

DIAZEPAM—A VALUABLE DRUG IN LABOUR

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Fear-tension-pain syndrome in association with labour is an everyday and perpetual problem for every obstetrician. It is more frequently experienced in primigravidae but multigravidae are not entirely free from it mainly due to superstitions and long standing ill effects of our civilization and culture. Fear and anticipation give rise to natural protective tension in the mind and muscle of the cervix. Excessive stimulation of the motor mechanism of the sympathetic nervous system increases the tone of the circular muscle fibres of the cervix. Resistance in these muscles produces pain by stimulating the sensory nerve endings in the uterus. Thus there is a disturbance in the polarity leading to incomplete relaxation of the uterus and spasm of the cervix. Analgesics and tranquilizers are given during labour to produce neuro-muscular relaxation without having any harmful effect on the arriving baby and on the progress of labour. Diazepam (Calm-pose), a benzodiazapine (7-Chloro-1, 3 - dihydro-1-methyl-5-phenyl - 2H-1, 4 Benzo-diozepene-2-one) has been shown to reduce anxiety and tension, while its relaxant action on striated muscle, which

is produced centrally, has led to its use in status epilepticus and tetanus. Landesman and Wilson (1965) and Cavanagh *et al* (1966) have demonstrated the action of diazepam on isolated human myometrium. They have shown that frequency and amplitude of contractions both reduce together with a lowering of basal tone. It is because of these important properties of diazepam that it has been used in cases of threatened abortion, Premature labour (Chalmers, 1966) and dysmenorrhoea (McAllister, 1964).

De Silva in 1964 has shown that Diazepam crosses placental barrier and is found in foetal plasma in approximately the same concentration as in the maternal plasma. No adverse effects on the baby have so far been reported.

The main aim of this study has been to see the overall effect of diazepam on labour with special reference to its influence on the length of the labour, rate of dilatation of cervix and emotional state of the patient.

Material and Methods

A total of 700 cases were studied from the indoor wards of U.T.S.E. Maternity Hospital attached to G.S.V.M. Medical College, Kanpur from January, 1977 to January, 1978. A double blind con-

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trolled study was carried out in order to exclude any errors. Three hundred and fifty patients were given diazepam (142 primigravidae and 280 multigravidae). Three hundred and fifty women were given placebo injections (214 primigravidae and 136 multigravidae). A detailed history of all the cases was noted with special reference to any medical disorder associated with pregnancy and an exhaustive obstetric history in multigravidae was obtained. Complete clinical examination was done to rule out any major antenatal complication. Majority of the women who were included in the study were attending the antenatal clinics (minimum 2 visits). Women with any malpresentation (other than vertex), cephalopelvic disproportion or any other major complication were not included in this study. The drug and the placebo ampoules were serially numbered and the number was noted by the investigator but the code which indicated the exact content of the ampoules was not known to any investigator and was kept sealed to avoid any bias regarding the drug, until the study was complete. No medication other than this was given except in 2 cases where pethidine 100 mg had to be given because these 2 patients did not show the desired response to even 2 ampoules (20 mg) diazepam administered at an interval of 1 hour.

In all the patients the drug was injected when cervix was at least 2-3 cms. dilated. Here we would like to mention that normally we do not repeat vaginal examination in primigravidae and do not perform any vaginal examination in multigravidae for fear of infection unless there is some specific indication to do so but during the present study vaginal examination was done repeatedly because we wanted to see not only the injection

delivery interval but also the rate of dilatation of cervix and if at all it was affected by the drug. Diazepam 10 mg i.m. was used after seeing the cervical dilatation and a second injection of the drug was repeated if no response was seen within one hour. Besides this a complete and thorough watch was kept on the mother regarding her pulse, B.P. behavioral pattern, emotional state, character of uterine contractions, their frequency, intensity and duration and effect on the baby when it was born. An apgar score at 1-5 minutes was noted and a check up of the baby was done next day at the morning round. Emotional state of the patients was carefully analysed in every individual case according to the scoring method of Marubini and Tretola (1963) which seemed to be the best for the purpose.

Observations

Out of a total of 700 cases there were 356 primigravidae and 344 multigravidae. These patients covered a wide age range varying from 17 years to 42 years. Majority of them fell into the age group of 20-32 years (67.7%). Any woman who had to have operative delivery was excluded from this study. All women were divided into 3 main socio-economic groups i.e. lower, middle and upper based on the per capita income of the family. But we did not find any correlation between this factor and the effect of diazepam in labour in any of our cases.

Both duration of labour and injection delivery interval were noted very carefully and are shown in Table 1. In group I the average injection delivery interval was observed to be 8.52 hours in primigravidae and 4.05 hours in multigravidae. In group II the average injection delivery interval was noted to be 9.26 hours in

primigravidae and 4.52 hours in multigravidae. The average duration of labour in group I was 16.18 hours in primigravidae and 6.22 hours in multigravidae, whereas in group II it was on an average 17 hours in multigravidae and 6.58 hours in multigravidae.

In group I, 11 (8.7%) patients achieved the excellent score, 68 (53.9%) good and 6 (4.8%) fair and 41 (32.3%) showed a poor score. In group II, 63 (28.2%) achieved the excellent score, 94 (41.8%) good, 8 (3.6%) fair and 59 (28.8%), showed a poor score. The scoring was

TABLE I
Average Duration of Labour and Injection Delivery Interval

Group & drug	Average duration of labour (hrs.)		Injection delivery interval (hrs.)	
	Primigravidae	Multigravidae	Primigravidae	Multigravidae
I Diazepam (350)	16.18	6.22	8.52	4.05
II Placebo (350)	17.00	6.58	9.26	4.52

() No. of patients.

Depending on the emotional state the patients were divided into 2 groups.

1. Very apprehensive, unco-operative and unmanageable patients.
2. Moderately apprehensive but co-operative patients.

The effect of diazepam on the emotional state of the patient has been shown in Table II.

judged by the method of Marubini and Tretola (1963).

Uterine contractions occurred at an interval of 5.4 min. in the placebo group and 6.5 min. in the diazepam group.

Table IV shows the average duration of uterine contractions when the cervix was fully dilated.

TABLE II
Emotional State and Response

Groups	Excellent		Good		Fair		Poor	
	C	P	C	P	C	P	C	P
I	11	—	68	—	6	21	41	95
	(8.7)		(53.9)		(4.8)	(18.1)	(32.3)	(81.9)
II	63	—	94	—	8	41	59	193
	(28.2)		(41.8)		(3.6)	(17.5)	(28.8)	(82.1)

C—Calmpose; P—Placebo; ()—percentage.

TABLE III
Frequency of Uterine Contractions

Total No. of cases	Frequency of uterine contractions in minutes	
	Before injection	After injection
Diazepam — 350	18.3	6.5
Placebo — 350	23.0	5.4

TABLE IV

Total No. of cases	Duration of uterine contraction in seconds	
	Before injection	After injection
Diazepam — 350	34.0	54.5
Placebo — 350	32.2	57.0

Table V shows the average state of between 6 and 10 in both drug treated maternal pulse rate during the period of and placebo groups, except in 4 cases Diazepam administration. while the baby was slightly asphyxiated

TABLE V

Total No. of cases	Average maternal pulse rate/minute	
	Before injection	After injection
Diazepam — 350	85.8	88.8
Placebo — 350	87.0	92.0

No effect was noted on the maternal pulse rate during the period of diazepam administration. Neither was any adverse effect observed on the woman during this period.

Table VI shows the effect of diazepam on the foetal heart sounds. No foetal monitor was used to record the foetal heart, only a simple stethoscope was used.

at birth but apparently the cause of this asphyxia was the tightly wound umbilical cord in 2 cases, whereas in other 2 we attributed the asphyxia to diazepam (20 mg in each case).

No significant analgesia could be achieved by diazepam which was found out only by directly questioning the patients.

TABLE VI

Total No. of cases	Foetal heart sounds/minute	
	Before injection	After injection
Diazepam — 350	144	144
Placebo — 350	144	144

No change in the foetal heart rate and rhythm was observed during the period of Diazepam administration. No adverse effect was noted on the newborn as was judged by the Apgar score at 1 min, 5 min and noted on the morning round the next day. The Apgar score of the babies varied

Discussion

Although exceptions are always present yet in general there seems to be a definite relationship between anxiety and a lowered threshold to pain. It is for this well established fact that obstetricians thought

of the psychotropic drugs—their important adjunctive role in human labour. Diazepam—a benzodiazepine which is supposed to be 5 times more potent than chlordiazepoxide (Librium) as a tranquilizer and muscle relaxant has proved to be quite promising in labour (Bepko and Lowe 1965; Berger and Neuweiller, 1962; Cavanagh and Condo, 1964; Rouchy *et al*, 1966). We observed in our study that injection delivery interval is less in diazepam group, in both primigravidae and multigravidae as compared to placebo group. In primigravidae it is less by 34 minutes; in multigravidae less by 47 min. This difference can not be called significant. Our findings are in total agreement with Bepko and Lowe (1965), Jungalwala and Jindal (1968), Elder and Crossley (1969), Nisbet *et al* (1967). Lee (1968), and Kaur and Gupta (1976); Choksi and Motashaw (1967) differ from us. The average duration of labour obviously followed the similar trend and has been recorded in Table I. Berger (1962) and Husslein (1965) have both noted a labour shortening effect of diazepam. According to Husslein (1965) diazepam acts by increasing the parasympathetic tone and by decreasing the sympathetic tonus. This, he says, results in diminished resistance to dilatation of the birth canal. Barger (1962) and Husslein (1965), both have recorded a 25-30 per cent reduction in the duration of labour.

A remarkable difference was found in the two groups as regards the emotional status of the patient after administration of the drug. True that diazepam does not have an analgesic action yet it has a tremendous beneficial effect by breaking the vicious circle of fear-tension-pain syndrome. When the activity of pain perception is diminished, the attitude of the patient also changes. This effect of

the drug has been recognised and reported by Bepko and Lowe (1965); Jungalwala and Jindal (1968), Elder *et al* (1969), Nisbet *et al* (1967) and Kaur and Gupta (1976).

Diazepam had no significant effect on frequency and duration of uterine contractions, maternal pulse rate, and foetal heart sounds. Choksi and Motashaw (1967) have made similar observations.

No harmful effects of Diazepam were noted on either the mother or the baby and that probably is the strongest point in favour of its usage in labour. It has a very wide margin of safety for both the mother and the baby as has been confirmed by other workers also (Bepko and Lowe, 1965, Berger and Neuweiller, 1962; Brandt and Oakes, 1965).

Summary and Conclusion

A controlled trial of Diazepam was conducted in 700 patients during labour, 350 patients received diazepam and 350 had placebo. The initial dose failed to produce the desired effect. The drug was found to have remarkable effect on the emotional status of the patient. It had absolutely no detrimental effect on either the mother or the baby and had a wide margin of safety.

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