

ETIOLOGICAL FACTORS IN PROLONGED LABOUR

by

V. KAMALA,** M.D.

J. MIRCHANDANI,* M.D.

Prolonged labour due to abnormal uterine action is a problem which confronts every obstetrician from time to time. Once the mechanical obstruction is excluded, early recognition and timely intervention would decrease foetal and maternal morbidity. With this in mind it was proposed to study the factors that predispose to prolonged labour in the absence of any mechanical obstruction. No attempt is made to assess the emotional factor.

Material and Methods

One hundred parturients, without mechanical obstruction but in labour longer than 24 hours are reviewed. The etiological factors in these parturients are compared with those in the control group of 1083 normal parturients admitted during the same period in Lady Hardinge Hospital, New Delhi. The cases with antepartum haemorrhage and those with gestation less than 32 weeks were excluded. The ICMR classification was followed for allotting socio-economic status.

The position and station of head at onset of labour was recorded and condition of the cervix, whether ripe or unripe, was

noted using the criterion laid down by Embry (1960).

Definition

It is difficult to fix the time of onset of labour since it involves certain amount of subjective error. In the present study, labour was considered to have started when the patient noted regular painful uterine contractions. It was also noted if patient had suffered from 'false labour' before starting actual labour. It was labelled 'prolonged', if duration was more than 24 hours.

Corner *et al*, (1951) considered 20 hours as the limit of normal labour, Schmitz *et al*, (1947); Willson & Allesbury (1951); Stewart (1952); McCall and Hara (1960) and Rubin and Gordon (1969) considered it as 24 hours, beyond which labour was labelled 'prolonged'.

MacRae (1949) considered labour prolonged if first stage lasted more than 48 hours. Friedman *et al*, (1969) base their definition on their curve of cervical dilatation in labour, separately for nulliparae and multiparae.

Incidence

Due to failure of forces, labour is prolonged beyond 24 hours in 1.8% to 5.4% of cases as reported by Wilson and Allesbury (1951); Starr (1952); McCall and Hara (1960); Rubin and Gordon (1969). In the present study, 3% (100 cases) of consecutive 3329 labour cases had labour longer than 24 hours.

*Asst. Professor, Lady Hardinge Medical College & Hospital, New Delhi.

A part of Thesis submitted for M.D., Delhi University.

**Asst. Medical Officer, E.S.I. Hospital, Quilon, Kerala.

Received for publication on 23-2-1973.

Observations and Comments

Socio-economic Factors

The environment in which a woman is brought up has an important influence on her reproductive performance (Baird 1952). As the present study is based on hospital population, there were no cases belonging to Class I (income above Rs. 1000/- per month) but statistically significant increased percentage of prolonged labour cases belonged to socio-economic Class II and III i.e. income above Rs. 200.00 per month irrespective of the parity (Table I). Baird (1952) found a higher social status in prolonged labour cases. The beneficial effects of better physical development may be possibly counterbalanced by the 'fear-pain-tension' syndrome:

Age

Disordered uterine action of all kinds is comparatively uncommon in young primigravidae, but increases with age (Baird 1952a; Stewart *et al*, 1952). Burnhill *et al*, (1962a) showed that total amount of work required for full dilatation of the cervix was less in the age group between 20-29 years than in younger or older parturients. This is borne out by the review of present cases, as among nulliparae with prolonged labour 29.16% (21 cases) were below the age of 19 years compared to 15.83% (41 cases) in the control group and among multiparae 25% (7 cases) belonged to age group 30-40 years compared to 17.61% (142 cases) in the control group (Table I).

Stewart (1952) and Baird (1952a) both found increasing incidence of prolonged labour with increasing age. Corner (1951) and Evans (1956) found no relation between age and duration of labour. Friedman (1962) demonstrated that age variation had no influence on the prolongation

of latent or active phase of cervical dilatation.

Parity

Parturition according to Jeffcoate and Lister (1952) is a function in which the genital tract becomes proficient only with experience and once the cervix has been dilated completely, it offers less resistance in subsequent labours, as confirmed in the present study. The nulliparae constituted 72% of the prolonged labour group. This figure closely approximates 65.5% of Keetel *et al*, (1940), 67.5% of Evans (1956) and 70% of Johnson (1961). But, Donald (1969) believes that the hypertonic variety of abnormal uterine action, has more tendency for repetition. In the present study, 21.42% (6 cases) of multiparae gave history of previous prolonged labour compared to 2.36% in control multiparae.

Height and Obesity

In the present study though obesity was more frequent no such association of maternal height with prolonged labour was found. Baird (1952a) and Jeffcoate (1961) also found no relationship of height to the duration of labour unless height caused changes in the shape of pelvis.

Prolonged labour is found more frequently in short, sturdy women showing "dystocia dystrophia" syndrome (Williams, 1942 and Torpin, 1947).

In the present study a woman was considered obese if the ratio of her weight in pounds to height in inches exceeded 2.2. Such patients in the prolonged labour group were twice more frequent than in the control group (Table I).

Dysmenorrhoea

Kennedy (1955) observed a higher incidence of primary dysmenorrhoea in the inertia group.

TABLE I
Incidence of Various Etiological Factors

	Nulliparae				Multiparae			
	Control		Prolonged labour		Control		Prolonged labour	
	No.	%age	No.	%age	No.	%age	No.	%age
	259	100	72	100	806	100	28	100
S. Econ. status								
II or III	47	18.15%	17	23.61%	85	10.54%	6	21.42%
Age less than 19 years	41	15.83%	21	29.16%	-	-	-	-
Age 30-34 years	-	-	-	-	142	17.6%	7	25.0%
Obesity	15	5.79%	8	11.1%	34	4.2%	3	10.7%
Previous history	-	-	-	-	19	2.36%	6	21.42%
Dysmenorrhoea	48	18.53%	29	40.28%	42	5.23%	5	17.87%
False labour	13	5.02%	18	25.00%	39	4.23%	5	17.87%
Prem. rupt. of membranes	22	8.5%	7	9.72%	43	5.34%	2	7.14%
Induction of labour	14	5.4%	9	12.5%	33	4.09%	2	7.14%
Over distended uterus	2	0.77%	1	1.39%	18	2.97%	4	14.28%
Foetal wt. 3500 G. or above	4	1.54%	5	6.95%	42	5.21%	4	14.28%

In the present study, 40.28% (29 cases) of nulliparae and 17.87% (5 cases) of multiparae with prolonged labour gave history of primary or secondary dysmenorrhoea, a higher incidence compared to 18.53% and 4.23% in the control nulliparae and multiparae, respectively.

The "Disturbed polarity" is one of the hypothetical cause of spasmodic dysmenorrhoea, and it is tempting to suggest that a persistence of the same functional abnormality in labour may manifest as uterine action.

False Labour

Caldeyro Barcia & Alvarez (1950 and 1952) found that contractions in false labour were synchronised, had reversed polarity, occurred in relative regular rhythm but were irregular in intensity. Whatever the cause of it, the same type of inco-ordination probably persists in labour, as these cases with "painful pre-labour" or "false labour" are particularly

prone to have long labour. Table I shows a definite higher incidence of false labour in the prolonged labour group compared to the control group, in both nulliparae and multiparae.

Out of 18 nulliparae with history of 'false pains' in the prolonged labour group, inco-ordinate uterine action as judged clinically, 1 had constriction ring dystocia, 2 had hypotonic uterine action and in one uterine action was considered clinically normal.

Postmaturity

The association of prolonged labour with post maturity is well acknowledged. Clayton (1953) found that in nulliparae with 42 weeks' pregnancy, the incidence of labour lasting more than 24 hours was almost double that of nulliparae in labour at term.

The present review (Table II) also indicates that delay in onset of labour after 41 weeks tends to prolong labour both

in nulliparae and multiparae. Both 'post dateism' and 'dysfunctional uterine action' may have same underlying hormonal basis. Nixon and Smyth (1959); Glenning (1962); and O'Leary (1965) taken up. Nixon and Smyth (1959); Glenning (1962); and O'Leary (1965) found that labour was shortened in duration where it was induced. Indeed, in the

TABLE II
Duration of Pregnancy in Control Group and Prolonged Labour Group*

Duration of Pregnancy	Nulliparae		Multiparae	
	Control 196 (100%)	Prolonged Labour 55 (100%)	Control 588 (100%)	Prolonged Labour 18 (100%)
32-36 weeks				
No.	19	2	74	3
%	9.69%	3.64%	12.58%	16.67%
36-41 weeks				
No.	156	45	467	10
%	79.59%	81.82%	79.42%	55.55%
Above 41 weeks				
No.	21	8	47	5
%	10.72%	14.54%	8.00%	27.78%

* Duration of pregnancy as calculated by Naegle's rule; cases with indefinite date of last menstruation excluded.

Premature Rupture of Membranes (PRM)

In cases with premature rupture of membranes, labour has been shown to be shortened by Gibson (1952) and Bainbridge (1958). This also was borne out by the present study as higher percentage of patients with premature rupture of membranes delivered within 12 hours than those with intact membranes. The P.R.M. does not predispose to prolonged labour. The membranes had ruptured before onset of labour in 8.5% of control nulliparae and in 9.72% of prolonged labour group and in 5.34% of control multiparae and 7.14% of multiparae with prolonged labour group (Table I).

Induced Labour

The induction of labour generally does not cause prolonged labour if it is carried at full term gestation when the foetal head

is well engaged and the cervix is well present study also in multiparae greater percentage of induced cases had labour shorter than 12 hours, than in those with spontaneous onset of labour (Table I). 5.4% of the nulliparae and 4.09% of multiparae of control group had labour induced, while in prolonged labour group, 12.5% of nulliparae and 7.14% of multiparae had induction of labour. This would depend upon the indications of induction and pre-existing conditions in such cases.

Overdistended Uterus

The intraamniotic fluid basal pressure was found to be increased in overdistended uterus by Caldeyro Barcia and Alvarez (1952 and 1957). It resulted in decreased intensity of contractions, which came back to normal once the mechanical difficulty was relieved by withdrawal of some fluid.

Table I shows higher percentage of cases with over distended uterus in prolonged labour group.

Weight of the Baby

While Corner (1951); Kennedy (1955); Keetel (1956); consider that weight of the baby is not a significant factor affecting the duration of labour, Jeffcoate (1961) has shown that any group of patients with inefficient uterine action contained greater number of large babies. Big baby may prolong labour, either by disproportion or by overdistension of the uterus. Babies with weight of 3500 G. or more were found in 6.95% of nulliparae and 14.28% of multiparae with prolonged labour compared to 1.54% of control nulliparae and 5.21% of control multiparae (Table I).

In both nulliparae and multiparae greater percentage of patients delivered within 12 hours if head was at station 0 than when it was at station—2. Eight (9.5%) out of 41 nulliparae with head at station 0 and 11 (23.4%) out of 47 multiparae with head at station—2, had labour longer than 24 hours.

MacRae (1949) recorded a high incidence of right occipitoposterior (R.O.P.), position (63.8%) in cases with labour more than 48 hours. Moore and D'Esopo (1955) reported that 30.79% of prolonged labour cases had R.O.P. position while overall hospital incidence was 13%. Even in the present study more frequently foetal back was found on the right side in prolonged labour group compared to control group (Table III), R.O.P. being four times more frequent.

TABLE III

Incidence of Various Positions of the Foetal Head in Control and Prolonged Group at Onset of Labour

	Nulliparae				Multiparae			
	Control 200		Prolonged Labour 67		Control 610		Prolonged Labour 24	
	No.	%	No.	%	No.	%	No.	%
L.O.A.	86	43.00%	15	22.39%	306	56.16%	5	20.83%
L.O.T.	61	30.57%	13	19.4%	149	24.43%	6	25.00%
R.O.P.	15	7.5%	18	28.87%	49	8.03%	8	33.33%
R.O.T.	27	13.5%	12	7.9%	48	7.88%	4	16.67%
R.O.A.	11	5.5%	09	13.43%	58	9.51%	1	4.17%

* Cases of IUD, breech and hydramnios are excluded, position of head was assessed by abdominal and vaginal examination at the onset of labour.

Station of Head

High foetal head at term in the absence of cephalopelvic disproportion is considered by Jeffcoate (1961) to be a manifestation of abnormal uterine action resulting in incomplete formation of the lower segment. Station of head was noted within 3 hours of onset of labour in 344 patients.

No significant increase of breech presentation was found in the prolonged labour group.

Nature and Dilatation of Cervix

The condition of the cervix within 3 hours of the onset of labour was noted according to Embry's (1960) classification

in 154 nulliparae and 190 multiparae. Only 11.53% of 78 nulliparae with favourable cervix were still undelivered after 24 hours, whereas 36.36% of 66 nulliparae with unfavourable cervix had labour longer than 24 hours.

Anomalies of the Uterus

While no case of Mullerian duct malformation was noted in present study, MacRae (1949) suggested that minor degree of arcuate uterus or disharmony of separately developed uterus may be associated with inco-ordinate uterus. Uterine hypoplasia, fibroid uterus and uterine scars do not play any significant role (Jeffcoate 1963).

Summary

The incidence of the various possibly etiological factors in prolonged labour in absence of mechanical factor is compared with that in normal labours.

The comparison suggests that higher social status, very young age, age above 30 years, obesity, postdated pregnancy, overdistended uterus, big baby with high head and ROP presentation make parturient liable to a slow labour.

History of dysmenorrhoea and false labour and in multiparae history of previous slow labour is more frequently obtained in cases with prolonged labour.

Premature rupture of membranes actually shortens labour, it does not predispose to prolonged labour.

Under present circumstances of lack of knowledge about exact pathogenesis of dysfunctional uterine labour, it would be worthwhile to take note of these likely etiological factors and start early active treatment of all those parturients who have a slow start of labour in the presence of these findings.

Acknowledgement

We thank Dr. S. Achaya, Principal, and Medical Superintendent, Lady Hardinge Medical College & Hospital and Dr. P. Madan, Professor and Head of the Department of Obstetrics & Gynaecology, Lady Hardinge Medical College and Hospital for women, New Delhi for granting permission to publish the above data.

References

1. Bainbridge, M. N. and Nixon, W. C. W.: *J. Obst. Gynec. Brit. Emp.*, 65: 189, 1958.
2. Bainbridge, M. N.: *Am. J. Obst. Gynec.*, 83: 572, 1962.
3. Baird, D.: *Am. J. Obst. Gynec.*, 63: 1200, 1952 a.
4. Baird, D.: *J. Obst. Gynec. Brit. Emp.*, 59: 661, 1952.
5. Burnhill, M. S., Danzis and Cohen, J.: *Am. J. Obst. Gynec.*, 83: 561, 1962 a.
6. Burnhill, M. S.: *Am. J. Obst. Gynec.*, 83: 572, 1962 b.
7. Caldeyro Barcia, R., Alvarez, H. and Reynolds, S. R. N.: *Surg. Gynec. Obst.*, 91: 641, 1950.
8. Caldeyro Barcia, R. and Alvarez, H.: *J. Obst. Gynec. Brit. Emp.*, 59: 646, 1952.
9. Caldeyro Barcia R., Pose, S. V. and Alvarez, H.: *Am. J. Obst. Gynec.*, 73: 1238, 1957.
10. Clayton, S. G. (1963): Quoted in *Progress in Clinical Obstetrics and Gynaecology* edited by T.L.T. Lewis, J. & A. Churchill Ltd. (London), 2nd ed. 1965, p. 342.
11. Corner, G. W. Jr., Kristner, R. W. and Wall R. L.: *Am. J. Obst. Gynec.*, 62: 1086, 1951.
12. Donald, L.: *Practical Obstetric Problems*, 4th ed. London (1969), Lloyd-Luke Ltd.
13. Embrey, M. P.: *J. Obst. Gynec. Brit. Cwlth.*, 69: 910, 1960.
14. Evans, T. N. G.: *Obst. & Gynec.*, 6: 522, 1956.
15. Friedman, E. A., Niswar, K. R., Sachtleben, M. R. and Nemose, J.: *Am. J. Obst. & Gynec.*, 33: 145, 1969.

16. Friedman, E. A. and Sachtleben, M. R.: *Am. J. Obst. Gynec.*, 20: 761, 1962.
17. Glenning, P. P.: *J. Obst. Gynec. Brit. Cwlth.*, 69: 629, 1962.
18. Gibson, C. B.: *J. Obst. Gynec. Brit. Emp.*, 59: 814, 1952.
19. Jeffcoate, T. N. A. and Lister, U. M.: *J. Obst. Gynec. Brit. Emp.*, 59: 327, 1952.
20. Jeffcoate, T. N. A.: *Lancet*, 2: 61, 1961.
- 20b. Jeffcoate, T. N. A.: In *British Obst. & Gynec. Practice (Obstetrics)* edit. by Brit. Obst. & Gynec. Practice, 3rd Edition. Edited by Eardly Holland & Aleck Bourne William Heinsmann, Med. Book's Ltd., London, 1963, p. 637.
21. Johnson, R. E.: *J. Obst. Gynec. Brit. Emp.*, 18: 468, 1961.
22. Keetel, W. C., Diddle, A. W. and Plass, E. D.: *Am. J. Obst. Gynec.*, 40: 225, 1940.
23. Kennedy, C.: *Brit. Med. J.*, 1: 1522, 1955.
24. MacRae, J.: *J. Obst. Gynec. Brit. Emp.*, 56: 785, 1949.
25. MacRae, J.: *J. Obst. Gynec. Brit. Emp.*, 59: 660, 1950.
26. Mecal, J. O. Jr. and Hara, G. S.: *Am. J. Obst. Gynec.*, 80: 296, 1960.
27. Moore, D. B. and D'Esopo, D. A.: *Am. J. Obst. Gynec.*, 70: 1338, 1955.
28. Nixon, W. C. W. and Smyth, C. N.: *Am. J. Obst. & Gynec.*, 77: 393, 1959.
29. O'Leary, J. L. and O'Leary, J. A.: *Obst. & Gynec.*, 25: 531, 1965.
30. Reid, D. E.: *Am. J. Obst. Gynec.*, 52: 719, 1946.
31. Rubin, M. and Gordon, R. N.: *South Afr. Med. J.*, 43: 652, 1969.
32. Schmitz, H. E., Bremnem, J. X., Towne, J. E. and Baba, G. R.: *Am. J. Obst. Gynec.*, 54: 643, 1947.
33. Starr, S. H.: *Am. J. Obst. Gynec.*, 63: 333, 1952.
34. Stewart, D. B.: *J. Obst. Gynec. Brit. Emp.*, 59: 641, 1952.
35. Willson, J. R. and Allesbury, R. J.: *Am. J. Obst. Gynec.*, 61: 1253, 1951.