LARGE SIZED BABY & DIABETES†

by

AJIT C. MEHTA,* M.D.

Summary

The problems of LSB and diabetes do exist either separately or combined. There is need to establish more definitely and more frequently the presence of maternal diabetes particularly in the third trimester to improve perinatal results in India, and this can be done now, even after delivery by estimation of glycosylated haemoglobin. Several maternal indications like obesity, multiparity, history of previous large sized babies, and postmaturity, should be taken for performing GTT. There is no gainsaying that history of previous diabetic pregnancy and history of diabetic (immediate) relative are unquestionable indications. The problems of LSB and maternal diabetes should be anticipated rather than accidentally detected.

The association of diabetes in pregnancy to the large sized baby (LSB) is well known. It has been recently emphasised (Stubbs *et al*, 1981) that hyperglycaemia in the third trimester of pregnancy is responsible for the deposition of excess subcutaneous fat in new born and hence there is increased birth weight. There is evidence to suggest (Stoetsteel *et al*, 1981) that mothers who have big babies may have had abnormal glucose tolerance during late pregnancy, and many of these mothers may be suffering from gestational diabetes. Detection of these cases after delivery has become possible in cases of LSB by estimation of glycosylated haemoglobin (Hb. A1 c) on first or second day of delivery.

The incidence of LSB and that of diabetes, and also their inter-relationship has not been shown specifically in India on many occasions. The association of several maternal characteristics with these conditions has not been spelt out well. The data on maternal and paternal hereditary influences in relation to diabetes is hardly available.

In this presentation the above factors have been studied amongst 1222 consecutive deliveries in private patients.

Material and Methods

A total of 1222 deliveries gave rise to 1235 births (1.06% twin pregnancy). All new borns with birth weight of 3800 grams and more (above the 94th percentile) were considered as LSB. All patients in whom glucose tolerance test was performed and in whom definite diabetic curves were obtained were classified as pregnancy diabetics and included both known cases of diabetes as well as gestational diabetes. In addition were included those cases in whom there was evidence of abnormal glucose levels at more than one reading. For example, when any value of glucose exceeded by 10 mg. over the maximum expected for that particular time or when the difference between the

Hospital for Women Care, 2nd Dadyseth Road, Bombay 400 007.

(†*Lecture delivered at a symposium on Diabetes and Pregnancy, to members of The Bom-OBS & GYN Society, 10th April* 1983).

Accepted for publication on 12-5-83.

fasting value and that of two hours post-glucose was more than 40 mg. it was considered as abnormal. These were cases of glucose intolerance during pregnancy. For the performance of GTT, oral glucose was administered on the basis of 1.5 G. per kilogram body weight.

Results

Rates

A total of 1222 deliveries/1235 births gave 52 LSB (4.21%). Abnormal glucose tolerance curves were detected among 46 women during pregnancy (3.76%). 6 of these (0.49%) were known diabetics, 21 had gestational diabetes (1.72%) and, 19 had unclassified carbohydrate intolerance (1.55%).

In other words, of the 46 cases of abnormal glucose values, one in 7, namely 13.04%, had known (true) diabetes mellitus, 46 per cent had gestational diabetes. and the remaining 41 per cent had only CHO intolerance.

Association of LSB and diabetes

Only 40 (76.92%) of the 52 mothers with LSB had GTT performed. Eight of them (15.38%) had abnormal glucose curves. Out of the 46 cases of 'diabetes', 8 had LSB (17.39%). This latter incidence is four times that of the overall population. The detailed birth weight distribution of the 46 cases is shown in Table I. Since all these 46 cases had 'controlled diet' and 6 of them in addition had insulin therapy, it is likely that the birth weights got automatically reduced and most of the babies had average birth weights. Moreover, some cases were induced and these inductions may have contributed to the above fact.

Of the 7 babies with low birth weight, 1 had preterm labour and 3 had hypertensive mothers to explain the LBW. It could be that in the other 3 diabetes caused IUGR.

Maternal Characteristics

(a) *Multiparity:* Of the total of 1222 deliveries, 645 (52.78%) were multiparous. Amongst the 44 LSB group, 29 (65.41%) were multiparous, and in the 8 cases in which there was also diabetes, none was nulliparous.

Of the 38 pregnant diabetic mothers, 29

TABLE I

Birth Weight Distribution in the 46 Cases of Diabetes

Type of diabetes	Number	LSB	Heavy baby	Average size	LBW
		3800 G. plus	3400-3750 G.	2500-3350 G.	Less than 2500 G.
Known diabetic	6 13.04%	1 16.67%	1 16.67%	4 66.66%	nil
Gestational diabetic	21 45.65%	4 19.03%	5 23.80%	8 38.10%	4 19.05%
Abnormal glucose Curve	19 41.31%	3 15.79%	3 15.79%	10 42.63%	3 15.79%
Total	46 100%	8 17.39%	9 19.57%	22 47.83%	7 15.21%

(76.32%) had one or more previous child. Thus the association of parous women with both the LSB and diabetes is outstanding.

(b) *Obesity*: The association between obesity on one hand and the LSB and the diabetes on the other was distinct. The incidence of obesity rose progressively from 24.88% in the study population to 34.09%, in the LSB, 36.84% in the diabetics and to 75.00% in patients who had LSB plus diabetes.

(c) *History of previous large babies and previous diabetes*: Considering only the parous women in both the LSB and the diabetic group, it was noted that in the former 15 out of 38 (39.47%), had histories of begetting LSB in the previous pregnancies, while in the latter, 5 out of 37 (13.16%), had histories of large babies. History of previous diabetes was obtained in only 2 of the LSB group (4.54%), and in 11 of the 38 (28.95%) of the diabetics. The repetitious nature of LSB is marked and the frequency of abnormal glucose tolerance is striking in the respective groups.

(d) *Postmaturity*: The overall postmaturity (40 weeks and 10 days complete) incidence was 8.1 per cent, 99/1222. It was noted in 10 of the 44 LSB (22.73%) and in only 1 of the 38 diabetic patients. No postmaturity was recorded in the 8 cases of LSB plus diabetes. Thus, frequency of postmaturity in LSB was significant. There was no case of preterm labour in the LSB group, while 2 preterm deliveries occurred in the diabetic group.

(e) *Hydramnios, Hypertension, and anaemia*: The incidence of hydramnios was no greater amongst the LSB and the diabetic groups than the overall incidence of 2.69 per cent. It was significantly elevated when the combination of LSB and diabetes was present (12.50%).

In the LSB group, hypertension was noted in less than ½ of the cases in the total population under study (10.22%). Hypertension was noted in 5/38 (13.16%) of the diabetics and in ⅛ of the combined group (12.5%). Thus hypertension was not particularly more frequently associated with LSB or diabetes.

Anaemia was present in fewer cases of LSB (20.45%) and also of diabetes (10.53%) when compared to its prevalence in the total cases (31.51%). Even in the combined group of LSB plus diabetes, anaemia had occurred in 25.00 per cent.

Family History of diabetes mellitus

Amongst the total of 1222 patients, 597 (48.85%) had known of the existence of diabetes mellitus in their family members. Table II gives the detailed breakup. It was interesting to note that, though direct relatives of patients had suffered from diabetes in majority, and there was definite linear increas as one progressed in categories, many members of husbands' family had diabetes too. Even 9 husbands themselves had diabetes mellitus. There was no evidence from this study that hiistory of diabetes in husband's family bore any significance to LSB or diabetes in patient.

It must be however said that in the 8 cases of LSB + diabetes, presence of diabetes was known to have in family of every patient.

Modes of delivery

Two modes of delivery are particularly considered.

Induction of Labour: A mean induction rate for 1222 deliveries was 18.49 per cent. It had increased to 23.26% and 27.03% for the groups of LSB and diabetes respectively. None was however

TABLE II

History of Diabetes Mellitus in Families of the Various Categories of Patients

Categories	Total Diabetics		Pt.s' Fanily		In In-Laws		Distant Relative	
	No.	%	No.	%	No.	%	No.	%
Overall N = 1222	597	48.85	380	31.10	175*	14.32	42	03.44
L.S.B. N = 44	19	43.18	15	34.09	4	9.09	—	—
Diabetic N = 38	23	60.53	20	52.63	3	7.89	—	—
LSB + Dia. N = 8	8	100.00	7	87.5	1	12.50	—	—

* Nine husbands had diabetes.

induced of the 8 patients who had LSB + diabetes.

Caesarean Section operation: Table III shows the rate of caesarean sections in the various groups under study. The rates were significantly more amongst all groups when compared with the general rate. It had risen very sharply with the combination of LSB and diabetes. It is seen that caesarean section was preferred to induction in the latter situation.

Perinatal Results

Mortality: There was no still-birth in any of the study groups. There was a case each of neonatal death in the 44 of LSB, 38 of diabetes, and in 8 with LSB plus diabetes, giving perinatal mortality rates of 22.72, 26.32 and 125 per 1000 respectively. The perinatal mortality rate was 21.87 (27 deaths in 1235 births) in the overall cases with a neonatal mortality of 12.15 per 1000.

One neonatal death in the LSB was due to congenital cyanotic heart disease and the other 2 deaths in the study groups had intranatal causes.

IUGR: Intrauterine growth retardation was noted in 6 of the 38 diabetic cases. In 3 of them, hypertension was responsible for the IUGR, and in the other 3 diabetes could have caused IUGR.

Other perinatal results: In the large LSB group, a new born suffered from spells of hypoglycaemia with cyanosis within few hours of birth, to recover later after intravenous therapy.

In the diabetic group, a baby had neonatal asphyxia temporarily. There was no other unfavourable perinatal outcome

TABLE III

Showing the Caesarean Rates in the Various Groups

Groups	Total No.	Caesarean Section No.	%
All Cases	1222	181	14.80
LSB	44	11	25.00
Diabetics	38	0	21.05
LSB + Diabetes	8	4	50.00

during the neonatal period in any of the groups.

Discussion

The problems of Large Sized Babies—macrosomy—and diabetes in pregnancy in a private practice in Bombay seem to be higher than generally quoted in India, (Dawn, 1982) and appear close to incidences in UK.

Moses (1983) stresses the need, in clinical pregnancy diabetology, to consider with equal significance all known diabetics, the gestational diabetics, and all mild carbohydrate intolerances (isolated abnormal GTT and isolated random blood sugar abnormality), and to treat them as fully as a known diabetic till pregnancy. The latter group is named, according to him as unclassified "Impaired glucose tolerance". There is therefore an urgent need in all our large hospitals to carry out GTTs in many more patients than is done. It is likely that perinatal results would improve if this is done.

The close association between LSB and maternal diabetes, as accepted as above, on one hand and several maternal factors like multiparity, obesity, history of previous LSB and earlier diabetes has been distinctly noted from the study. History of diabetes in patients' families in all groups with LSB and diabetes in pregnancy is remarkable. It has been suggested (Moses, 1983) that when no cause is found for LSB in any case, paternal diabetes should be looked for. The study did not reveal any closeness between the two, however.

The coventional oral GTT is still a good test to bring out carbohydrate metabolism abnormalities in pregnancy. It is indicated that often more than one GTT is required to be done during pregnancy. Though in this study the quantity of oral glucose administered at GTT was calculated on patient's weight, it has been argued that, for sake of uniformity, all GTTs in the third trimester of pregnancy should be carried out after 100 gms. of oral glucose and the readings should be taken upto three hours (As per WHO recommendation).

Estimation of glycosylated haemoglobin will show in retrospect many maternal diabetics in all cases of macrosomy, if performed within few days of birth. Whenever there is a suggstion from past obstetric history or from clinical examination in early pregnancy, of diabetes during pregnancy, it may be advisable to estimate Hb.A1c in the first trimester to reveal a known diabetic.

Induction of labour as a method of management in LSB group and in maternal diabetics was practiced more frequently in the present study. In fact, the author has often induced patients in anticipation of LSB at term. This practice has helped to reduce the number of mechanical dystocia and asphyxia cases.

The rates of caesarean sections have doubled in cases of LSB and maternal diabetics. The rates rose steeply in cases when both these conditions co-existed. This seems to be an accepted trend every where (Goyal and Mukerjee, 1980 and Sikdar *et al*, 1980).

It was gratifying that there was no case of still birth among the cases under study. Of the 3 neonatal deaths, only 1 was avoidable. A case of congenital cyanotic heart disease was too bad. Another one had delivered prematurely at 33 weeks

due to premature rupture of membranes. A case of hypoglycaemia in the new born had manifested with spells of cyanosis; the necessity to look for metabolic and electrolyte abnormalities in the newborn is emphasised.

References

1. Dawn, C. S.: Postgraduate Obstetrics and Gynaecology. Orient Longman, 1982.
2. Goyal, U. and Mukherjee, S. J.: J. Obstet. Gynaec. India. 30: 241, 1980.
3. Mises, S. G. P.: Personal Communication, Madras Medical College, 1983.
4. Sikdar, K., Dutta, J. and Roy Chaudhary. N. N.: J. Obstet. Gynaec. India. 30: 235, 1980.
5. Steel, J. M., Thompson, G. D. and Smith, A. F.: Brit. Med. J. 282: 357, 1981.
6. Stubbs, S. M., Leslie, R. D. G. and John, P. N.: Brit. Med. J. 282: 439, 1981.