

BEHAVIORAL PATTERNS OF CERVIX UTERI DURING SECOND AND THIRD TRIMESTERS OF PREGNANCY

by

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It is not an infrequent experience during an incidental internal examination in the second or the third trimester of pregnancy to find that the cervical canal and the internal os of the cervix permit the examining finger to pass through. Under such a circumstance, three questions come to one's mind. Why has the cervix opened out prematurely? What is the probability of premature delivery? And, given a large number of pregnant women at a particular week of gestation, in how many of them would the internal os of cervix be open and will permit the examining finger to pass through?

This communication attempts to answer the last two questions. Further, the behavioral patterns of cervix during pregnancy have been studied, and a classification of these patterns has been suggested.

Parikh and Mehta had undertaken a somewhat similar study in 1961, and a comparison between that data (referred to as 'Old Series' henceforth) and the present one (New Series) is presented wherever relevant.

Material and Methods

Three hundred and eighty-six private patients in the 2nd and the 3rd trimesters of pregnancy, and belonging to upper middle class of population were taken up for the study. At the time of their selec-

tion for the study, these patients had no abnormality to vitiate the outcome of pregnancy. No case had a suggestion of an incompetent cervix. A hundred and eight patients out of these 386, presented for repeated examinations, while the rest had only a single examination.

The condition of cervix in each case and at each examination was observed by the author himself by making a vaginal examination under proper asepsis. Grossly, if the examining finger could be introduced through the internal os of the cervix, the latter was labelled as being open for the purpose of this study. The remaining cases including the ones in which the external os of cervix was closed, were labelled as having 'closed' internal os.

A total of 541 vaginal examinations were done on 386 patients, at different weeks of gestation, ranging from 16 to 38 weeks.

Analysis and Results

In the 541 vaginal examinations the internal os of cervix was found open in 130, while it was closed in 411 instances. This meant that when random vaginal examinations were done between 16th and 38th weeks of pregnancy, in 24.03 per cent of instances the os was open.

Table 1. gives the detailed break-up of the 541 examinations according to the week of gestation, the parity and the condition of cervix.

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TABLE I
The Number of 'Open' and 'Closed' os at Different Weeks

Parity	O		I		II		III		IV and above		Total	
	op	cl	op	cl	op	cl	op	cl	op	cl	op	cl
16	0	4	0	7	0	4	0	2	0	2	0	19
17-18	0	5	0	3	0	1	0	1	0	1	0	11
19-20	0	0	2	10	1	2	1	4	1	0	5	25
21-22	0	8	2	10	0	1	0	3	0	5	2	27
23-24	0	10	1	20	1	7	1	5	1	4	4	46
25-26	1	13	5	10	2	11	1	6	2	7	11	47
27-28	0	21	4	30	6	7	1	9	2	8	13	75
29-30	1	12	2	10	2	8	2	4	2	3	9	37
31-32	4	10	3	14	2	6	2	8	2	5	13	43
33-34	2	8	4	13	5	3	4	5	3	3	18	32
35-36	5	16	12	13	8	7	9	4	6	2	40	42
37-38	0	2	4	3	2	1	5	0	4	1	15	7
16-38	13	118	39	143	29	58	26	51	23	41	130	411
Total	131		182		87		77		64		541	
Percentage	9.0	90.08	21.42	78.58	33.33	66.67	33.76	66.24	35.93	64.07	24.03	75.97

Figure 1 co-relates the character of the internal os with the duration of pregnancy and in addition shows the differences between the two series, the 'Old' the 'New'.

FIGURE NO. 1
OPEN OS AND GESTATIONAL AGE
COMPARISON-OLD AND NEW SERIES

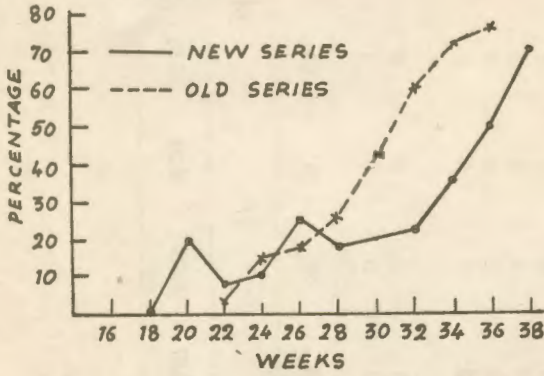


Fig. 1

The graphs showing the percentage of open os as at different weeks of gestation in the two series.

The above table and the figure show that prior to 19 weeks the os was always closed, between 19th and 32nd weeks there was an irregular but gradual rise in the number of open os, and after 32nd week there was a sharp rise in the incidence of open os as pregnancy advanced. This trend, though not so obvious in the primigravidae, was very clear in the other parity groups.

In the primigravidae, 9.92 per cent of the total of 131 cases had an open os, irrespective of the week of gestation; in parity I, 21.42 per cent of the total of 182 had open os; while in parity II and beyond the percentage of open os was about 33.

The incidence of open os in the 'Old' series had risen from 25 per cent at 28 weeks to a steep climb of 76 per cent at 36 weeks. The 'New series showed a

TABLE II
Incidence of 'Open' and 'Closed' as at 24, 34 Weeks and Beyond That

Parity	O		I		II		III		IV & above		Total	
	op	cl	op	cl	op	cl	op	cl	op	cl	op	cl
Cervix												
24 weeks and less	0	36	5	50	2	15	2	15	2	15	11	128
		100%	9%	91%	12%	88%	12%	88%	14%	86%	8%	92%
Between 25 & 34 weeks	8	64	18	77	17	35	10	32	11	26	64	234
	11	89%	19%	81%	33%	67%	24%	76%	30%	70%	21%	79%
Over 34 weeks	5	18	16	16	10	8	14	4	10	3	55	49
	22%	78%	50%	50%	56%	44%	78%	22%	77%	23%	53%	47%

similar steep climbing curve but only after 32nd week.

Figure 2 co-relates the character of the internal os with the parity of the patients in both the 'Old' and the 'New'

had an open os. Out of 298 examinations done between 25th and 34th weeks, 21 per cent had an open os. And, out of 104 examinations done after 34th week, 53 per cent had an open os. In each of

FIGURE NO. 2.

OPEN OS AND PARITY

COMPARISON-OLD AND NEW SERIES.

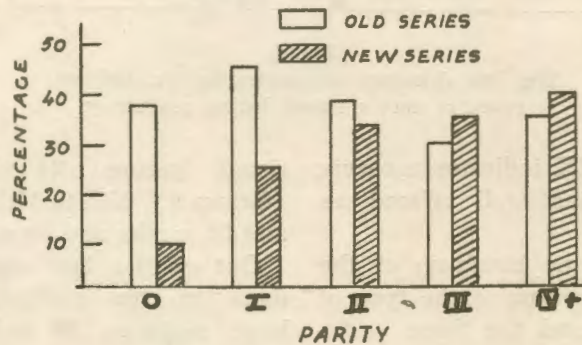


Fig. 2

The histograms showing the percentage distribution in the parity groups in the two series.

series. While the percentage of open os cases in the 'Old' series showed no definite distribution trend among the parity groups, the percentage of open os in the 'New' series increased from 9.9 in parity 0 to 35.9 in parity IV and above.

When the open internal os is detected prior to 24 weeks, an operation of tightening of the cervix may become obligatory. When it is found open between 25th and 34th week, it is customary to advise extra bed rest; and, after 34th week if the os is found open no particular treatment is generally recommended.

The data of the present study was hence re-grouped according to these three periods of gestation. (Table II) Out of 139 examinations done at 24 weeks or less, irrespective of parity, eight per cent

these three groups, the internal os is open undoubtedly more often once a woman has had a delivery.

Classification of the Different Types of Cervix

The vaginal examinations during the study revealed that there were nine different pictorial types of cervix. A classification according to these different types is, therefore, presented here for the first time. Figure 3 shows the classified types of cervix. Types I, II, III and IV have closed os as the examining finger could not reach the lower pole of the amniotic sac, and types V, VI, VII, VIII and IX have open os as the examining finger could palpate the lower pole of the amniotic sac. Type VII corresponds to what is generally known as the ripe

FIGURE NO. 3

TYPES OF CX

CLOSED OS				OPEN OS				
I	II	III	IV	V	VI	VII	VIII	IX
NON PREG.	EXT OS OPEN	CANAL OPEN ↓ LONG	CANAL OPEN ↓ SHORT	CANAL ↓ LONG	MULTI PAROUS ↓ CANAL SHORT	RIPE	1F	2F IN LABOUR As 1F

Fig. 3

The line drawings demonstrating the different types of cervix noted during pregnancy.

cervix, while type IX indicates a cervix three cms. open and well effaced as if in early labour.

tional groups, 24 weeks and less (Group A), 25th to 34th week and 35 weeks and over (Group C).

Table III shows the break-up of the vaginal findings according to the type of cervix, the parity, and the three gesta-

Out of the 116 vaginal examinations done in the nulliparous group, the large majority, 98 belonged to type I

TABLE III

The Break up of the Cases According to the Type, the Week of Gestation and the Parity

Type CX	I			II			III			IV					
	0	1-3	4+	0	1-3	4+	0	1-3	4+	0	1-3	4+			
Parity	0	1-3	4+	0	1-3	4+	0	1-3	4+	0	1-3	4+			
24 & less weeks	33	51	10	1	12	-	2	13	1	-	5	-			
25 to 34 weeks	52	67	12	2	11	4	7	37	8	2	29	2			
35 to 38 weeks	13	13	1	-	3	-	3	7	1	2	6	-			
Total	252			33			79			46					
	V			VI			VII			VIII			IX		
	0	1-3	4+	0	1-3	4+	0	1-3	4+	0	1-3	4	0	1-3	4+
	-	5	2	-	4	-	-	-	-	-	-	-	-	-	-
	4	24	5	2	18	6	2	2	-	1	1	-	-	-	-
	1	10	2	1	18	4	3	10	1	-	-	-	-	3	2
	53			53			18			2			5		

Table IV indicates the percentage of the various findings falling into the different types of cervix at the three specific periods of gestation, irrespective of parity.

One hundred and seven patients co-operated, and each of them had at least three vaginal examinations between 16 and 38 weeks. The number in parity O group were 17, in parity I-III were 75,

TABLE IV

The Percentage of the Various Types of Cervix at the 3 Specific Periods of Gestation, viz. 24 Weeks (Group A) 25-34 Weeks (Group B) and Beyond 34 Weeks (Groups C) Irrespective of Parity

Type	I	II	III	IV	V	VI	VII	VIII	X
Group A	69	10	10	3	5.5	2.5	-	-	-
Group B	44	6	17	11	11	9.5	1	0.5	-
Group C	25	4	10.5	7.5	12.5	22.5	13.5	-	4.5

cervix. Amongst the 425 examinations done in the multiparous group, 154 were of type I, 139 were either type II, III, or IV, and the remaining 132 were of type V or higher, irrespective of the period of gestation.

When the Types I and II are taken as non-pregnant like, Types III, IV and V as the transitory ones, and Type VI and higher as the ripe ones for delivery, it is noted that as the period of gestation tends to increase so is there a shift in the percentage of cases from Types I and II, to the transitory types and finally to the ripe types. Thus, in Group A, 79 per cent were of Type I and II. In Group B, 50 per cent were of Types I and II, 39 of Types, III, IV and V, and 11 per cent of ripe Types. In Group C, however, the percentage of Types I and II fell to 29, while those belonging to Types VI or more, rose to 40.5 per cent. The presumption that in pregnancy the cervix is inevitably and progressively preparing itself to open out for labour and delivery may be accepted from these observations.

To substantiate the above presumption, a longitudinal study throughout pregnancy

was undertaken in a group of co-operative and in parity IV and above were 15.

Figures 4 and 5 represent graphically the patterns obtained in the longitudinal study in the parity O and I-III groups, respectively. The number of lines noted on the graphs do not correspond to the

FIGURE NO. 4

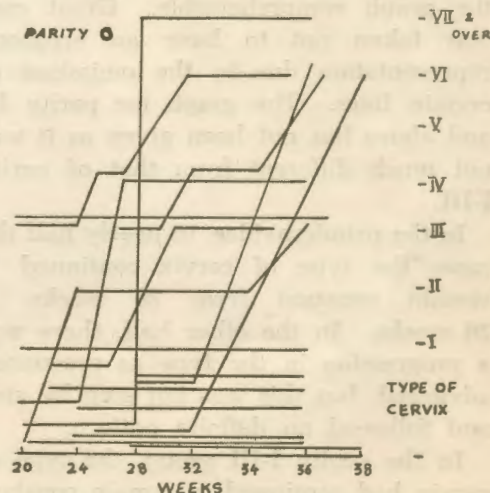


Fig. 4

The representative graph of behavioral patterns of cervix in the primigravidae in a longitudinal study.

FIGURE NO. 5

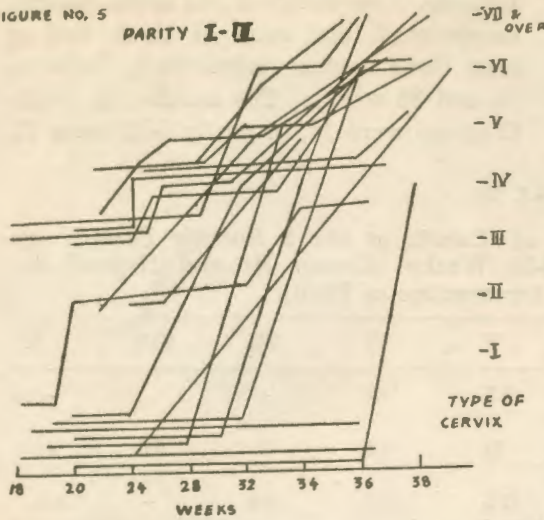


Fig. 5

The representative graph of behavioral patterns of cervix in parity group I-III in a longitudinal study.

number of cases. In parity 0 group few cases had identical lines and these then have overlapped. In parity I-III, a number of lines overlapped each other, while a few had to be erased to make the graph comprehensible. Great care was taken not to have an erroneous representation due to the omissions of certain lines. The graph for parity IV and above has not been given as it was not much different from that of parity I-III.

In the primigravidae, in nearly half the cases the type of cervix continued to remain constant from 20 weeks to 36 weeks. In the other half, there was a progression in the type as pregnancy advanced, but this was not step by step and followed no definite pattern.

In the parity I-III group, the type of cervix had continued to remain constant throughout pregnancy in only a small number. In majority of cases in this group, the cervix progressed from a lower

to a higher type as pregnancy advanced. At 36 weeks there was a rush towards Type VI or higher, indicating true preparation of the cervix for delivery.

Both graphs indicate that there can be an arrest in the progressive opening out of cervix at any stage of gestation. There can be a jump from a lower type of cervix to a much higher type within a span of two or three weeks. No explanation for the phenomena was forthcoming from the clinical evaluation of the cases. Moreover, detection of Type V cervix even before 36 weeks of pregnancy did not mean a premature delivery as the lines continued beyond 36 weeks.

Premature Deliveries According to the Birth Weight Criterion of 2500 Gms.

If an open internal os is detected during pregnancy, one is interested in knowing if it will lead to premature delivery. The premature deliveries mentioned here are in respect of the vaginal examinations and not to the number of cases as the object was to co-relate the outcome of pregnancy with the vaginal finding.

Out of 541 vaginal examinations, in 54 (14%) instances the pregnancy terminated prematurely. In 16 instances the cause for prematurity was apparent, like accidental haemorrhage, pre-eclampsia, premature rupture of membranes, and hydramnios. In 38 instances prematurity was unexplained. The incidence of unexplained prematurity was thus 38 among 525 examinations (7.25%); in only six of these 38 instances the internal cervical os was open.

In the 525, the actual number of open os instances were 125, and premature delivery was associated with only six among the 125 examinations (4.8%). In the remaining 255 closed os instances,

prematurity was associated 32 times (12.54).

Premature Delivery and the Type of Cervix

Table V indicates the number and percentage of premature deliveries in the different types of cervix seen. (The premature deliveries with known causes

25 weeks and 34 weeks with no premature delivery, and 51 were over 34 weeks and four had premature delivery.

It may be re-emphasised here that Table V indicates that when a random vaginal examination is done during pregnancy in normal pregnant women, the outcome of this pregnancy is not influenced by the type of cervix.

TABLE V

The Number of Premature Deliveries (2500 gms.) and the Types of Cervix

Type of CX	Total No. Examinations	Premature Deliveries	Percentage of Premature Deliveries
I	245	24	9.79
II	32	2	6.25
III	78	3	3.84
IV	45	3	6.66
V	50	2	4.00
VI	50	3	6.00
VII	18	1	5.83
VIII & IX	7	nil	

have been excluded). According to the figures, the type of cervix did not significantly alter the outcome of pregnancy. It is interesting to note that in the 125 cases with Type V and over, 11 were 24 weeks or less with two premature deliveries, 63 were between

Outcome of Pregnancy, the Type of Internal Os and Parity.

This was compared as is shown in Table VI. (The premature deliveries with known causes have been excluded). In none of the parity group was there any significant difference between the

TABLE VI

The Co-relation of the Outcome of Pregnancy with the Type of Internal Os and Parity

Parity	No. of Examinations	Open Os cases		Closed Os cases	
		Term Delivery	Premature Delivery	Term Delivery	Premature Delivery
0	124	101	11	11	1
I	181	129	14	36	2
II	81	51	4	24	2
III	76	51	Nil	24	1
IV & More	70	40	1	29	Nil

incidence of premature delivery in cases with closed os and in cases with open os.

Discussion

A significant point of note had been the large number of open os cases. These cases increased with the increase in the gestational period from about 8 per cent at 24 weeks, to 25 per cent at 34 weeks, to 50 per cent at 36 weeks, and to 68 per cent at 38 weeks. While ten per cent of primiparae had open internal os, approximately 30 per cent of multiparae had open os.

In order to answer the question raised previously by Parikh and Mehta, (1962) whether there existed any degree of incompetency of the cervix, the cervixes in the present work were classified in nine different types, the first four belonging to the closed os group and the next five to the open os group. It has been brought out that the character of the internal os and the whole of cervix undergo frequently gradual but definite transformation as pregnancy advances, as if with the sole object of facilitating the ultimate opening of the cervix in labour. However, these characteristic changes did not occur in each case, and did not follow any clear pattern in a number of cases. The cause for this unpredictable behaviour of cervix remains unexplained. In the multiparae, the patterns were more definite than in the primigravidae.

Hendricks *et al*, (1970) studying the cervical patterns in the 4 weeks of pregnancy prior to delivery illustrated a progressive dilatation of cervix in both primi- and multi-gravidae, the dilatation being more in the latter group. Effacement too according to them, occurred progressively in all parity groups in the 4 weeks preceding delivery, it being more in

nulliparous compared to multiparous women. The present study stops at 38 weeks and therefore cannot substantiate or disprove the above findings.

The character of internal os, the type of cervix and the parity did not significantly determine the outcome of pregnancy as far as prematurity was concerned. The character of the internal os did not seem to help predict the time of onset of labour, as suggested by Wood *et al*, (1965) and Anderson and Turnbull (1969). It may be repeated that functional incompetence of cervix which is a different entity, is not synonymous with an anatomical change occurring in the cervix.

Lastly, the findings of this study concur largely with those of previous study of Parikh and Mehta.

Summary

1. Three hundred and eighty-six pregnant women between 16 and 38 weeks, had a total of 541 vaginal examinations performed on them.

2. In 130 instances, the internal os of cervix was found open, irrespective of parity and the week of gestation.

3. A detailed analysis according to parity, and the week of pregnancy has been submitted.

4. A classification of the different types of cervix found during pregnancy has been put forth here for the first time. In all, there were nine types.

5. The behavioral patterns of the cervix during pregnancy have been critically analysed with respect to the week of gestation, parity, and the time of delivery. Multiparae seemed to follow more frequently fixed patterns.

6. Premature delivery could not be co-related to any type of cervix. Anato-

mical shortening or opening out of cervix showed no functional significance.

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