

STUDY OF MORBIDITY AND MORTALITY PATTERN IN INFANTS BORN TO DIABETIC MOTHERS

By

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SUMMARY

Neonatal outcome of 49 infants born to diabetic mothers was determined in this study. 21 babies were born to known diabetic women (IDM) and 28 belonged to IGDM. The neonatal mortality of 122.4/1000 was significantly higher in IDM and unsupervised pregnancies as compared to that in IGDM and supervised pregnancies respectively. Neonatal jaundice, hypoglycemia and respiratory distress were main problems in babies.

Introduction

Diabetes whether overt or gestational, not only adds to maternal risks but also gravely jeopardises the newborn by making it susceptible to a number of metabolic and other complications. Some of these include peculiar body composition leading to increased weight at birth, birth trauma and birth asphyxia, respiratory problems, developmental defects and metabolic problems such as hypoglycemia, hypocalcemia and hyperbilirubinaemia. This presentation highlights the specific problems of infants of diabetic mothers (IDM) and gestational diabetic mothers (IGDM) in an Indian hospital with level II care facilities and delivery rate of over 10,000 annually.

Material and Methods

Forty nine infants born to diabetic mothers at Smt. Sucheta Kriplani Hospi-

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tal, New Delhi comprised the study group. Those pregnant diabetic women who were attending antenatal clinic were admitted in late pregnancy and their diabetic state controlled as far as possible. Fetal monitoring was done by DFMC, Non Stress Test, ultrasound examination and repeated clinical examination. Delivery was planned either by induction of labour or by Caesarean Section when fetal pulmonary maturity was considered appropriate. No case was allowed to go beyond expected date of delivery. Delivery in all cases was attended by a pediatric resident and babies were cared for in the special care level II neonatal nursery, where they were observed for morbidity and given appropriate therapy for any problems till discharge or death.

Criteria for Neonatal morbidity were as follows:

1. *Hypoglycemia:* Blood sugar below 20 mg/dl in low birth weight, < 30 mg/dl in term babies below 72 hours of age and < 40 mg/dl after that.

2. *Respiratory Distress:* Respiration rate > 60/min after 3 hours of age or

lower R/R associated with groaning, grunting, retraction and irregularity.

(a) *Hyaline membrane disease (HMD)*: Onset of respiratory distress within 3 hours of birth, gradually increasing R/R till 24 hrs of age associated with increased O₂ requirement and radiological evidence at 24 to 48 hours.

(b) *Transient tachypnoea of Newborn (TNB)*: Onset of resp. distress within 3 to 8 hours of age which increased during next ten hours and resolved by 2 days age. Radiology at 24 hours is diagnostic of the condition.

3. *Birth Asphyxia*: Apgar Score at 1 min < 6.

4. *Hyperbilirubinemia*: Serum bilirubin > 12 mg/dl.

5. *Septicemia*: Positive blood culture along with clinical picture of septicemia.

Results and Discussion

Out of 49 infants of diabetic mothers, 21 were born to mothers with pre-existing overt diabetes (IDM) and 28 babies were born to those who developed glucose intolerance during pregnancy as evidenced by oral glucose tolerance test using the criteria for diagnosis suggested by O'Sullivan and Mahas (1964).

The incidence of live infant born to

mother with diabetes in our study was only 1 in 900 births which is significantly lower than other Indian studies Krishna *et al* 1969, Gun and Chakraborty, 1976). A normal GTT in early pregnancy may become abnormal later on in some high risk subjects, so GTT needs to be done routinely even in late pregnancy. Impact of intensive screening to detect gestational diabetes in high risk pregnancies at PGIMER, Chandigarh was reflected as increase in hospital incidence of gestational diabetes from 0.53 per cent (1971-74) to 1.88 per cent (1977-80) (Agarwal and Gupta, 1982). Almost 60 per cent of births in our hospital were among women with poor antenatal care and thus lacked rigid check to detect gestational diabetes in last trimester. This could account for lower incidence of IDM and IGDM.

Mean birth weight and gestational age of IGDM and IDM was similar in our study (Table I). As majority of patients were booked cases and admitted to hospital before delivery, the mean birth weight was only 300 gm more than the general births in hospital. The incidence of large for date babies (< 2 SD) was only 16% and was similar in IDM and IGDM, others have reported an incidence of 25% to 41.4% (Krishna 1969; Agarwal and Gupta, 1983).

TABLE I
Distribution of Cases According to Type of Maternal Diabetes

	IDM (21)	IGDM (28)
Mean Birth weight (Kgm)	3.28 (Range 1.7-4.7)	3.22 (Range 2.3-3.5)
Mean gestation (weeks)	38.61	38.83
Hospital stay (Days)	7.1	7.42
Neonatal Deaths (%)	23.8 (5)	3.5 (1)

Absence of post-term babies in diabetics in the present study in contrast to the incidence of 13.8 per cent reported by Vishwanathan *et al* (1961) probably reflects our hospital policy of terminating all diabetic pregnancies by their expected date of delivery. However, there was no case of iatrogenic prematurity. In our study 55 per cent of deliveries were by caesarean section with no birth trauma in any case. 32.7% of cases had elective caesarean section. Other Indian workers have also reported a caesarean section incidence of 22.5 to 68.8% (Gun *et al* 1970).

Forty nine babies were born to 45 diabetic women; 4 had two deliveries each. As shown in Table II, 34 multigravida mothers had 86 past pregnancies, only 39.5% of these had resulted in live births, similar to the experience of Gun *et al* (1976). A total of 6 neonates had a fatal outcome in the present study i.e. 122.4/1000 neonatal mortality rate (NNMR). All cases were booked with strict diabetic control and level III neonatal care. NNMR in IDM's was noted to be significantly higher than in IGDM's (238/1000 Vs 35.7/1000). Further, NNMR in the supervised pregnancies

was 51.2/1000 which is significantly less than in unsupervised cases i.e. 300/1000. Similar results were reported by Agarwal and Gupta (1982, 83).

TABLE II
Fast Obstetric Outcome in 34 Multigravida Women

	No.	%
Alive children	34	39.5
Still Births	12	13.9
Abortion	30	34.9
Neonatal death	7	8.1
Later death	3	3.5
Total	86	100

Average No. of pregnancies/women = 2.53

Hyperbilirubinemia, hypoglycemia and respiratory problems were three common problems observed in 42.86%, 28.57% and 36.73% of babies respectively (Table III). Hypoglycemia, hyperbilirubinemia and hyaline membrane disease were more frequent in IDMs; TTNB had a higher incidence in IGDM. No major malformation was noted by us.

To conclude, the findings of the present study support increased perinatal risk of undetected or untreated gestation and overt diabetes. All pregnant women should be screened for glucose tolerance

TABLE III
Neonatal Morbidity According to Diabetic Status of Mother

	IGDM (N=28)	IDM (N=21)	Total (N=49)
Birth asphyxia (1 min Apgar<7)	5 (17.86)	5 (23.8)	10 (20.4)
Hypoglycemia	5 (17.86)	9 (42.9)	14 (28.57)
Hyperbilirubinemia	8 (28.56)	13 (61.9)	21 (42.86)
HMD*	1 (3.6)	4 (19.05)	5 (10.2)
TTNB**	10 (35.7)	4 (14.3)	13 (26.53)
Septicemia***	4 (14.3)	6 (28.6)	10 (20.4)
Cong. malf. (minor)	—	2 (9.5)	2 (9.5)

* Hyaline membrane disease (HMD).

** Transient tachypnea of newborn (TTNB).

*** +ve Blood culture.

because selective screening based in clinical attributes or obstetric history has been shown to be inadequate (Gabbe, 1986); and management needs a team approach by physicians, obstetricians and neonatologist for optimum perinatal outcome.

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TABLE III

Sexual Maternity according to Gestational Age at Birth

Year	MDM	MDM
(n=10)	(n=10)	(n=10)
(1980) 10	1 (10%)	1 (10%)
(1981) 10	1 (10%)	1 (10%)
(1982) 10	1 (10%)	1 (10%)
(1983) 10	1 (10%)	1 (10%)
(1984) 10	1 (10%)	1 (10%)
(1985) 10	1 (10%)	1 (10%)
(1986) 10	1 (10%)	1 (10%)
(1987) 10	1 (10%)	1 (10%)
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(2001) 10	1 (10%)	1 (10%)
(2002) 10	1 (10%)	1 (10%)
(2003) 10	1 (10%)	1 (10%)
(2004) 10	1 (10%)	1 (10%)
(2005) 10	1 (10%)	1 (10%)
(2006) 10	1 (10%)	1 (10%)
(2007) 10	1 (10%)	1 (10%)
(2008) 10	1 (10%)	1 (10%)
(2009) 10	1 (10%)	1 (10%)
(2010) 10	1 (10%)	1 (10%)
(2011) 10	1 (10%)	1 (10%)
(2012) 10	1 (10%)	1 (10%)
(2013) 10	1 (10%)	1 (10%)
(2014) 10	1 (10%)	1 (10%)
(2015) 10	1 (10%)	1 (10%)
(2016) 10	1 (10%)	1 (10%)
(2017) 10	1 (10%)	1 (10%)
(2018) 10	1 (10%)	1 (10%)
(2019) 10	1 (10%)	1 (10%)
(2020) 10	1 (10%)	1 (10%)