SIGNIFICANCE OF INITIAL CONDITION OF CERVIX UTERI TO SUBSEQUENT COURSE OF LABOUR

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Prolonged labour in the absence of cephalo-pelvic disproportion, where the cervix uteri fails to become fully dilated twenty-four hours or more from the onset of contractions, remains one of the great problems of obstetrics. Much research has been carried out into the causes responsible for this delay, and it was during one such departmental investigation into the problem at University College Hospital, London, that Nixon (1952) gave a preliminary report upon the correlation of the initial condition or type of the cervix and the subsequent course of labour. This investigation has been continued and 133 cases have now been studied.

It was decided to note carefully the condition of the cervix before the onset of labour at the time of surgical induction. In the great majority of cases pre-eclamptic toxæmia was the indication for induction in primigravidae at or near term with the vertex presenting. Cases of cephalo-pelvic disproportion were excluded from this study.

The diagram shows the way in which the cervix has been typed at the time of induction of labour. Types 1 and 2 represent the condition most commonly and

Diagram showing types of cervix uteri. 1. Soft, effacing; canal admits one finger. 2. Soft, long, and closed; whole canal admits one finger. 3. Firm, long, and closed; external os will not admit one finger. 4. Firm and short external os admits one finger; internal os rigid. 5. Cervical anomalies: pinhole os, duplication, etc. A=Sacral os, anterior sacculum occurring in any of the previous types.

types 3 and 4 the condition least commonly found. Cervical anomalies are included in type 5. It will be seen that there is an increasing hardness of the cervix as well as increasing difficulty in inserting the examining finger through the cervical canal as one passes from types 1 to 5. Other authors have noted differences in texture of the cervix. Arthur (1949) describes certain characteristics, such as hardness and tenseness, in his observations on the cervix in cases of cervical dystocia; and MacRae (1949) refers to a similar rigidity of the tissues in cervical achalasia in certain cases of primary uterine inertia. Dieckmann and McCready (1947) classify the cervix somewhat similarly by the degree of softening, effacement, and estimated amount of dilatation. Calkins (1954) also has drawn attention to the importance of the firm cervix in prolonged labour.

The diagram also depicts a special position of the cervix that has been found in types 1 to 4. This is the "sacral" position, or "sacral" os, in which there is posterior displacement of the cervix, with the external os pointing backwards towards the hollow of the sacrum in such a manner that if the presenting part is engaged in the maternal pelvis its lower part is at a deeper level in the birth canal than the external os. In order to enter the cervix the examining finger will first have to hook it down below the presenting part and thus bring the cervical canal back into its normal axis. Greenhill (1951) has described this position, and states that "the location of the cervix at term varies. . . . Most often it is in the middle of the pelvis, many times it is back in the hollow of the sacrum. . . . If it is near the sacrum and hard to reach with the finger it is pathological."

Kerr and Moir (1949) also discuss this backward displacement of the cervix in association with anterior sacculum and abnormal stretching of the anterior wall of the lower uterine segment. Presumably, the degree of posterior or sacral position depends upon the amount of stretching of the anterior uterine wall.

Present Investigation

In this study 133 cases have been observed—99 cases without and 34 cases with a sacral os. The distribution of these types of cervix is shown in Table I, where the numbers of the "ripe" cervix (types 1 and 2) and "unripe" cervix (types 3, 4, and 5) are also shown.

By typing the cervix from the condition found at the time of surgical induction and by noting the course of labour that followed, it has been possible to investigate whether any particular type of cervix, especially if combined with a sacral os, is associated with a long labour, a long latent interval prior to the onset of labour, or an increased interference rate by forceps or by caesarean section in the ultimate delivery.

Table II sets out the findings of the course of labour studied for the average time of the induction-to-delivery interval (I.D.I.), average duration of labour, and average latent interval in relation to the condition of the cervix with a sacral os. It is evident that the average latent interval before labour starts in the "ripe" types of cervix (types 1 and 2) is significantly less than in the "unripe" types of cervix (types 3, 4, and 5), confirming previous clinical observations. The average duration of labour is also less in types 1 and 2.

Dr. D. E. Barton, of the statistical department of University College, London, has kindly investigated the figures in

TABLE I.—Distribution of the 133 Cases According to Type of Cervix

Type	Cases Without Sacral Os	Cases With Sacral Os
1	66	17
2	23	14
3	4	1
4	5	2
5	1	0
Total ..	99	34

TABLE II.—Types of Cervix Uteri Without a Sacral Os, Showing the Subsequent Course of Labour (99 Cases)

Type of Cervix	Average I.D.I. in Hours	Average Duration of Labour in Hours	Average Latent Interval in Hours (i.e., Induction to Onset of Labour)	No. of Cases
1	19.7	10.7	9.0	66
2	27.0	16.0	11.0	23
3	71.7	22.0	49.7	4
4	53.2	21.5	31.7	5
5	One case delivered by caesarean section after being 9 hours in labour with a pin-hole os			

these tables as well as the individual figures of the cases, and has shown them to be statistically significant.

The course of labour with the various types of cervix complicated by a sacral os has also been analysed, and is shown in Table III. It will be seen that, compared with

TABLE III.—*Course of Labour in Cases of Sacral Os (34 Cases)*

Type of Cervix	Average I.D.I. in Hours	Average Duration of Labour in Hours	Average Latent Interval in Hours	No. of Cases
1	61.1	16.0	45.1	17
2	44.8	34.2	10.6	14
3	One case only. This patient was 72 hours in labour, and was subsequently delivered by caesarean section			1
4	46.0	17.0	29.0	2

Table II, the induction delivery interval is strikingly prolonged in types 1 and 2 and the average duration of labour is also increased, especially in type 2. The increased latent interval in type 1 cervix with a sacral os is also of great interest. The difference in the mean times of these cases compared with the same type of cervix without the sacral os is highly significant statistically.

Table IV compares the relative rates of forceps delivery and caesarean section in the different types of cervix and gives the figures for the total number of deliveries (1,232)

TABLE IV

Type of Cervix	Forceps Delivery	Caesarean Section	No. of Cases
Ripe cervix (types 1 and 2) ..	15 (16.8%)	4 (4.4%)	89
Unripe cervix (types 3, 4, and 5) ..	2 (20%)	3 (30%)	10
All types with sacral os ..	4 (11.7%)	6 (17.6%)	34
Total deliveries in 1951 ..	11%	5.4%	1,232

for the year 1951. The increased interference rate in the unripe types as compared with the ripe types of cervix is statistically significant, as is also the increased caesarean section rate in cases of sacral os found in all types of cervix.

Table V shows the numbers of cases in which labour lasted over 24 hours or in which labour was terminated before this time for reasons associated with delay in cervical

TABLE V.—*Course of Labour in Relation to Type of Cervix (133 Cases)*

Type	No. of Labours over 24 Hours or Terminated Earlier by Caesarean Section		No. of Cases	
	Without Sacral Os	With Sacral Os	Without Sacral Os	With Sacral Os
1	7	5	66	17
2	9	7	23	14
3	1	1	4	1
4	3	1	5	2
5	1	—	1	—

dilatation by caesarean section. The latter operation was performed in these cases for such reasons as increasing pre-eclamptic toxæmia if deterioration in the maternal condition was directly associated with a long latent interval. The sacral os is especially seen to be responsible for a higher incidence of prolonged labour and surgical intervention.

A typical example is shown by the following case, in which a high rupture of membranes was performed for a mild pre-eclamptic toxæmia near term. The cervix was found to be firm, long, and closed, and admitted a finger only with difficulty (type 2). It was also sacral in position and required hooking down digitally—a difficult procedure—before a Drew-Smythe catheter could be introduced. Eighteen ounces (510 ml.) of liquor amni was withdrawn, but 5½ hours passed before contractions began. After a further 29½ hours caesarean section had to be performed on account of an increasing degree of toxæmia and a rising foetal heart rate.

Discussion

By a careful examination of the condition of the cervix at the time of induction of labour or, for that matter, at the spontaneous onset of labour, it should be possible to classify the cervix according to its degree of "ripeness" and so give a reasonable estimate of the likely course of labour that will follow. If there is a soft open and partially effaced os an early onset of labour and a spontaneous delivery are to be expected. If, however, the cervix is firm and difficulty is experienced in inserting the finger, then a prolonged latent interval and a somewhat longer labour are likely.

If a sacral position of the cervix is found, even in the case of a type 1 cervix, a longer latent interval is to be expected, although once labour starts it may well be of average duration.

Intervention either by forceps or by caesarean section is also more likely in the unripe type of cervix, and caesarean section is more likely to be required in cases in which the sacral os is present.

As well as the risk of deterioration in cases of severe pre-eclampsia, there is an increasing risk of infection and foetal death when the membranes have been ruptured for 24 hours. In certain cases, therefore, in which the type of cervix is unfavourable and the latent interval likely to be prolonged, it may well be advisable to perform caesarean section without awaiting the onset of contractions.

In cases of sacral os in which time is not so pressing it may be possible to hook down the cervix and sweep the membranes digitally without actually rupturing them. Forty-eight hours later the cervix may be found to have become much easier to enter, and rupture of the membranes can then be more effectively performed. Faris and Kahlenberg (1954) suggest the use of a dilute oxytocin drip to soften certain cases of the hard unripe cervix. It is given during the day for two days. This may well be tried in such cases of sacral os following a digital sweep, provided the uterus is not hypertonic, although in such cases proper toco-graphic control is advisable.

In the light of these findings, a special plea is made for a more careful assessment of the cervix uteri at the time of surgical induction than is often the case. By so doing, the clinician can learn much that will help him in the subsequent care of his cases, and at the same time increase his interest in what is often, quite incorrectly, thought to be a somewhat prosaic obstetric procedure.

Summary

The cervix has been classified into five types at the time of the induction of labour in 133 cases.

The course of labour in regard to the induction delivery interval, the duration of labour, and the latent interval prior to the onset of contractions has been studied. Special reference is made to the "sacral" position of the cervix.

The relative interference rate by forceps or caesarean section in relation to the various types of cervix has been noted.

The significance of certain types of cervix in labour and their management is discussed.

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