

Active Management of Labour

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British Medical Journal, 1973, 3, 135-137

Summary

Active management of labour has been developed to the extent that an assurance is given to every woman who attends this hospital that her first baby will be born within 12 hours. This assurance could lead to a welcome change in present attitudes because the mere prospect of prolonged labour is often a cause of serious concern during a first pregnancy. Labour of strictly limited duration makes it possible to provide every woman with a personal nurse, and it places the problem of pain in a new setting.

The results of a prospective study of 1,000 consecutive primigravidae are presented, and the guidelines to a standard policy of management are defined. Difficulty in meeting the commitment to early delivery arose almost exclusively in cases in which the diagnosis of labour was in doubt; only seven women were retained in the delivery unit for 12 hours.

Introduction

Though there are not many areas of common experience associated with greater stress it is only in recent years that a systematic attempt has been made to curtail the duration of labour. Obstetricians previously accepted labour as subject to wide natural variation and largely outside medical control; management was delegated to resident medical and nursing staff until secondary complications developed several hours after admission. The main emphasis was on relief of pain. There has been a complete break with this tradition at the National Maternity Hospital where the passive concept of labour has been replaced by an intensive care situation in which every patient has a personal nurse and every labour is controlled. The main emphasis is on early delivery (O'Driscoll *et al.*, 1969).

The policy of active management has proved so successful that expectant mothers are now informed of the change in outlook and are given a firm assurance that the duration of labour will not exceed 12 hours. To supervise labour effectively it is essential to have clear guidelines in a field of human activity in which these have been notably vague. The purpose of this paper is to establish guidelines and to examine results.

Methods

A prospective study of labour was conducted in 1,000 consecutive primigravidae during 1972. The duration was recorded from the time of admission to the delivery unit. When a decision was made that a patient was not in labour she was transferred to an antenatal ward, but the duration of labour was recorded from the first admission if she returned to the delivery unit within 24 hours.

A policy of active management was pursued to ensure that every patient was delivered within 12 hours. Cervical dilatation was plotted on a simple graph (Friedman, 1967). Intervention was mandatory unless cervical dilatation exceeded one centimetre each hour. Stimulation was by artificial rupture of the membranes followed by oxytocin infusion after an interval of one hour. A standard concentration of 10 units of oxytocin per litre was used. The rate of infusion started at 10 drops and increased every 15 minutes to a maximum of 60 drops per minute. The volume was limited to one litre. The drip was operated manually, and every patient in labour had a personal nurse. Oxytocin was given to 550 patients (55%).

Pethidine was the only analgesic drug permitted; a test dose of 50 mg was given and this was repeated after 30 minutes. Epidural anaesthesia was available on a selective basis.

Results

Diagnosis of Labour.—The circumstances in which patients entered the delivery unit were as follows: 903 admitted themselves in labour, 63 were admitted for oxytocin induction, and there were 34 elective caesarean sections. The diagnosis of labour was rejected by the staff on 103 occasions. This decision proved incorrect in 42 cases, because the patient returned to the delivery unit within 24 hours and as a result of this mistake 38 cases were not delivered within 12 hours of admission. There had been a show or ruptured membranes to substantiate the initial diagnosis in all but three of these cases. These cases are included to account for all admissions and to focus attention on the diagnosis of labour. The decision to reject the diagnosis proved correct on 61 occasions.

Duration of Labour.—The commitment to early delivery was not fulfilled on 45 occasions. Seven patients were retained in the delivery unit for 12 hours—the type of case usually classified as prolonged labour. Thirty-eight patients were transferred to an antenatal ward; these cases are not usually classified as prolonged labour because they were not retained in the delivery unit. All were delivered within 12 hours of the second admission.

Operative Deliveries.—There were 52 caesarean sections (5.2%). The operation was performed before labour on 34 and during labour on 18 occasions. The indications for caesarean section during labour were fetal distress in nine, prolonged labour in seven, and cephalopelvic disproportion in two cases. There were 195 forceps deliveries (19.5%). The ventouse was not used.

Induction of Labour.—Labour was induced on 267 occasions (26.7%). Induction was by rupture of the membranes; oxytocin infusion was used only when labour had not started after 24 hours. The number of cases admitted to the delivery unit in labour was 204 and the number needing oxytocin infusion was 63. Progress in cases admitted in labour after artificial rupture of the membranes was similar in all respects to cases admitted in spontaneous labour. Oxytocin, to induce or accelerate, was always given in the delivery unit.

Analgesia.—No pethidine was given to 416 patients, 50 mg to 493, and 100 mg to 57. Epidural anaesthesia was given to 13 patients.

Perinatal Deaths.—There were 25 perinatal deaths (2.5%) and necropsy was performed on 24 occasions. Seven deaths were attributed to malformation, three to breech presentation, and in 11 cases the fetus died before labour began. Two neonatal deaths were attributed to prematurity, at 30 weeks and at

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36 weeks, and necropsy showed hyaline membrane disease. Two deaths were associated with mismanagement in labour—one occurred after induction of labour for toxæmia and necropsy showed infection, the other occurred after forceps delivery and necropsy showed subdural haemorrhage.

Brain Damage.—Four infants suffered cerebral irritation and were suspected of brain damage at discharge from hospital. One was a second twin, one was a case of abruptio placentae, one had subdural haemorrhage after forceps delivery, and one was subjected to oxytocin infusion after rupture of the membranes showed thick meconium. Mismanagement in labour may have been responsible for the last case. Stimulation was begun before the cervix was sufficiently dilated to permit a fetal blood sample, and when the pH was found to be 7.18 caesarean section was performed. These infants were examined after six months and only the last case showed evidence of brain damage.

Discussion

A first labour is a unique experience which may cause permanent damage to a woman's personality when unduly prolonged. The aim should be to deliver every woman within eight hours and to perform caesarean section at 12 hours unless delivery is imminent. As the permissive attitude to labour is now an anachronism it is logical that women should be made aware of this when confronted with the experience for the first time.

The first requirement in any discussion of labour is to define an objective starting point. We adopted the suggestion by Hendricks *et al.* (1970) that labour should be measured from the time of admission. This has the great advantage that it can be defined accurately, and it has particular relevance to the present discussion because a method of treatment cannot be evaluated until patients avail themselves of it. It also seems reasonable to assume that women in labour everywhere make the decision to enter hospital for more or less the same reasons and at more or less the same stage of discomfort, and we are impressed at how often the duration of labour is recounted subsequently as the number of hours spent in a delivery unit. In the present series of 1,000 consecutive primigravidae 45 were not delivered within 12 hours of admission and these are the cases in which the assurance given was not fulfilled. Failure was due to an error in the diagnosis of labour in 38 cases.

The most important decision in labour is the decision that labour has started, because not everyone who admits herself to a delivery unit is necessarily correct in doing so. Diagnosis of labour, and subsequent management, present no problem when the cervix is dilated; the difficulties arise only when the cervix is not dilated. A patient who admits herself in labour and finds her opinion at least tacitly supported by the attitude of those around her is exposed to equal stress, and this may lead eventually to caesarean section before labour has even started. The patient was mistaken in 6% of the present series and these cases were identified, transferred from the delivery unit, and subsequently allowed home. The opposite situation arises when failure to institute treatment exposes a patient to the dangers of prolonged labour. The staff was mistaken in rejecting the diagnosis of labour in 4% of the present series with the result that these patients were readmitted to the delivery unit within 24 hours. The distinctive feature of these cases was that almost all had a show or ruptured membranes. The lesson is that when a patient admits herself in labour and has a show or ruptured membranes to support her contention she should be treated as such, and if this simple rule had been applied in the present series the number of cases in which the commitment to early delivery was not fulfilled would have been reduced to seven. Though diagnosis before the cervix is dilated is the main problem in management the subject is avoided by either excluding these cases from consideration (Philpott and Castle, 1972 a) or by introducing the spurious category of false labour (Friedman, 1970).

The practical problems in accelerating slow labour mainly concern the use of oxytocin. A basic uncertainty is evident in many hospitals where consultants favour different regimens, the diversity of which undermines confidence in medical and nursing staff. We have developed a standard procedure which has been tested in thousands of cases over several years. The guiding principle is that treatment is applied early, before an abnormal pattern of cervical dilatation is established. Firstly, the membranes are ruptured to show meconium in the event of fetal distress, and this may accelerate progress. Secondly, an oxytocin infusion is started when progress has been assessed after one hour. The details are as follows: a uniform concentration of oxytocin is used because the practice of changing both the concentration and the rate of infusion makes no pharmacological sense; the flow is restricted to provide a dose above which response does not improve and rapid infusion may outrun cervical dilatation; and the volume is limited to one litre because this requires a period of eight hours, after which caesarean section is considered. Within these parameters fetal distress is the only danger and oxytocin should not be given when there is evidence of fetal distress. This rule was broken in the present series and a child suffered brain damage. In 1,000 primigravidae only seven were in labour for 12 hours because they failed to respond to treatment.

The most frequent objection to a policy of active management in labour is the possibility of cephalopelvic disproportion (*British Medical Journal*, 1972; Ledger and Witting, 1972). Active management, however, has shown that most cases diagnosed as cephalopelvic disproportion are in fact cases of inefficient uterine action. This has led to the conclusion that the clinical and radiological evidence on which the diagnosis of disproportion was based is largely illusory (O'Driscoll *et al.*, 1970). The functional capacity of a pelvis can be tested only by efficient labour and this often requires oxytocin. The rare exceptions, which justify caesarean section without trial of labour, are almost exclusively cases of pelvic deformity. In the present series there were only two cases of cephalopelvic disproportion and one of pelvic deformity.

The subject of pain in labour is highly emotive and widely publicized. None would dispute that relief of pain is desirable or that labour can be conducted without pain. But it is important to consider whether women are sometimes influenced to expect pain for the purpose of having it relieved, and if it is desirable to stimulate popular demand for procedures such as caudal or epidural anaesthesia, which are potentially dangerous. Stress in labour is cumulative and related closely to the duration of exposure, and management has for far too long been concentrated on alleviating the effects of prolonged exposure, especially pain. This has proved a remarkably sterile exercise. We advocate fundamental change in which the primary purpose of management is to limit exposure, because when labour ceases to be open-ended the problem of pain is placed in a different perspective.

Pethidine is accepted as the prototype analgesic drug in labour and was used exclusively in the present series. Crawford (1972) recommends a loading dose of 150 mg and a maintenance dose of 100 mg every three hours. Because we are convinced that many unpleasant experiences wrongly attributed to labour are caused by even small doses of pethidine in women not accustomed to hard drugs, we prescribe a test dose of 50 mg and a similar amount when the initial effects have been assessed. In the present series of 1,000 primigravidae 420 received no analgesia and only 60 received 100 mg of pethidine, but more than 70% of patients were delivered within six hours. Crawford believes that epidural anaesthesia should be given to every woman unless there is a specific contraindication and in more than half his cases, which included multigravidae, the anaesthesia was started before labour began (Crawford, 1972). Epidural anaesthesia was available at all times in the present series and was considered when patients were distressed soon after admission, when patients were not close to full dilatation after six hours, and when patients suffered from special diseases such as toxæmia

or heart disease. About 50 cases (5%) were considered under these headings and epidural anaesthesia was given on 13 occasions.

Dilatation of the cervix is the measure of progress in labour and a simple graph on which cervical dilatation is plotted every hour is of much help in routine practice (Philpott and Castle, 1972 b). Rectal examination has a decided advantage over vaginal examination in assessing progress because it can be performed at regular intervals with much less formality, which is an important practical consideration in a busy unit. There is a growing belief that labour cannot be conducted efficiently without mechanical aids, though the opposite is frequently the case when undue emphasis is laid on one aspect of labour to the detriment of total patient care. Automated pumps are not used in this hospital because precise rates of flow offer no advantage and a machine can be a poor substitute for personal attention. A personal nurse is the basis of good intranatal care.

Though doubts have been expressed about the practical problems arising from the supervision of numerous infusions (*British Medical Journal*, 1972), it is only when the duration of labour is restricted that it is possible to provide every patient with personal attention. There were 7,250 births in this hospital during 1972 and every patient had a personal nurse because for each nurse employed the number of babies born was three times greater than in similar hospitals in the United Kingdom (O'Driscoll, 1972). The unproductive use of nursing time is related to the number of inductions but of the 267 cases in the present series in which labour was induced only 63 required the use of oxytocin (6.3%). Nurses were therefore free to concentrate on patients in labour.

The conclusion is that once labour has started it is possible to regulate the duration with almost complete success. This requires a systematic approach with formal diagnosis, regular assessment, and decisive action in every case admitted to a delivery unit. A realization that the important decisions are made in the first two hours is essential. Greatly improved efficiency leads to the ideal situation in which every woman has a personal nurse. There is an urgent need for radical reappraisal of labour along

these lines because, in spite of a growing awareness of the principle of planned action, conventional attitudes, both lay and medical, are still based on the assumption that labour remains open-ended and not subject to genuine control. Neither is it generally recognized that almost all the complications of labour are secondary phenomena, themselves products of passive management. The problem of pain is a noteworthy example. Active management has been standard practice in this hospital for more than five years, when more than 30,000 babies were born, and it has been presented to students of medicine, nursing, and physiotherapy as the normal approach to labour. The educational process has now been extended to patients, particularly primigravidae on whom the mere prospect of prolonged labour may have a prejudicial effect.

We are grateful to the nursing sisters in the delivery unit at the National Maternity Hospital to whom the credit for the management of these patients is due, to Dr. Francis Geoghegan who performed the necropsies, and to Dr. Niall O'Brien who assessed the infants for brain damage. We wish to acknowledge the encouragement and constructive criticism of the Master, Dr. Declan Meagher.

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Plasma Calcium, Magnesium, Phosphorus, and Alkaline Phosphatase Levels in Normal British Schoolchildren

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British Medical Journal, 1973, 3, 137-140

Summary

In a cross-sectional survey 624 schoolchildren were screened for plasma calcium, inorganic phosphate, and alkaline phosphatase levels. Plasma magnesium and alkaline phosphatase isoenzymes were also estimated in some cases.

No significant difference was found between adult and childhood values for calcium and magnesium. Levels of alkaline phosphatase and inorganic phosphorus varied with both age and sex. The magnitude of these variations in normal ranges is of clear importance in assessing data from individual paediatric or adolescent patients.

Introduction

While biochemical values in apparently healthy adults have been well documented similar data from children and adolescents are scanty, and this makes the interpretation of biochemical tests from young patients difficult. Particular difficulties exist with regard to the investigation of hereditary and acquired disorders of bone growth and development. It was therefore important to estimate plasma calcium, alkaline phosphatase, and inorganic phosphate in a sample population of apparently healthy schoolchildren between the ages of 7 and 17 years, thus covering almost completely any changes which might be associated with normal puberty. Magnesium, another cation closely related to calcium, was also determined.

Subjects and Methods

Boys and girls from four London and two Hertfordshire schools participated in the survey. The schools in London were selected in order to try to cover a cross-section of socioeconomic backgrounds, and the Hertfordshire schools were also visited to