Fetal Macrosomia at a Tertiary Care Centre in Lagos, Nigeria.

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ABSTRACT

Background: Large babies have attracted immense attention as they present obstetric problems with associated increase in perinatal morbidity and mortality. The major risk of fetal macrosomia is trauma to the fetus and mother during vaginal delivery.
Objective: To compare the outcome of macrosomic babies with babies of normal birth weights.
Methods: This was a retrospective comparative study of deliveries over a period of two years from 1st August 2005 to 31st July 2007.
Results: There were 198 macrosomic babies (6.9%) out of a total of 2,879 deliveries that occurred within the study period. Majority of the mothers were multiparous; para 2 to 4 (47.5% in the study group and 33.7% in the control group). Emergency Caesarean Section (EMCS) rate in the study group was 44.4% while it was 25.3% in the control group and this was statistically significant (p value <0.001). In this study the maternal injuries in the study group were not significantly higher than the control group. The fetal morbidity and mortality in the study group was significantly higher than the control group both with p values <0.001.
Conclusion: Fetal macrosomia is associated with high morbidity and mortality in this centre, there is a need to identify pregnant women at risk as well as adequate counseling of possible interventions and outcomes.

Keywords: Incidence, fetal and maternal outcome, fetal macrosomia.

INTRODUCTION

Macrosomia signifies newborn with excessive birth weight and it has no universally accepted definition. It is however generally accepted as birth weight of 4kg to 4.5kg or more regardless of gestational age [1] and based on this definition; macrosomia affects 1% to 10% of all pregnancies. [2,3,4] Males generally weigh more than females at birth and it has also been reported that Hispanic women have a higher risk of fetal macrosomia than Caucasians, African Americans and Asian women.[5,6] Genetic factors like height and weight of parents also influence the birth weight of the new born as well as metabolic factors like diabetes mellitus.[5] Macrosomic babies are at increased risk of shoulder dystocia, traumatic injury and birth asphyxia while their mothers are at increased risk of genital lacerations and postpartum haemorrhage.[3,4,5] No combination of risk factors can accurately predict macrosomia for clinical usage, also attempt at perinatal diagnosis has proven difficult and often inaccurate.[5] Ultrasound scan has not been any better as errors of 10% to 15% has been reported even in skilled hands which range from 300 to 550 gms error.[4] Ultrasonic diagnosis of macrosomia has a sensitivity of 24% to 88% and a specificity of 60% to 98%.[6]

The definitive diagnosis of fetal macrosomia can only be made by measurement of the birth weight after delivery. [5,6,7] This retrospective weight confirmation has also led to no consensus regarding the most appropriate mode of delivery which is influenced by many factors including the accoucheur's bias, patient's preference as well as the medico-legal situation in the country of practice.[2,4] Caesarean Section has been advocated for estimated fetal weight of 4.5kg or more with the hope of reducing fetal and maternal morbidity and mortality. This has however been criticized as being empirical and controversial in the absence of randomized controlled trial to that effect.[2,3,8] This study was designed to evaluate the outcome of pregnant women with fetal macrosomia in our centre where vaginal delivery is usually the first choice of mode of delivery except obstetrically contraindicated.

MATERIALS AND METHODS

This was a retrospective comparative study of all macrosomic deliveries from 1st of August 2005 to 31st of July 2007 at Lagos University Teaching Hospital, Lagos. A birth weight of ≥4000g was defined as macrosomia. Two controls were taken for each macrosomic baby, singleton deliveries just before and immediately after an index macrosomic delivery, weighing 2500-3999g were used as controls, this was done to eliminate bias that may occur if the control group only comprises of singleton deliveries just before or immediately after a macrosomic delivery. The data were extracted from the case records of these patients. Data was analyzed using the Epi-Info 7 version; categorical variables were compared using chi square and Fisher's exact test as appropriate while continuous variables were compared using t-test. A p of < 0.05 was considered as statistically significant.

RESULTS

There were 198 macrosomic babies amongst 2,879 deliveries during the study period giving an incidence of 6.9%. One hundred and ninety eight macrosomic babies made up the study group while three hundred and ninety six babies were control group. Four case notes from the control group had incomplete data hence was not used. Majority of the mothers from the study group and control group were within ages of 30-34 years, while the mean age for the study group was 31.4 ± 4.4 years, the mean age for the control was 30.5 ± 4.4 years (table 1), this was not statistically significant. Majority of the mothers from the two groups were booked (study group: 90.9%, control 91.3%). The mean birth weight was 4.3 ± 0.3kg for macrosomic babies (range 4.0 - 6.4kg) and 3.2 ± 0.4kg for the control group (range 2.5 - 3.9kg) and this was statistically significant p <0.001.
Most of the mothers from the two groups were multiparous

(Parity 2 to 4). Pregnancy was generally carried to term in both groups with macrosomic fetus being more likely to be post-term which was statistically significant with ($p < 0.001$) as shown in table 1.

Table two revealed that the macrosomic babies were more likely to be delivered by emergency caesarean section (study group- 44.4% ,control-25.3%) with a *p* value of less than 0.001.Ironically there was no significant difference between maternal morbidity and mortality in the study group and control group in this study as demonstrated in table three. No maternal death occurred in the two groups. Table three showed the maternal injuries that occurred at delivery.

Table four compared the fetal complications in the two groups, revealing a single episode of shoulder dystocia which occurred in the study group. Macrosomic babies were more likely to be asphyxiated and more likely to be admitted into the special care baby unit and these were statistically significant ($p < 0.001$). Macrosomic babies were also more likely to result in perinatal deaths when compared to the control group and this was also statistically significant ($p < 0.001$). The perinatal mortality for the study group was 66 per 1000 births having 13 (6.6%) deaths in the study group while perinatal mortality for the control group was 13 per 1000 births having 5 (1.3%) deaths. The Major cause of deaths was birth asphyxia which occurred more in the study group and was significant with a p value of less than 0.001. Some fetuses were already macerated, some were fresh still birth and there was a case of congenital anomaly- anencephaly in the control group.

Table five demonstrates that macrosomic babies delivered by elective caesarean section and spontaneous vaginal delivery had better outcome than those delivered by emergency caesarean section, assisted breech delivery and instrumental deliveries with most of the babies having apgar scores greater than seven in the first minute of life, p value was 0.000182, as well as the fifth minute of life, p value <0.00001. Table six shows that in the control group, the babies delivered by elective caesarean section and spontaneous vaginal delivery also had better outcome than those delivered by emergency caesarean section, assisted breech delivery and instrumental deliveries with most of the babies having apgar scores greater than seven in the first minute of life, p value was 0.008693. At the fifth minute of life, there was however no significant difference in the different modes of delivery with respect to apgar scores greater than seven.

There were 6 (3.03%) mothers with diabetes mellitus in the study group and 3 (0.77%) mothers with diabetes mellitus in the control group and was statistically significant (Fisher exact chi square 25.2421; $p = 0.0426$)

The macrosomic babies had a total of 135 males (68.2%) and 63(31.8%) females while for the control group there was no much difference in the male to female ratio: 206 (52.6%) males and 186 (47.4%) females. There are significantly more males among the macrosomic babies compared to babies of normal weights ($p = 0.000397$).

Table 1
Obstetric Characteristics of mothers of cases and controls

Characteristic	Macrosomic group (n = 198) (%)	Control group (n = 392) (%)	Chi-square	P
Age (years)				
<25	8 (4.0)	31 (7.9)	5.26	0.26
25-29	61 (30.8)	130(33.2)		
30-34	83 (41.9)	160(40.8)		
35-39	41 (20.7)	61 (15.6)		
≥40	5 (2.5)	10 (2.6)		
	Range = 19- 46; Mean = 31.4 ± 4.4 years	Range = 19- 43; Mean = 30.5 ± 4.4 years		
Booking Status				
Booked	180 (90.0)	358 (91.3)	0.03	0.866
Unbooked	18 (9.1)	34 (8.7)		
Parity				
0	46 (23.2)	140 (35.7)	13.15*	0.0043
1	55 (27.8)	113 (28.8)		
2-4	94 (47.5)	132 (33.7)		
>4	3 (1.5)	7 (1.8)		
Mean Parity	1.6 ± 1.4	1.3 ± 1.3		
GA at delivery				
Preterm	7 (3.5)	8 (2.0)	17.22	<0.001
Term	141 (71.2)	335 (85.5)		
Postterm	50 (25.3)	49 (12.5)		

*** Fisher's test**

Table 2
Mode of Delivery

Mode of Delivery	Macrosomic group (%)	Control group (%)	Fisher's test	P
SVD	90 (45.5)	243 (61.9%)	27.102	0.001
EMCS	88 (44.4)	99 (25.3)		
ELCS	14 (7.1)	44 (11.2)		
Assisted breech	3 (1.5)	1 (0.3)		
Forceps	3(1.5)	5 (1.3)		
Total	198 (100.0)	392 (100.0)		

Key: SVD= spontaneous vaginal delivery; EMCS= emergency caesarean section ELCS= elective caesarean section

Table 3
Injuries sustained at Delivery

Maternal Injuries	Macrosomic group (%)	Control group (%)	Fisher's test	P
Bruises	2 (7.4)	6 (10.7)	0.5478	0.761
First degree laceration	22 (81.5)	46 (82.1)		
Second degree laceration	3 (11.1)	4 (7.2)		
Total	27 (100.0)	56 (100.0)		

Table 4
Fetal Complications

Complications	Macrosomic group (%)	Control group (%)	Chi-square	P
Shoulder dystocia				
Yes	1(0.5)	0(0)	1.9832*	0.159
No	197(99.5)	392(100.0)		
Total	198(100.0)	392(100.0)		
Death				
Yes	13(6.6)	5 (1.3)	12.45	<0.001
No	185(93.4)	387(98.7)		
Total	198(100.0)	392(100.0)		
Admission to SCBU				
Yes	21(10.7)	9 (2.3)	18.824	<0.001
No	177(89.3)	383(97.7)		
Total	198(100.0)	392(100.0)		
Asphyxia (1st minute of life)				
Yes	65(32.8)	51(13)	32.71	<0.001
No	133(67.2)	341(87)		
Total	198(100.0)	392(100)		

***Fisher's test**

Table 5
Apgar score by mode of delivery of cases

Apgar Score (1st minute)	**0-3**	**4-5**	**6-7**	**8-10**	**Total**
SVD	2	3	14	71	90
EMCS	11	6	22	49	88
ELCS	0	0	2	12	14
Assisted breech	2	0	1	0	3
Forceps	0	1	1	1	3
Total	**15**	**10**	**40**	**133**	**198**

Fisher's test = 37.5481
P value = 0.000182

Apgar Score (5th minute)	**0-3**	**4-5**	**6-7**	**8-10**	**Total**
SVD	2	0	2	86	90
EMCS	9	0	4	75	88
ELCS	0	0	0	14	14
Assisted breech	1	1	0	1	3
Forceps	0	0	1	2	3
Total	**12**	**1**	**7**	**178**	**198**

Fisher's test = 85.1901
P value < 0.00001

Table 6
Apgar score by mode of delivery of control

Apgar Score (1st minute)	**0-3**	**4-5**	**6-7**	**8-10**	**Total**
SVD	5	3	14	221	243
EMCS	4	4	14	77	99
ELCS	0	0	4	40	44
Assisted breech	0	0	0	1	1
Forceps	1	0	2	2	5
Total	**10**	**7**	**34**	**341**	**392**

Fisher's test = 26.6436
P value = 0.008693

Apgar Score (5th minute)	**0-3**	**4-5**	**6-7**	**8-10**	**Total**
SVD	3	1	4	235	243
EMCS	3	0	0	96	99
ELCS	0	0	0	44	44
Assisted breech	0	0	0	1	1
Forceps	1	0	0	4	5
Total	**7**	**1**	**4**	**380**	**392**

Fisher's test = 14.6237
P value = 0.262665

DISCUSSION

The incidence of macrosomic babies was found to be 6.9% in this study which is higher than 2.9% [9] found in Jos and 4.9% [10] found in an earlier study in Lagos but not as high as 9.2% [4] in America. Most studies done on macrosomic babies showed majority of the mothers were multiparous which was the case for this study, also the mothers tended to be more of 30 years and above in age.[10,11]
There were six mothers with diabetes mellitus in the study group, while the control group had three mothers that was diabetic which is significant (p=0.0426), this trend is similar to studies done else where.[5,10] This can be attributed to the continous hyperglyceamic state which in turn leads to improportionate excessive growth of the fetus with excess deposition of fats in the shoulder, limbs and viceral sparing the head hence causing complications at delivery. Thus routine screening in mothers with diabetes mellitus and gestational diabetes mellitus is necessary in other to have a well planned delivery programme.
Macrosomic babies were more likely to be delivered as postterm deliveries, 50 (25.3%) for the study group while the control had 49 (12.5%) which was statistically significant with p value less than 0.001.

The incidence rate for caesarean section delivery was 88 (44.4%) for emergency ceasarean section and 14 (7.1%) for elective caeserean section in the study group while in the control group 99 (25.3%) had emergency caesarean section and 44 (11.2%) had elective ceasarean section. This was also significant statistically especially with emergency caesarean section. The emergency caesarean section were mainly performed for obstructed labour, failure to progress in labour, fetal distress and cephalopelvic disproportion. Babies delivered by ceasarean section generally had higher weight while as expected, babies with weight within normal range were mostly delivered by spontaneous vaginal deliveries. Hence the recommendation of caesarean section for suspected babies with weight above 4500g especially diabetic mothers and non diabetic mothers with suspected babies with weight above 5000g.[2,6,8] The high rate of caesarean delivery in this study is similar to other studies.[2,9]

The fact that macrosomic babies delivered by elective caesarean section and spontaneous vaginal delivery had more babies with the fifth minute apgar scores greater than seven that was statistically significant when compared with other modes of delivery has far reaching implications. This may be a pointer to the fact that macrosomic babies with birth asphyxia respond less favourable to resuscitation when compared to those without birth asphyxia. Thus macrosomic babies are more likely to have more serious morbidities and complications from difficult deliveries and as such it is necessary to prevent intra-partum asphyxia especially in macrosomic babies.

Contrary to expectation this study showed no significant disparity in the injuries sustained by the mothers in both groups. On the other hand as expected from previous studies done, fetal complications were more in the study group compared to the control. There was a single case of shoulder dystocia in the study group and none in the control group. Perinatal mortality and morbidity was higher in the study group. These infants are at increased risk for shoulder dystocia, traumatic injury, and birth asphyxia. There were more cases of asphyxia and special care baby unit admissions in the study group which was statistically significant with p value of less than 0.001, this emphasises the predilection of macrosomic babies to complications.

CONCLUSION

This study has shown that macrosomia with predeliction for male babies, is an essential factor to be considered in reducing perinatal mortality and morbidity. Hence the importance of the obstetricians' high index of suspicion and skill in diagnosing suspected fetal macrosomia in order to abate the mortality and morbidity to both mother and child , and promote live healthy baby and mother at the end of pregnancy and delivery.

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