ATENOLOL IN THE TREATMENT OF ESSENTIAL HYPERTENSION DURING PREGNANCY

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Atenolol has been studied prospectively in the management of ten patients with essential hypertension during pregnancy. Median supine BP fell significantly from 156/98 mmHg before treatment to 128/82 mmHg at term. Atenolol did not suppress cardiotocographic signs of foetal distress. Although there was one intrauterine death, the remaining nine babies had a median Apgar score at birth of 9 and a median weight which was 82% of the gestational mean. There were no cases of neonatal bradycardia or respiratory depression and the only case of hypoglycaemia was in a dysmature baby. These findings justify a formal study of β -adrenoceptor blocker therapy in hypertensive diseases of pregnancy.

Introduction

The recent account of atenolol in the treatment of pregnancy-induced hypertension (Thorley *et al.*, 1981) prompts us to report our experience using this drug for several weeks during pregnancy in the management of essential hypertension.

Methods

The study involved ten women consecutively referred by a group of obstetricians for management of essential hypertension in pregnancy. All patients had been documented to have hypertension on their booking visit in the first trimester. Following referral, hypertension was confirmed if systolic blood pressure lying recumbent exceeded 140 mmHg or the diastolic pressure exceeded 90 mmHg on two separate occasions at least one day apart. In all cases the patients had normal haematological and biochemical indices and no proteinuria or glycosuria at the time of referral. The aim of treatment was to maintain supine blood pressure below 140/90 mmHg. Atenolol was first prescribed in the dose of 100 mg/day and increased to 200 mg/day if control was unsatisfactory. In two patients (8 and 9, Table 1) methyldopa was being taken at the time of referral and was continued. In patients 8 and 10 prazosin was administered when atenolol alone failed to control the pressure. Foetal growth and wellbeing were assessed by the individual obstetricians concerned with each case. Following delivery the babies were monitored for 24 h. Statistical analysis was by Wilcoxon matched pairs signed-rank test.

Results

The blood pressures before starting atenolol and at term, together with details of drug doses and additional treatment are shown in Table 1. There was a significant reduction in blood pressure for the group as a whole, nine patients achieving a supine systolic blood pressure below 140 mmHg and a diastolic pressure below 90 mmHg. Seven patients were controlled on atenolol alone and six of these received 100 mg/day. Four patients required 200 mg per day of atenolol, three receiving additional therapy and one of these failing to respond to any treatment. None of the patients developed proteinuria.

Atenolol did not influence beat to beat variation of foetal heart rate or mask cardiotocographic signs of foetal distress (Figure 1).

There was one intrauterine death in a woman whose pregnancy had been allowed to extend beyond 41 weeks. Post mortem revealed no congenital abnormalities. The remaining nine patients delivered spontaneously ($n = 4$) or were induced ($n = 5$) at a median of 39 weeks (Table 2). The babies had a median 5 min Apgar of 9 and a median weight which was 82% of the gestational mean. None of the nine live babies developed a heart rate below 120 beats/min or respiratory depression. One baby developed border-line hypoglycaemia and one definite hypoglycaemia requiring treatment. However, the latter pregnancy was complicated by placental bleeding and heavy maternal cigarette use with the baby being both premature and dysmature. All nine babies left hospital in good condition and had satisfactory post-natal progress.

Table 1 Supine blood pressure before atenolol and at term

Patient	Atenolol started (weeks)	Atenolol dose (mg/day)	Other drugs	Blood pressure (mmHg)			
				Systolic Pretreatment	Systolic Term	Diastolic Pretreatment	Diastolic Term
1	15	100	—	156	120	76	70
2	11	100	—	142	120	88	80
3	16	100	—	162	130	104	82
4	11	100	—	176	126	114	82
5	25	100	—	132	130	100	84
6	25	100	—	146	120	80	70
7	32	200	—	130	122	98	88
8	25	200	Methyldopa Prazosin	190	180	110	120
9	20	200	Methyldopa	150	130	100	80
10	14	200	Prazosin	180	130	114	84
<i>P</i>				0.01		0.02

Figure 1 The deceleration of foetal heart rate following uterine contraction during second stage labour is uninfluenced by atenolol in a woman who had received 200 mg per day since the eleventh week of gestation until the day of labour (patient 4). Basal heart rate and beat-to-beat variation are normal.

Table 2 Maternal and neonatal profile

Subject	Age (years)	Gestation at delivery (weeks)	Apgar (5 min)	Placental weight (g)	Neonatal weight (% of gestational mean)	Bradycardia	Respiratory depression	Hypoglycaemia
1	19	39	8	795	93	—	—	—
2	29	40	10	640	81	—	—	—
3	35	40	8	275	71	—	—	—
4	42	39	10	510	82	—	—	—
5	26	41+	0	475	105	—	—	—
6	21	39	10	505	97	—	—	—
7	34	39	10	455	83	—	—	—
8	21	38	10	650	90	—	—	—
9	34	36	8	235	51	—	—	+
10	30	40	10	398	83	—	—	±

— = absent; + = present; ± = borderline.

Discussion

β -Adrenoceptor blockers have previously been used in treating essential hypertension during pregnancy, though the absence of adequate control groups has often limited the interpretation of suggestions that these drugs are either beneficial or harmful. The literature on this subject has recently been reviewed with the conclusion that case reports suggesting β -adrenoceptor blockers to be commonly responsible for growth retardation, neonatal hypoglycaemia, bradycardia and respiratory distress have generally not been supported by the few prospective studies which have been performed (Rubin, 1981).

The preliminary study described here tends to support this view in that no cases of bradycardia or respiratory depression were observed and the only baby requiring treatment for hypoglycaemia had other risk factors which could have been contributory. There was a definite trend for the babies to be small for gestational age but no relationships existed be-

tween length of atenolol treatment and neonatal weight ($r = 0.25$). Previous suggestions that β -adrenoceptor blockers might mask cardiotocographic indices of foetal distress do not have a strong theoretical basis since acute heart rate changes in foetal distress appear to be modulated largely by changes in parasympathetic function (Hon *et al.*, 1961). During this study we observed no cardiotocographic effects of atenolol.

There is a tendency for some obstetricians still to regard essential hypertension as a relatively benign risk factor in pregnancy. The one foetal death in this study, which occurred 1 week after term, emphasises that essential hypertension should not be ignored and it is doubtful if women with this condition should be allowed to go beyond term.

The results which we present here, together with those of Thorley *et al.* (1981) suggest that a more comprehensive assessment of atenolol in the management of hypertension during pregnancy would be justified.

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