

Pattern of Descent of Foetal Head in Normal Labour

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The phenomenon of foetal head descent and the effect of station of foetal head at admission on the course of labour were studied on the basis of a prospective partographic study in 100 cases of normal labour. Only 16.9% of nulliparous women had engaged foetal head at admission in labour. Engagement of foetal head occurred during the period of maximum slope of cervical dilatation in nulliparous women and at the onset of deceleration phase in multiparous women.

Parturients with unengaged foetal head entered hospital much earlier in labour than those with engaged foetal head. Course of labour was uninfluenced by the degree of engagement of foetal head. However, multiparous women showed faster rate of foetal head descent than nulliparous women ($p < 0.001$) and women with lesser haemoglobin concentration demonstrated slower rate of descent of foetal head ($p < 0.01$).

AMONG the major notable clinical features of labour, cervical dilatation and descent of foetal head seem utilitarian in assessing labour progression. The value of critical analysis of relationship of cervical dilatation as related to time elapsed in labour had been reported^{1,2}. Late in 1st stage and during the 2nd stage of labour, when cervix has been fully dilated and retracted out of reach, the station of foetal head subserves the same role as an index of progression as cervical dilatation did earlier.

It has been observed that in many nulliparous women, engagement of the foetal head is accomplished prior to the onset of labour and further descent does not occur until late in labour. In others in whom engagement of the foetal head initially is not so extensive, further descent occurs during the 1st stage of labour³. It is also acknowledged that the unengaged foetal head in nullipara at the onset of labour is commonly associated with cephalopelvic disproportion^{4,5}.

This communication based on prospective partographic study, purports to characterise the phenomenon of foetal head descent observed objectively during the course of normal labour and attempts to ascertain whether the course of labour was somehow influenced by the degree of engagement that the foetus had reached by the time labour began.

MATERIAL AND METHOD

One hundred cases of normal labour (71 nullipara

and 29 multipara) were studied in detail for the change in foetal head station related to cervical dilatation - time function of labour as determined by frequent digital vaginal examinations.

Normal labour is defined as one in which a normal female with live foetus (singleton) with cephalic (vertex) presentation started labour spontaneously between 37 and 41 weeks of gestation. She was not given induction anaesthesia or oxytocic drugs and was delivered normally.

Normal parturient was defined as one aged between 18-30 years, minimum 140 cm tall, with haemoglobin of at least 8g/dl, without scar on uterus and, without any detectable medical or surgical disorders complicating pregnancy.

Cases with parity more than 4, more than 5 cm dilatation of cervix at admission, premature rupture of membranes (ie, before the onset of labour) and those with cephalopelvic disproportion were excluded.

The diagnosis of established labour was based on the findings of regular, progressive and painful uterine contractions and was confirmed by abdominal and vaginal examinations. The parturients were thus admitted with different degrees of cervical dilatation.

The time of admission to labour ward was taken as zero hour. Vaginal examinations were performed at 2 to 4 hourly intervals until delivery to record on the composite partogram the cervical dilatation achieved (in cm) and the level of lowest part of the foetal head in relation to ischial spines (in cm). On an average a parturient had 4 vaginal examinations during the course of labour. Low amniotomy was carried out if the membranes had not

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Accepted January 25, 1993

spontaneously ruptured by the time 4 cm cervical dilatation was reached.

The onset of 2nd stage of labour was confirmed when cervicograph predicted the time of full dilatation, or when the parturient was beginning to bear down.

Originally 124 consecutive parturients satisfying the selection criteria were recruited for the study. Twenty-four cases were excluded from the analysis because of need for intervention with oxytocin stimulation in 4, instrumental delivery in 15 and caesarean section in 5 cases.

OBSERVATIONS

Average age of parturients was 23.97 years and period of gestation was 39.09 weeks. None of the parturients registered were overweight or anaemic. The average weight of the babies born was 2919.63 g.

It was interesting to note that 83.1% of 71 nulliparous women admitted in labour had unengaged foetal head.

Data representing the average stations as related to the cervical dilatation defined phases of labour are shown in Table 1. As cases were admitted with different degrees of cervical dilatation, observation in latent phase was possible in 39 (nullipara 37 and multipara 2) and acceleration phase in 78 (nullipara 56 and multipara 22). The composite curve (Fig 1) shows that in nulliparous women descent of foetal head begins well before the

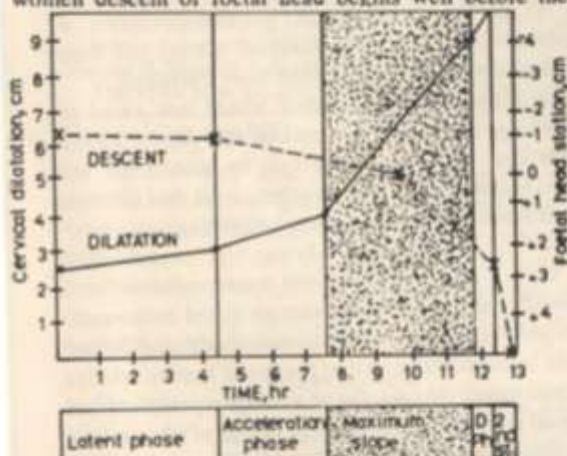


Fig 1 — Showing Pattern of Cervical Dilatation and Foetal Head Descent in Normal Labour in Nullipara (D ph - Deceleration phase, 2nd st - 2nd stage, hr - Hour)

2nd stage of labour, the earliest point of acceleration coinciding with the phase of maximum slope. Increased rate of descent reached at the onset of deceleration phase and then continued maintaining the same rate until perineum was reached. Similar pattern of foetal head descent was noticed in multiparous women (Fig 2).

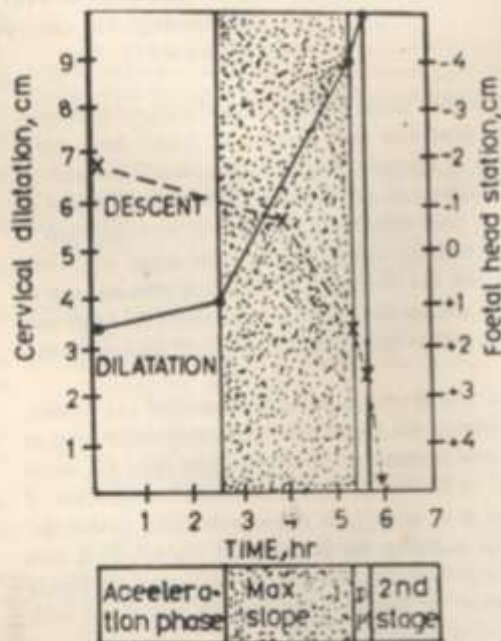


Fig 2 — Showing Pattern of Cervical Dilatation and Foetal Head Descent in Normal Labour in Multipara (Max - Maximum, D ph - Deceleration phase)

The course of labour in nullipara in engaged and unengaged foetal head, did not show significant differences in the durations of their active phases and 2nd stages respectively (Table 2). However, the duration of observed latent phase of labour was significantly longer in unengaged group ('t' test, $p < 0.001$). Except the duration of observed latent phase, the curves for engaged and unengaged groups could be superimposed (Fig 3). But, the duration of conventional latent phase calculated from the onset of labour based on patients' perception of start of 'pains' was no different in 2 groups.

Various factors that could influence the rate of foetal

Table 1 — Showing Progression of Foetal Head Descent (in cm) in Labour

Station of head in	At admission (mean ± SD)	Onset of active phase (mean ± SD)	Mid maximum slope (mean ± SD)	Onset of deceleration phase (mean ± SD)	Onset of 2nd stage (mean ± SD)	Rate of descent (mean ± SD)
Nullipara (n=71)	-1.5 ± 0.93	-1.3 ± 0.91 (n=56)	-0.2 ± 0.75	+1.3 ± 1.07	+2.4 ± 1.29	1.12 ± 0.53 cm/hour*
Multipara (n=29)	-1.9 ± 0.82	-1.9 ± 0.75 (n=22)	-0.7 ± 0.84	+1.5 ± 1.16	+2.6 ± 1.14	1.97 ± 0.99 cm/hour*

Table 2 — Showing Cervicographic Data (Mean \pm SD) in Nulliparous women with Engaged and Unengaged Foetal Head at Admission in Labour

Phase of labour	Unengaged foetal head (n=59)	Engaged foetal head (n=12)
Latent phase (hour)**	4.61 \pm 3.52 (n=34)	2.20 \pm 0.36 (n=3)
Active phase (hour)	8.37 \pm 4.52	9.18 \pm 5.29
Acceleration phase (hour)	3.24 \pm 2.75 (n=50)	2.41 \pm 1.22 (n=6)
Maximum slope (cm/hour)*	1.30 \pm 0.67	0.90 \pm 0.49
Deceleration phase (hour)	0.61 \pm 0.53	0.62 \pm 0.21
Second Stage (hour)	0.57 \pm 0.48	0.47 \pm 0.41

Statistical significance with Student's 't' test, *p < 0.05, **p < 0.001

bead descent and affect course of labour were studied. Multiparous women had significantly faster rate of descent of 1.97 \pm 0.99 cm/hour than 1.12 \pm 0.53 cm/hour in nulliparous women (p < 0.001). Women with blood haemoglobin less than 10 g/dl had significantly slower rate of foetal head descent of 0.95 \pm 0.25 cm/hour than 1.18 \pm 0.57 cm/hour in those with haemoglobin more than 10 g/dl (p < 0.01). Other factors like maternal age, height and weight, foetal head position, infant weight, social class, rural or urban background, antenatal clinic booking status did not significantly influence the rate of foetal head descent.

All the 24 cases, that were excluded for the analysis hitherto for cervicographic data were nulliparous women. Of them, 22 had unengaged foetal head and 3 patients who had caesarean section for cephalopelvic disproportion detected during labour were admitted with unengaged foetal head, meaning, lack of engagement was associated with disproportion in 3.8% of 79 nulliparous women.

None of the babies born were asphyxiated at birth, all having Apgar scores of 7-8 and 10 at 1 and 5 minutes, respectively.

DISCUSSION

The present study tends to confirm that non-engagement of foetal head at the onset of labour in nulliparous women is not an unusual phenomenon⁶⁻¹² (Table 3). Only 16.9% were found to have engaged foetal head at admission in labour in the absence of identifiable factors for non-engagement, the aetiology of high station could lie with cervix or lower uterine segment support¹³. Engagement of foetal head took place in nulliparous women midway through the phase of maximum slope of cervical dilatation and in multiparous women sometime later, at the onset of deceleration phase.

Descent of foetal head in the course of labour followed the same pattern as described for American women¹⁴.

Lack of engagement of foetal head did not seem to

Table 3 — Showing Frequency of Unengaged Foetal Head in Nulliparous women at Term in Different Studies

Series	Unengaged foetal head	
	Duration of pregnancy	Percentage of cases
Salzman <i>et al</i> ⁶	38 weeks	72
Weekes and Flynn ⁷	37 weeks	67
	38-42 weeks	50
Sharma and Soni ⁸	38-42 weeks	50
Melmed and Evans ⁹	Onset of labour	88
Ghosh and Chaudhury ¹⁰	Onset of labour	66
Stipp ¹¹	Admission in labour	55.2
Chogru and Khanum ¹²	Ditto	95
Present series	Ditto	83.1

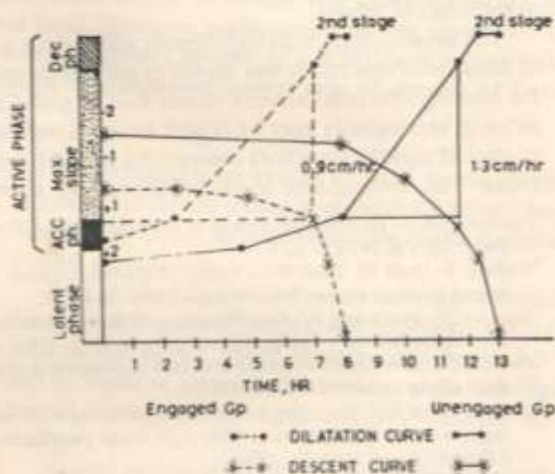


Fig 3 — Showing Patterns of Cervical Dilatation and Foetal Head Descent in Normal Labour in Nullipara with Engaged and Unengaged Foetal Head (Acc ph - Acceleration phase, Gp - Group)

have any effect on the course of labour in nullipara. Though the duration of observed latent phase in hospital was significantly longer, the conventional latent phase calculated from the onset of labour based on parturient's perception of start of 'pains' was similar to that in women entering labour with engaged foetal head. That is, the parturients with unengaged foetal head entered the hospital much earlier in labour than those with engaged foetal head.

In active phase, the durations of acceleration phase and phase of maximum slope were longer in parturients with unengaged foetal head. But, duration of deceleration phases were similar and overall duration of active phase had no significant differences in 2 groups. This observation corresponds with that of Kalyanikutti and Rajagopalan¹⁵ and Friedman and Sachtleben¹⁶ that correction of high station actually occurs towards the maximum slope of active phase and with that, the apparently deleterious effect on labour of high station is not ir-

remediable provided the station is correctable sometime during the course of labour.

The rate of foetal head descent is faster with relatively shorter labour in multipara and Hendricks *et al*¹⁷ attributed it to the greater dilatation of cervix in multipara at the onset of labour.

The haemoglobin status significantly affected the rate of foetal head descent. It was slower in parturients with the haemoglobin concentration of less than 10 g/dl. Circulating haemoglobin may be related to the myoglobin content of muscle, since both compete for available iron stores. The haemoglobin level, therefore, may mirror

myoglobin concentrations in the myometrium and labour may vary accordingly.

The observation that 96.2% nulliparous women entering labour with unengaged foetal head delivered vaginally without distress underlines the opinion that the lack of engagement of the foetal head is not unusual although worthy of critical attention, it is not necessarily ominous.

ACKNOWLEDGMENT

The author is grateful to Professor GI Dhali and Professor Kamala Dhali, Department of Obstetrics and Gynaecology, Postgraduate Institute of Medical Education & Research, Chandigarh for the guidance and encouragement.

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Swenson *et al*⁷ most frequently isolated *Peptococcus prevotii* and *Peptostreptococcus anaerobius* from pelvic inflammatory diseases, this particularly corroborates with the present data of wound sepsis. Comparative results of septic wounds of the abdominal wall and of the normal cervix as performed in this series are not available in the literature.

ACKNOWLEDGMENT

The authors are grateful to Prof NN Sen, Director, School of

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Tropical Medicine, Calcutta for his help, interest and advice, to Dr SK Chatterjee of Nilratan Sircar Medical College, Calcutta, Dr CS Dawn, Dr KM Gun, Dr SK Chaudhuri, Dr NN Roy Chowdhuri and Dr MM Das of Medical College, Calcutta for making material available for study and to (Miss) Pallavika Sinha for technical assistance, Dr SC Roy, Mr N Nandi and Dr A Salem, May and Baker Private Ltd, provided us with clindamycin (Upjohn), metronidazole (MB) and trypticase peptone (BBL). The work was financially supported by the ICMR, New Delhi.

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