PAPERS AND ORIGINALS

Ambulation in labour

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Summary and conclusions

In a randomised prospective study of 68 women in spontaneous labour half were allocated to an ambulant group and half to a recumbent group. The duration of labour was significantly shorter, the need for analgesia significantly less, and the incidence of fetal heart abnormalities significantly smaller in the ambulant group than in the recumbent group. Apgar scores at one and five minutes were also significantly greater in the ambulant group. More patients in the recumbent group required augmentation with oxytocic drugs. There was no statistically significant difference in the third stage loss in the two groups.

Ambulation in labour should be encouraged: it may bring human benefits while allowing the advantages of hospital supervision.

Introduction

Since some of our patients had complained about being confined to bed during labour we introduced continuous fetal monitoring in the ambulant patient by means of radiotelemetry[1] and, more recently, incorporated intrauterine pressure measurements into our continuous fetal heart rate monitoring telemetry system.

As early as 1748 the value of getting the patient out of bed early in labour was mentioned by William Smellie.[2] In more recent times uterine action has been shown to be more efficient in the lateral than in the dorsal position.[3] Mendex-Bauer[4] not only recorded better uterine action in women who stood during labour than in those who lay down but also found that the patient experienced less pain with uterine contractions and felt more comfortable in this position. Mitre[5] reported shorter labours and less discomfort in the sitting position than in the recumbent position. Similar beneficial effects from being upright in labour were reported in a large series of patients.[6] McManus and Calder[7] claim that there is no advantage in changing conventional recumbent intrapartum nursing attitudes; this view has been challenged.[8]

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Patients and methods

During the antenatal period patients were told that we could allow a certain number of patients to walk around while being continuously monitored in labour. Patients who expressed an interest in ambulation were, when admitted in labour, randomly allocated to an ambulant group or to a recumbent group. The patients who remained in bed believed that this was because there were no more telemetry machines available. There were 34 patients in each group—17 primigravidae and 17 multigravidae. Their age distribution, gestation, and height are shown in table I. The presentation was cephalic in 33 patients and breech in one patient in each group. The electrode was applied to the presenting part and an intrauterine pressure catheter inserted when the cervix was at least 2 cm dilated. If the forewaters had not already ruptured spontaneously before monitoring then amniotomy was performed. A patient allocated to the ambulant group then walked around for as long as she wanted, the fetal heart and intrauterine pressure being continuously monitored by radiotelemetry. Such a patient could walk to the television room to be with friends or relatives, help herself to a drink from the ward kitchen, go to the toilet, and even help with chores while the fetal heart and intrauterine pressure were continuously recorded—the maximum range of the telemetry being 200 metres. Patients in the recumbent group were nursed in the lateral position with conventional bedside monitoring of the fetal heart and intrauterine pressure. All patients were nursed in bed during the second and third stages of labour.

TABLE I—*Age, height, and gestation. Results are means (and ranges)*

	Age (years)	Height (cm)	Gestation (weeks)
Ambulant	23·3 (16–38)	159·8 (146–173)	40·8 (37·0–42)
Recumbent	22·0 (16–32)	160·5 (146–171)	40·4 (36·5–42)

The dilatation of the cervix and the station of the presenting part were assessed at the start of monitoring and every two to three hours

during labour. There was no significant difference in the mean dilatation of the cervix (3·4 cm in ambulant group and 3·6 cm in recumbent group); but the mean station of the presenting part was significantly higher in the group who then became ambulant (−2·1 cm from ischial spines) than in the group who remained in bed (−1·7 cm; $P < 0.05$; Mann-Whitney U test).

Analgesia was administered when the midwife thought the patient was becoming distressed with pain. Augmentation in labour by oxytocin or prostaglandin was given when indicated by delay in labour. When intravenous treatment was necessary in the ambulant group—for example, because of ketonuria or delay in labour—the patient was returned to bed; this was not necessary with oral prostaglandin.

Radiotelemetry—A small battery-operated transmitter (Hewlett Packard 78100A) which was used in our original work on the telemetry of the fetal heart signal was adapted in the department of medical physics to include intrauterine pressure by means of a multiplexing unit so that the system could record intrauterine pressure and fetal heart rate simultaneously. The signals obtained from the presenting part electrode and intrauterine pressure catheter were combined or multiplexed in the combining unit, which was incorporated into the transmitter. The combined signal was then radioed to a receiver (Hewlett Packard 78101A). From the receiver the multiplexed signal of the fetal ECG and intrauterine pressure were separated and appeared on separate channels of the chart recorder. Fig 1 shows the compact easily portable transmitter carried by the patient. An example of the continuous record obtained is shown in fig 2; the record continued satisfactorily even when the patient went to the toilet. The intrauterine pressure record for each patient was analysed for frequency and amplitude of contractions and resting or basal uterine tone during a period of 30 minutes, starting 15 minutes after the start of monitoring, to compare uterine action in both groups. The pressure transducer was maintained at a level with the fundus in both groups and zero readings were made every 30 minutes when the catheter was flushed.

FIG 1—Compact transmitter worn on shoulder strap by patient.

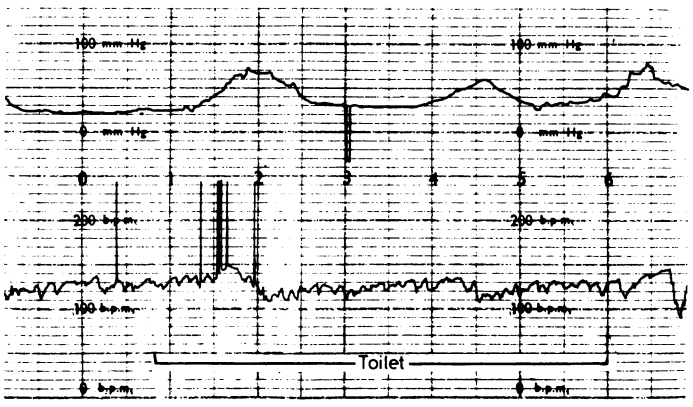

FIG 2—Upper record shows intrauterine pressure (mm Hg) while lower record shows fetal heart rate (beats/min). Continuous records were obtained while patient was ambulant and performing normal functions—for example, going to toilet.

Results

Uterine action was significantly better in the ambulant group. The first stage of labour from the time of monitoring or ambulation was over two hours shorter in the ambulant group than in the group nursed in bed (table II). The mean time spent ambulant was 2·2 hours (range 0·8 to 8·3 hours). More of the patients nursed in bed needed augmentation of labour. Contractions were less frequent and the amplitude greater in the ambulant group, while the basal tone was similar in both groups (table II).

The mode of delivery is shown in table III; there were more normal deliveries in the ambulant group.

The ambulant patients needed less analgesia: 20 patients needed neither pethidine nor an epidural analgesic (table IV). The mean dose in patients who did need analgesia was also smaller among those who were ambulant.

The fetal heart rate patterns, the beat-to-beat variation, and the

TABLE II—*Uterine action. Values are means (and ranges)*

	Ambulant (n = 34)	Bed (n = 34)	Significance of difference (Mann-Whitney U test)
First stage of labour (h)	4·1	6·7	$P < 0.001$
Time spent ambulant (h)	2·2 (0·8–8·3)		
No who needed augmentation of labour	6	12	
Intravenous oxytocin	1	6	
Intravenous prostaglandin	3	6	
Oral prostaglandin	2	0	
Contraction frequency per 30 min	8·53 (5–12)	10·13 (7–15)	$P < 0.05$
Contraction amplitude (mm Hg)	55·53 (40–70)	46·54 (25–70)	$P < 0.005$
Basal tone (mm Hg)	11·0 (5–18)	11·4 (5–20)	Not significant

TABLE III—*Mode of delivery*

	Ambulant (n = 34)	Bed (n = 34)	Significance of difference (χ^2)
Normal	31	22	$P < 0.01$
Assisted breech	1	1	
Forceps (for delay in 2nd stage)	2	10	
Caesarean section for fetal distress and failure to progress	0	1	

TABLE IV—*Analgesia required*

	Ambulant (n = 34)	Bed (n = 34)	Significance of difference
Pethidine with or without promazine	14	26	
Epidural	0	5	
Pethidine with or without promazine plus epidural	0	3	
No analgesia	20	0	$P < 0.001$ (χ^2)
Dose (mg): Pethidine	103 (50–150)	153 (100–300)	$P < 0.001$ (Mann-Whitney U test)
Promazine	25 (all 6 same dose)	28 (25–50) (27 patients)	Not significant
Epidural (bupivacaine)		108·06 (37·5–200)	

Apgar scores at one and five minutes are shown in table V. This illustrates the beneficial effects of ambulation on the fetus and the newborn.

The mean third-stage loss was 226 ml (range 50-800 ml) in the ambulant group and 233 ml (50 to 500 ml) in the group nursed in bed. These differences were not significant. When the patient who had a caesarean section was excluded, the mean third-stage loss in the patients who were nursed in bed was 225 ml (range 50-400 ml).

TABLE V—*Fetal heart rate and Apgar score*

	Ambulant (n = 34)	Bed (n = 34)	Significance of difference
Accelerations (with contractions)	10	1	P<0·01*
Decelerations (with contractions):			
Early	2	7	P<0·005*
Variable	2	6	
Late	0	4	
Beat-to-beat variation (beats/min):			
5	0	9	P<0·001†
5–9	8	22	
10–14	18	3	
15–20	8	0	
Apgar score:			
1 minute	8·8 (7–10)	7·5 (1–10)	P<0·001†
5 minutes	9·9 (9–10)	9·4 (7–10)	P<0·05†

*χ^2 test. †Mann-Whitney U test.

Discussion

This is the first study to measure the effects of ambulation in labour using continuous monitoring by radiotelemetry. Ambulation seemed to have beneficial effects: labour was shorter, the need for analgesia was less, and the condition of the fetus during labour and of the baby at birth were better. More patients in the recumbent group needed augmentation with oxytocic drugs, although this difference did not reach the 5% level of statistical significance that we adopted by convention. We have previously reported on the beneficial effects of maternal satisfaction as assessed by our "mood or emotion thermometer" and also on breast-feeding and lactation.[9] The transducer when the patient is ambulant should be maintained at the same level as when she is resting. Our patients, unlike those of McManus and Calder, were in spontaneous labour; all were continuously monitored (presenting part electrode and intrauterine pressure catheter) in labour; and all were ambulant rather than "encouraged to remain upright." These differences might explain the differences between our results and theirs. We would agree that the nursing of the ambulant patient in labour is different, but it is not more complicated, and continuous monitoring using radiotelemetry is not a problem.

The advantages to the mother and her fetus indicate that ambulation in labour should be encouraged. The beneficial effects might be due to the labour being more natural, the effect of gravity, or the reduced need for analgesia and augmentation, or a combination of all three.

Some women are rebelling against the concept of the modern maternity hospital with all its complex machinery; some are even pressing for a return to home confinement. The fault may lie with us, the hospital staff. For normal labours, and these are in the majority, we should attempt to make our delivery rooms look less like operating theatres and more like lounges by allowing our patients the benefits of ambulation without the loss of the intensive supervision afforded by continuous recording of fetal heart rate and uterine activity.

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ONE HUNDRED YEARS AGO A married woman, aged 35, was attacked by acute albuminuria. The disease resisted the usual remedies. She became extremely oedematous, with congestion or oedema of both lungs. Respiration was rapid; the pulse weak and rapid. She became semi-comatose, and there was suppression of urine for thirty-six hours. The case appeared hopeless; but, having read in the BRITISH MEDICAL JOURNAL a case in which the external use of digitalis was effectual in restoring the secretion of urine, I determined to try it. I ordered half an ounce of the tincture on a large linseed-meal poultice to be applied to the abdomen. Next day, I was agreeably surprised to find her vastly improved, quite conscious, and cheerful. The oedema was very much diminished. Respiration was easy, and the pulse nearly natural. I was informed that, in one hour after the application, a copious flow of urine commenced and continued all night, and, what was very remarkable, the urine, which the day before contained a large quantity of albumen, was now quite free from it. Convalescence was rapid, and she is now quite well.

A young unmarried woman suffered from shock, caused by the sudden death of a near relative. When I saw her, she was comatose, and had not passed urine for twenty-four hours. The bladder was empty. I ordered the same poultice with digitalis, and, in the course of a few hours, urine was secreted and passed in quantity. She quickly recovered consciousness, and recovery followed.

A young lady, six months pregnant with her first child, was seized with convulsions, severe and frequently repeated. I was called in consultation, and recommended enemata with chloral hydrate. She got only one with half a drachm of chloral. A third physician being called in from a neighbouring town, the gentleman first in attendance wished to suspend treatment until his arrival. When he arrived, without my consent and contrary to my judgment, he commenced the measures usual for evacuating the womb, and, in the course of the night, completed the operation in my absence; not, however, with the desired effect; for convulsions continued, even more severe and frequent, and coma set in. He left, considering the case hopeless. Next evening, I was called in again, and, coma continuing and urine not having been passed for thirty-six hours, I applied the digitalis poultice. Towards morning, she began to pass urine, and consciousness returned. When the physician who had emptied the womb was again called in, I did not meet him; but the result of the case was that, in four days from the day I last saw her, she died, as I was informed, of congestion of the lungs, but quite conscious. The treatment adopted for the convulsions involves a most important question, which I will not discuss at present; but the application of the digitalis poultice clearly seemed effectual in restoring consciousness.

A man, upwards of fifty years of age, much addicted to the use of ardent spirits, after a bout of drinking, was seized with violent pain in the frontal region, attended with delirium, quick pulse, and fever, followed by imperfect hemiplegia in the left side. Next day, he became comatose, and the urine was suppressed. The digitalis poultice was applied, and, in the course of six hours, urine was secreted and passed in large quantity, and the coma gradually disappeared. He improved in every respect for two days, when the urine was again suppressed and coma again set in. The digitalis poultice was again effectual in restoring consciousness, and the man gradually recovered, still slightly hemiplegic; but he has since gradually recovered the use of his limbs, and is now able to follow the occupation of a weaver. I have used this treatment only in cases in which there was suppression of urine, and only in these four cases. (*British Medical Journal*, 1878.)