant association noted in other characteristics. Maternal and perinatal outcomes in the study population are listed in Table I. The odd ratios for macrosomia on each outcome are listed in Table II.

DISCUSSION

In our study 5.2% women were found to have macrosomic babies .The ratio is 2.2% in an Australian study done on a cohort of pregnant women5. In America the prevalence of babies with birth weight 4000g is 9.2%3 while studies have done in Pakistan shows the prevalence as 3%-4%[12,13].

In our study the risk factors associated with macrosomia were found to be multiparty, male gender and maternal diabetes mellitus. Multiparty and diabetes mellitus were not associated significantly in the Australian study compares to other studies[14,15].

We identified a greater risk of caesarean delivery for women having a macrosomic infant (67%). Most of caesarean section was done in emergency primarily indicated for labor and delivery complicated by obstructed labor. Macrosomia was sole indication for caesarean in seven cases. Spellacy and Berard[16] have mentioned the amount of caesarean section 33.8% and instrumental delivery 36%. The incidence of caesarean section was three times more common in the study by OA Adesina[17], the prevalence of caesarean section in the study done on Pakistani women were 40.5%[18]. The rate of cesarean section among women delivering macrosomic babies was 47.6% in Saudi Arabia[19].Other workers, however, failed to find a substantial decrease in fetal morbidity and mortality in macrosomic babies delivered by caesarean section to justify the high prevalence of caesarean section, and therefore advocate earlier induction at term in mothers of macrosomic babies[15,16].

Compared to studies done by other authors induction of labor was not high in our macrosomic babies only in 10 of women induction of labor was performed for suspected macrosomia.

In our study shoulder dystocia occurred in only two cases delivered vaginally among macrosomic infants This rate lower than reported in other studies.

We could not find any association between pregnant women with diabetes mellitus and shoulder dystocia. We took 4 kg as a cut off to define macrosomia as compare to many Western and American studies. This is mainly due to morphological and cultural norms of our women.

Other maternal complications in this study were infrequent.

Fetal sex influences macrosomia potential. Male infants weigh more than female infants at any gestational age. Our study has confirmed this association.

We had a very low neonatal morbidly and mortality among macrosomic babies. The most feared result of macrosomia is shoulder dystocia up to one fourth of the infants with shoulder dystocia had described to suffer from brachial plexus or facial nerve injuries or fractures of the humerus or clavicle[20].

Group	Macrosomic baby		Control baby		Pearson Chi-Square	
Characteristics	**n**	**%**	**n**	**%**	**Statistic**	**p-value**
Parity						<0.001
0	25	24.3	78	75.7		
1	39	43.3	51	56.7		
2	28	50.0	28	50.0		
3	29	56.9	22	43.1		
4	24	75.0	8	25.0		
> 5	50	79.4	13	20.6		
Mode of delivery					28.36	<0.001
SVD	110	42.8	147	57.2		
Assisted delivery	2	13.3	13	86.7		
LSCS	83	67.5	40	32.5		
Induction of labor					0.624	0.429
No	160	48.5	170	51.5		
Yes	35	53.8	30	46.2		
Baby sex					5.012	0.025
Female	70	42.7	94	57.3		
Male	125	54.1	106	45.9		
Maternal diabetes					17.10	<0.001
No	179	47.2	200	52.8		
Yes	16	100.0	-	-		
Maternal complication					NA	
None	167	46.4	193	53.6		
PPH	16	84.2	3	15.8		
Prenatal trauma	6	60.0	4	40.0		
Shoulder dystocia	6	100.0	-			
Admission to NICU					1.28	0.257
No	165	48.2	177	51.8		
Yes	30	56.6	23	43.4		
Hypoglycemia					6.090	0014
No	181	48.0	196	52.0		
Yes	14	77.8	4	22.2		
Nerve injuries						0.119*
No	192		200	51.0		
Yes	3		-	-		

Table-I. Association of mother and perinatal characteristics between macrosomic and control baby

Characteristic	B	S.E	P-value	Odds Ratio	Odds Ratio (95% C.I)
Parity					
0 (Reference category)					
1	0.87	0.31	0.005	2.36	(1.29-4.40)
2	1.13	0.35	0.001	3.10	(1.56-6.22)
3	1.41	0.36	<0.001	4.13	(2.01-8.40)
4	2.23	0.46	<0.001	9.30	(3.73-23.44)
≥ 5	2.48	0.38	<0.001	12.00	(5.62-25.61)
Mode of delivery					
Assisted delivery (Reference category)					
SVD	1.58	0.77	0.04	4.84	(1.07-21.99)
LSCS	2.60	0.78	0.001	13.47	(2.90-62.64)
Induction of labour					
No (Reference category)					
Yes	0.21	0.27	0.43	1.20	(0.72-2.11)
Gender of baby					
Female					
Male	0.46	0.20	0.02	1.54	(1.05-2.37)
Admission to NICU					
No (Reference category)					
Yes	0.33	0.29	0.25	1.39	(0.78-2.50)
Hypoglycemia					
No (Reference category)					
Yes	1.33	0.57	0.02	3.70	(1.22-11.72)

Table-II. Logistic regression analysis of macrosomic and control baby

Only one case of erb palsy occurred in macrosomic spontaneous vaginal delivery complicated by shoulder dystocia. In literature incidence of 4-40% of brachial plexus injury has been reported following shoulder dystocia. The risk of admission to neonatal intensive unit was also not high in macrosomic babies compared to controls.

CONCLUSIONS

As there are various adverse outcome associated with fetal macrosomia efforts should be made to identify macrosomic fetuses in the antenatal period and before labor. In diabetic patients, tight glucose control before pregnancy can reduce the risk of congenital malformation.

Policy of elective caesarean section for macrosomic babies is unjustified. In addition a limited approach to instrumental vaginal delivery should be adopted. Since the majority of factors which lead to the delivery of macrosomic infants are preventable, it is hoped that with close cooperation of gynecologists, pediatricians and

dieticians along with training of mothers, the number of such incidences would be minimized.

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