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ORIGINAL ARTICLE

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Hypothyroidism in pregnancy: Is universal screening needed?

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OBJECTIVE(S): To determine the maternal and fetal outcomes in hypothyroid pregnant women and to decide whether universal screening of pregnant women for hypothyroidism is required.

METHOD(S): A retrospective analysis of 161 cases of hypothyroidism complicating pregnancy, over a period of 2 ½ years from January 2002 to June 2004 was done. The incidences of maternal complications and fetal outcome in these pregnancies were calculated and compared with those in women with diabetes complicating pregnancy, an endocrine disorder which has universal screening recommended in pregnancy. Chi square test was used for statistical analysis.

RESULTS: The incidences of maternal complications in hypothyroid and diabetic pregnant women were similar. The incidence of low birth weight babies was increased and there were nine perinatal deaths among hypothyroid women compared to only one stillbirth in the diabetes group.

CONCLUSION(S): Hypothyroidism in pregnancy is associated with incidence of maternal complications similar to that in diabetes complicating pregnancy but has a much higher perinatal mortality rate. Hence screening for hypothyroidism in pregnancy is recommended.

Key words: hypothyroidism, screening during pregnancy

Introduction

Screening is defined as the application of a test to detect a potential disease or condition in a person who has no known signs or symptoms of that condition at the time the test is done. The presence of the condition, however, should have proven adverse effects which can be prevented by early detection and treatment.

Thyroid diseases are the commonest endocrine disorders affecting women of reproductive age group [1], and hence constitute the commonest endocrine disorder complicating pregnancy. In women the incidence of hypothyroidism diagnosed before pregnancy is 1% [1]. Maternal and fetal complications have been found to be higher in this population [2,3]. The aim of our study was to determine the incidence of hypothyroidism complicating pregnancy and its associated maternal and fetal complications. With the evidence provided by these results we wanted to determine whether hypothyroidism fitted into a condition warranting routine screening in pregnancy.

Methods

This was a retrospective observational study done over 2 ½ years from January 2002 to June 2004. The total number of hypothyroid pregnant women was 161. These were all diagnosed before pregnancy and were on thyroxine replacement. The incidences of maternal problems in the form of hypertensive disorders, presence of diabetes mellitus, placental abruption, and any other medical disorder complicating pregnancy were determined. The fetal outcomes studied were birth weights, perinatal deaths, perinatal mortality rate, incidence of congenital anomalies, and the incidence of small for gestational age and large for gestational age babies. For comparision, 139 women with

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diabetes complicating pregnancy were taken as controls and the same outcomes were determined. We chose diabetes mellitus since it is another endocrine condition for which routine screening is now well established and recommended in pregnancy. Fisher's two sided probability test was used for statistical analysis.

Results

The total number of hypothyroid pregnant women during the study period was 161 out of 6420 deliveries giving an incidence of 2.5%. Table 1 gives the maternal parameters in the two groups of hypothyrodism and diabetes. Primigravidas comprised 34.1% (55/161). There were 11 sets of twins (6.8%). Nine pregnancies in the hypothyoid group were IVF conceptions (5.5%) and of these five were twin pregnancies.

Maternal complications were seen in 39.1 % (63/161). The incidence of hypertensive disorders complicating pregnancy was 17.4% (28 / 161). Diabetes mellitus was seen in 16.8% (27/161), out of which 78% (21/27) were gestational diabetics and six were pregestational diabetics (22%). Ten (6.2%) women tested positive for anticardiolipin antibodies and this incidence was not obtained on routine screening, but as part of an evaluation for bad obstetric history. Only one woman had abruptio placenta.

The fetal outcome was determined in 172 babies as 11 were twins (Table 2). The perinatal mortality rate (PNMR) was 52 / 1000, using the CESDI definition of PNMR (all perinatal deaths > 24 weeks and > 500 g/ 1000 births). There were equal number of small for gestational age (SGA) and large for gestational age (LGA) babies (21 / 172 , 12.2%). There were three (1.8%) babies with congenital anomalies, one each with polydactyly, cleft lip, and renal agenesis. Maximum number of babies (63.3%) had birth weight of 2500 – 3500g.

Table 1. Maternal parameters.

Parameters	Hypothyroid group n = 161 No. (%)	Diabetic group n = 139 No. (%)	P value [a]
Hypertension	28 (17.4%)	24 (17.2%)	0.9 [a]
Anticardiolipin positive	10 (6.2%)	4 (2.8 %)	0.272[b]
IVF conceptions	9 (5.5%)	6 (4.3%)	0.6 [a]
Twins	11 (6.8%)	8 (5.7%)	0.7 [a]
Preterm delivery	35 (22%)	27 (19%)	0.6 [a]
Primigravida	55 (34.1%)	42 (30.3%)	0.4 [a]
Gravida 2-4	93 (57.8%)	87 (62.5%)	0.3 [a]
Gravida > 4	13 (8.07%)	10 (7.2%)	0.7 [a]

[a] Fisher's exact 2 sided probability test, P> 0.05; not significant

[b] Only one value was less than five. Using Fisher's exact probability test the value 0.272 is not significant.

Table 2. Perinatal outcome.

Outcome	Hypothyroid group (n=172)	Diabetes group (n=147)	P value[a]
Stillbirths	5	1	0.003
Neonatal deaths	4	0	0.002
Perinatal deaths	9	1	0.023
Perinatal mortality rate	52 / 1000	7 / 1000	0.0002

[a] Fisher's exact 2 sided probability test.

In the diabetic group, most of the women belonged to the age group of 20 – 30 years (76%) (Figure 1). The incidence of hypertensive disorders was 17.2 %. The percentage of women with miscarriages in the past was similar to that in hypothyroid women. The incidence of LGA babies was 12.9% and SGA babies were seen in 9.5%. There was only one intrauterine fetal death.

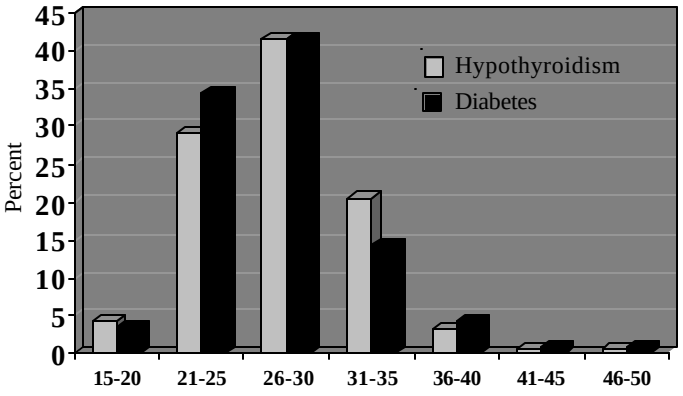

Figure 1. Maternal age distribution

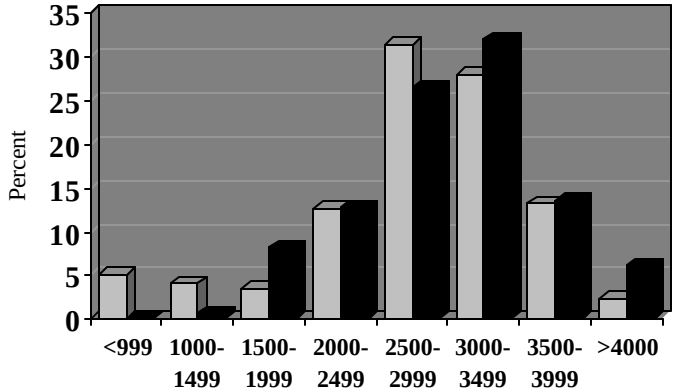

Figure 2. Birth weight distribution.

Discussion

Clinical hypothyroidism is diagnosed when T_4 is low and thyroid stimulating hormone (TSH) levels are high. The variety of end organ effects and wide range of disease severity – from entirely asymptomatic individuals to patients in coma with multisystem failure – can make hypothyroidism an elusive clinical entity [4].

Overt hypothyroidism in pregnancy is rare because of its association with anovulation and infertility [5]. The incidence of hypothyroidism during pregnancy is reported to be 1% [6,7]. Our study found a high incidence of hypothyroidism during pregnancy viz., 2.5%, which could be due to the fact that ours is a tertiary referral center. The incidence of IVF pregnancies was not significantly higher in hypothyroidism (5.5% vs 4.3%; P=0.6; Table 1) but there was high incidence of twin pregnancies viz 6.8%. Higher incidence of IVF conceptions was related to increased maternal age and resulted in increased incidence of twin pregnancies [6].

The incidence of any medical disorder complicating pregnancy in the study group was very high (39%). Hypothyroid pregnant women in our study had diabetes mellitus in 16.8 % of cases, as against 2.6% reported in the literature [6]. In our study, 22% of hypothyroid women were pregestational diabetics (6 / 27), compared to 13.6% in the control group of diabetic women. The incidence of hypertensive disorders was the same in both hypothyroid (17.4%) and diabetic women (17.2%). This was, however, higher than the general incidence of hypertensive disorders at our institute, which is 8.6%.

There were five stillbirths and four early neonatal deaths in the study group giving a PNMR of 52 / 1000 compared to 7/1000 in the diabetics (P=0.0001) (Table 2). The PNMR at our institute is 25/1000. The number of women with a past history of at least one miscarriage was 26 / 161 (16.2%) and seven had three or more miscarriages in the past (4.3%). The majority of babies had birth weight between 2500 – 3500 g, and the incidence of SGA babies was 12.7% (21 / 172). The number of babies with birth weight less than 1500 g was 9% in the study group compared with 0.6% in the diabetic group (Figure 2). The incidence of preterm delivery was 22% in the study group compared to 19% in the diabtetic group.

The maternal outcomes were similar in the two groups but the fetal outcomes showed many differences. The PNMR was much higher in the hypothyroid group compared to that seen in the diabetes group (P=0.0002). The incidence of low birth weight babies in hypothyroid group was higher than that in the control group (Table 3).

Table 3. Birth weight.

Birth	Hypothyroid n=172 [a]		Diabetes n=147 [b]		P value [c]
(g)	No.	%	No.	%	
<999	8	5	0	0	0.008
1000-1499	7	4	1	0.6	0.05
1500-1999	6	3.4	12	8.2	0.07
2500-2999	22	12.7	19	12.9	0.9
3000-3499	48	27.9	47	31.9	0.2
3500-3999	23	13.3	20	13.6	0.9
>4000	4	2.3	9	6.1	0.08
Mean	2.771 ± 0.7686		2.982±0.6445		0.009

[a] Includes 11 twins [b] Includes 8 twins [c] Fishers exact probability test

Diabetes in pregnancy is an endocrine disorder, known to be associated with adverse outcomes in both mother and fetus. Robust evidence now strongly recommends routine screening for diabetes in pregnancy and a fixed protocol for antepartum fetal surveillance. Evidence from our study supports the need for similar recommendations for hypothyroidism in pregnancy. Many studies on delayed neurological development in babies born to hypothyroid women have been published in recent years, and have advocated routine, prepregnancy, and early pregnancy screening [8]

This is further strengthened by the January 2005 statement of The American Thyroid Association and The American Association of Clinical Endocrinologists recommending routine TSH measurement during prepregnancy evaluation or as soon as pregnancy is diagnosed [7].

Conclusion

Our data regarding hypothyroidism supports all the criteria needed to justify routine screening during pregnancy. We propose the inclusion of serum TSH as a screening test for hypothyroidism during the antepartum period, at the time of the booking visit.

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