PREMATURITY AND CERVICAL STATUS

by

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Prematurity is associated with 70% of perinatal loss and is directly responsible for 17 to 20 per cent of intranatal or neonatal deaths. Amongst all premature deliveries, not more than 20 per cent have distinct aetiological factors. A very large number of premature deliveries occur unexpectedly and remain unexplained. Predictibility of impending premature delivery and its consequent stalling by institution of appropriate measures, would perhaps significantly lower prematurity and perinatal mortality rates.

Cervical status assessment during the period of 16 to 36 weeks of gestation may be considered of possible value in the prediction of premature labours. Hendricks *et al* (1970) have concluded that the cervix prepares itself prior to delivery by undergoing almost consistently the following alterations few weeks before the onset of labour: (1) Dilatation of more than 1.5 cms., (2) effacement of at least 60%, and (3) considerable softening. The dilatation was noted predominantly in the parous women and the effacement occurred more constantly in the nulliparous group.

Cervical typing during pregnancy, as classified by Mehta (1974) figure 1 incorporates the above three characteristics of cervical responses and the observation of the type of cervix gives total idea of these features. While Type IV indicates reasonable effacement, and Type V at least 1 cm. dilatation, it is only Type VI or higher ones, which herald the changes of dilatation, effacement, and softening so necessary before the onset of labour. It may be that if one detects Type VI, VII, VIII, or IX, prior to the end of 36 weeks of gestation, be it in any parity, the probability of a delivery before completion of 37 weeks and of having a new-born of 2500 gms. or less, is high.

This study was undertaken to test this hypothesis and it was hopefully felt that unexplained and unexpected deliveries prior to term could be avoided by timely corrective steps after detection of the danger point.

Material and Methods

Vaginal examinations were randomly performed from 16 to 36 weeks of pregnancy in 974 women. The parity distribution is shown in Table I, and this corresponds closely to the natural parity distribution of all women who were delivered during the last 10 years period. A total of 945 examinations were done, 433 amongst the nulliparous, 279 in Parity I patients, and 233 in Parity II + group. The detailed distribution of the examinations by parity and the weeks of gestation is shown in Table II.

The observations of the different cervical types at the various gestational periods were recorded for each of the parity groups. These findings are shown in Table III. Within each gestational

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CERVICAL PATTERNS DURING PREGNANCY FOR
(1) DETECTION OF INCOMPETENT CERVIX
(2) PREVENTION OF PREMATURITY AND (3) ASSESSMENT OF INDUCIBILITY

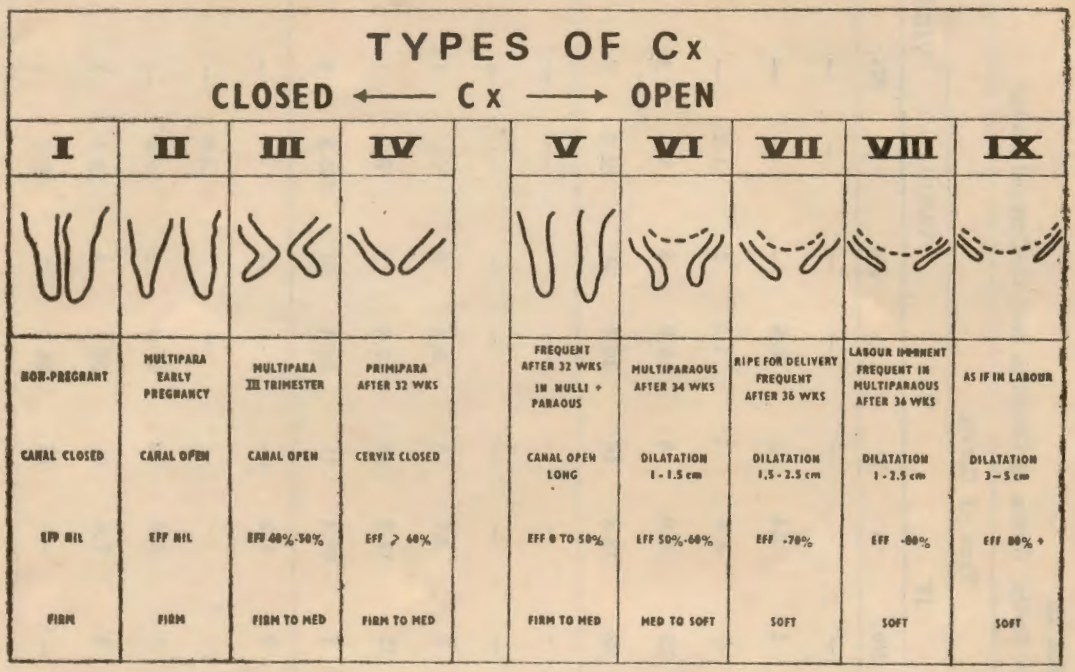

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Fig. 1

TABLE I
The Distribution of 794 Cases by Parity

	Total	Parity		
		0	I	II +
No. of cases	794	362	241	191
Percentage		45.59	30.35	24.06

TABLE II
Distribution of the Vaginal Examinations According to Gestational Period and Parity

Maturity	Total PV	0	I	II +
16–20	171	71	52	48
21–24	93	29	31	33
25–28	172	84	54	34
29–32	228	100	75	53
33–36	281	149	67	65
Total	945	433	279	233

TABLE III

The Distribution of the 945 Vaginal Findings According to Parity, Weeks of Gestation and the Cervical Status

Parity	Weeks	Total No.	Type of Cervix											
			I–II		III		IV		V		VI-VII		VIII-IX	
			No.	%	No.	%	No.	%	N.	%	No.	%	No.	%
0	16–20	71	71	100.0	—	—	—	—	—	—	—	—	—	—
	21–24	29	26	89.6	0	—	1	3.4	2	6.9	—	—	—	—
	25–28	84	75	89.3	4	4.8	3	3.6	1	1.2	1	1.2	—	—
	29–32	100	58	58.0	4	4.0	25	25.0	4	4.0	8	8.0	1	1.0
	33–36	149	59	39.6	5	3.3	28	18.8	16	10.7	34	22.8	7	4.7
I	16–20	52	51	98.1	1	1.9	—	—	—	—	—	—	—	—
	21–24	31	28	90.3	3	9.7	—	—	—	—	—	--	—	—
	25–28	54	36	66.7	10	18.5	2	3.7	5	9.3	0	—	1	1.8
	29–32	75	31	41.3	15	20.0	13	17.3	10	13.3	5	6.7	1	1.3
	33–36	67	19	28.4	6	9.0	7	10.4	11	16.4	24	35.8	0	—
II +	16–20	48	43	89.6	2	4.2	3	6.2	—	—	—	—	—	—
	21–24	33	28	84.8	4	12.1	—	—	—	—	1	3.0	—	—
	25–28	34	25	47.2	7	20.6	1	2.9	6	17.6	2	5.9	—	—
	29–32	53	18	52.8	4	7.5	4	7.5	11	20.7	8	15.1	1	1.9
	33–36	65	25	38.5	6	9.2	—	—	16	24.6	17	26.1	1	1.5

TABLE IV

Distribution of the Number of Vaginal Examinations According to the Cervical Type in Each Parity Group Amongst the Premature and the Term Deliveries

PREMATURE DELIVERIES

	PARITY O							PARITY I							PARITY II +						
Weeks	I-II	III	IV	V	VI-VII	VIII-IX	Weeks	I-II	III	IV	V	VI-VII	VIII-IX	Weeks	I-II	III	IV	V	VI-VII	VIII-IX
16–20	8	–	–	–	–	–	16-20	5	–	–	–	–	–	16-20	4	–	–	–	–	–
21–24	2	–	–	1	–	–	21-24	2	1	–	–	–	–	21-24	4	1	–	–	1	–
25–28	8	–	–	–	–	–	25-28	2	2	–	3	–	–	25-28	1	1	–	2	1	–
29–32	2	–	3	–	3	–	29-32	3	0	1	3	–	–	29-32	1	–	–	4	2	1
33–36	3	1	2	0	9	5	33-36	0	1	0	0	6	0	33-36	2	0	0	0	3	0

TERM DELIVERIES

	PARITY O							PARITY I							PARITY II +						
Weeks	I-II	III	IV	V	VI--VII	VIII-IX	Weeks	I-II	III	IV	V	VI-VII	VIII-IX	Weeks	I-II	III	IV	V	VI-VII	VIII-IX
16–20	63	–	–	–	–	–	16-20	46	1	–	–	–	–	16-20	39	1	2	–	–	–
21–24	24	–	1	1	–	–	21-24	26	2	–	–	–	–	21-24	24	3	–	–	–	–
25–28	67	4	3	1	1	–	25-28	34	8	2	2	–	1	25-28	17	6	1	4	1	-
29–32	56	4	22	4	5	1	29-32	28	15	12	7	5	1	29-32	24	4	4	7	6	–
33–36	56	4	26	16	25	2	33-36	19	5	7	11	18	–	33-36	23	6	–	16	14	1

period group, no patient had more than one vaginal examination. The figures thus indicate the distribution according to the cervical type at the different weeks of gestation in each parity group. Since the examinations were random, the figures give the probability rates of various cervical types at different gestational periods in individual parity groups. These figures have a high reproducibility index.

The likelihood of premature delivery (Prior to the completion of 37 weeks of pregnancy) with the finding of a particular type of cervix at various periods of gestation in each parity group was next calculated, and this distribution is shown in Table IV.

The data were analysed and valid conclusions reached.

Analysis and Results

The incidence of prematurity (not completed 37 weeks of gestation) among the 794 patients were 85, or 10.79%. The distribution according to parity groups is shown in Table V, and it is not much different in each group.

(1.9%) Parity I case and 5 (10.4%) Parity II cases had effacement only (Type III-IV). No case had dilatation.

21 *to* 24 *weeks*: Effacement alone was noted in one (3.4%) case of Parity 0, 3 (9.7%) cases of Parity I, and 4 (12.1%) cases of Parity II +. The finding of dilatation only (Type V) was noted in 2 (6.9%) cases of Parity 0 and none in the other parities. The former may be incidental and may have no reproductibility value. Effacement and dilatation (Type V and over) was noted in a solitary (3.0%) case of Parity II +.

25 *to* 28 *weeks*: The percentage of cases of effacement alone in the multiparous women was (22.1% and 23.4%) more than 2½ times greater than in the nulliparous (8.1%). Women with dilatation only were higher in Parity I (9.3%) than in Parity 0 (1.2%), and higher still in Parity II + (17.2%). There was a small percentage of cases indicating both dilatation and effacement in all the parity groups.

29 *to* 32 *weeks*: Effacement alone was noted in 29.0% of Parity 0 cases, 37.2% of Parity I, and 15.1% of Parity II +

TABLE V
The Distribution of Premature Deliveries by Parity

		PARITY		
		O	I	II
Total Cases	85	39	23	23
Percentage (85/794)	10.79	10.77	9.54	12.04

Table VI shows the reconstruction of Table III in another way. Findings of both these tables permit the following observations:

16 *to* 20 *weeks*: No nulliparous case had effacement or dilatation. One cases. Dilatation alone was noted in 4.0%, 13.3% and 20.7%, while both the changes were noted in 9.0%, 8.0% and 17.0% respectively.

33 *to* 36 *weeks*: Effacement alone was more frequent in nulliparae and in Parity

TABLE VI

The Probability in Percentage (Corrected to one decimal point) of Detection of cervical Effacement and Dilatation (1 Cm. +) at Various Gestational Periods in Each Parity Group. (Derived from Table 3)

WEEKS	PARITY O				PARITY I				PARITY II +			
	No. D. No. E	EF. only	D. only	E+D	No. D No. E	EF. only	D. only	E+D	No. D. No. E	EF. only	D. only	E+D
16-20	100.0%	–	–	–	98.1%	1.9	–	–	89.6%	10.4	–	–
21-24	89.6	3.5	6.9	–	90.3	9.7	–	–	85.0	12.0	–	3.0
25-28	89.6	8.1	1.2	1.2	66.6	22.1	9.3	1.8	52.9	23.4	17.6	5.9
29-32	58.0	29.0	4.0	9.0	41.3	37.3	13.3	8.0	47.1	15.1	20.7	17.0
33-36	39.6	22.2	10.7	27.5	28.36	10.4	16.4	35.8	38.5	9.2	24.6	27.7

I than in Parity II; that of dilatation alone rose from 10.7% in Parity 0, to 16.4% in Parity I, to 24.6% in Parity II +. In nearly 30% in all pregnant women irrespective of parity, dilatation and effacement was observed at this stage of pregnancy.

From the above it may be surmised that a random vaginal examination prior to 25 weeks of pregnancy is most unlikely to reveal any of the changes of cervical ripening. After 25 weeks however, the cervical changes are noted in all parities, and more so after 29 weeks of gestation.

Whether these changes can be indicative of impending premature delivery or not may be appreciated from the study of Table IV. The following trends are shown:

Parity 0: The number of vaginal examinations showing Type VI or higher is much greater among the premature delivery group than the term deliveries. This state of affairs occurs significantly after 29 weeks of pregnancy.

Parity I: The number of Type V as well as those of VI + examinations are more in the premature delivery group, and this risk stage is reached by 25 weeks.

Parity II +: The findings here are similar to those of Parity I group.

It is, however, interesting that after 33 weeks, in the parous groups Type V did not play any role in increasing the risk of prematurity, but the higher types continued to do so.

Discussion

The findings of the study indicate that the effacement and dilatation of cervix occur during pregnancy much before term is reached in a substantial number of cases. This trend is noted from the

25th week of pregnancy and is more evident in the parous women.

The method of cervical typing of Mehta (1974) is extremely useful in the detection of these changes during pregnancy.

The study revealed that the danger of premature delivery is no more than the overall risk as long as the status of cervix is Type IV or less. Whereas Type V between 21 and 32 weeks does not appear unsafe in a nulliparous woman, it increases the risk of premature delivery in a parous woman. At any period of gestation prior to 36 weeks, Type VI or higher certainly means greater probability of premature delivery.

It may be stated that the test for prediction of premature delivery by assessment of cervical status becomes positive at Type VI in nulliparae and Type V in multiparae. A test for any condition or disease, to be highly effective, should be strongly positive in presence of it, and strongly negative in absence of it. How far the above test for prematurity would be valid was studied in 664 women in whom, a single vaginal examination between 21 and 36 weeks of pregnancy were performed. Table VII and Table VIII indicate the grouping of these women according to the finding of the test, and the week of gestation at which the test was applied and the type of delivery obtained.

The results indicate that at any given period of gestation, the probability of positive test leading to prematurity, is between 22% and 30%, except at 21-24

TABLE VII

Positive Test at Various Weeks and the Type of Delivery

Weeks	Total	Term	Premature	
21-24	2	–	2	100.0%
25-26	4	3	1	25.0%
27-28	10	7	3	30.0%
29-30	13	10	3	23.07%
31-32	24	17	7	29.16%
33-34	35	27	8	22.85%
35-36	52	39	13	25.0%
Total	140	103	37	26.43

TABLE VIII

Negative Test at Various Weeks and the Type of Delivery

Weeks	Total No.	Term		Premature
21-24	78	70	89.74%	8
25-26	48	44	91.66%	4
27-28	79	72	91.14%	7
29-30	78	73	93.59%	5
31-32	79	74	93.67%	5
33-34	75	68	90.66%	7
35-36	87	85	97.70%	2
Total	524	486	92.75%	38 7.25%

weeks when the probability was cent per cent. The overall risk of prematurity with a positive test from 21 to 36 weeks was 26.42%. The positive test is thus, not highly specific for prematurity. It may be, however, taken as an additional tool in the prediction and prevention of prematurity, in consideration with other factors.

The negative test was highly specific for term delivery and hence its presence during 21-36 weeks period of gestation in all pregnant women, is extremely reassuring. At any period of gestation prior to the end of 36 weeks, Type VI or higher certainly means greater probability of prematurity rates.

Increasing the prematurity rates means adding to the perinatal mortality figures. The perinatal mortality rate among the 794 patients under study was 36 per 1000 (29 cases). The detailed distribution of the perinatal mortality is shown in Table IX. Whereas the perinatal mortality rate among the term deliveries was 20/1000, it was 188/1000 among the premature deliveries, focussing attention to the necessity of diminishing the incidence of the latter. Of the 16 perinatal losses in the premature group, 10 had taken place in the 17 cases with known and distinct causes of prematurity. Inspite of their exclusion, 6 deaths in the 68 premature deliveries, having no aetiological factor, more than doubles the overall rate. Reduction of this perinatal mortality rate may be achieved by applying the method of assessment of cervical status in pregnancy and taking appropriate steps.

The conditions of incompetent cervix and early ripening of cervix in all parities may well be detected by the method. Patients with obstetrical conditions like hydramnios, multiple pregnancy, and abnormal presentations may be submitted to vaginal examinations during pregnancy and the probability of premature delivery detected. In maternal diseases like pre-eclampsia, diabetes mellitus, severe anaemia, renal infections, chronic diarrhoeas and dysenteries, and few other diseases, fore-warning of impending premature delivery may be obtained, by noting the cervival type during pregnancy. The necessary corrective measures may then be instituted in time for the postponement of impending premature deliveries. Besides, there are a number of cases where no medical or obstetrical factor exists and yet a premature

TABLE IX

Perinatal Mortality in 794 Cases

	No. Cases	Perinatal Mortality Rate
TOTAL	794 29	36/1000
Term Delivery	709 13	20/1000
Premature delivery	85 16	188/1000
Premature delivery* (Cause known)	17 10	588/1000
Premature delivery (Cause not known)	68 6	88/1000

* Pre-eclampsia, Macerated Still Birth. Definite cases of incompetent Cx, and Gross Congenital Malformation.

delivery results. These too may be noticed. Routine application of the test of assessment of cervical status for prematurity during 25 to 36 weeks of pregnancy in the antenatal department will strengthen preventive obstetrics.

Conclusions

1. Premature or early effacement and/or dilatation of cervix, much before term is not an infrequent phenomenon. (25-36 weeks).

2. Dilatation alone between 25 and 36 weeks of pregnancy may lead to premature delivery. When associated with effacement, it increases the risk further. The risks are greater in the parous women compared to nulliparous. Effacement alone seems inocuous.

3. Prematurity and low birth weight problems increase the perinatal morbidity and mortality, and a method of prevention will reduce these happenings.

4. It is suggested from the study that if assessment of cervical status by cervical typing of Mehta is done routinely, twice during 25 to 36 weeks of pregnancy in all parity groups, cases with increased vulnerability to prematurity will be picked up. The assessment of cervical condition is of further importance in women with medical and obstetrical complications.

5. It is suggested too that if proper and timely corrective measures to postpone occurence of premature delivery are applied to the vulnerable cases detected by the above method, the incidences of perinatal morbidity and mortality would diminish.

References

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