intention is to use data on death rates to inform patient choice about whether or not to undergo a procedure. This is entirely different from the publication of crude league tables of death rates by hospital or surgeon that, by providing an incentive to avoid treating high risk patients or to collect data in a way that gives favourable results, would probably mislead.¹⁰

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Active management of labour: current knowledge and research issues

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Abstract

Objectives—To review the evidence that the package of labour interventions collectively called “active management”—namely, strict diagnostic criteria for labour, early amniotomy, early use of oxytocin, and continuous professional support—reduce rates of caesarean sections and operative vaginal delivery in first labours.

Design—Review of observational data, supplemented by evidence from four separate overviews of relevant randomised trials previously published as part of the Cochrane Collaboration pregnancy and childbirth database.

Results—Observational data do not permit a clear conclusion. There have been no randomised trials of the total package of active management or of the use of strict diagnostic criteria alone, but trials of early amniotomy, early oxytocin, and these interventions combined do not suggest that these interventions are effective in reducing rates of caesarean sections or operative vaginal deliveries. In contrast, the provision of continuous professional support in labour seems to reduce both types of operative delivery, although the effect on caesarean sections is confined to those settings where non-professional companions are not normally present in labour.

Conclusions—Delivery units should endeavour to provide continuous professional support in labour, but routine use of amniotomy and early oxytocin is not recommended.

Doctors and midwives often intervene in labour by rupturing membranes and prescribing oxytocin in the hope of preventing harm to both mother and baby. Until the 1970s both interventions were considered meddling, but since then routine amniotomy and the early use of oxytocin have become widespread as part of a movement associated in particular with the National Maternity Hospital in Dublin. These measures were introduced there in the late 1960s¹ as part of a package of care, “the active management of labour.”² Other components of the package were strict criteria for the diagnosis of labour and a commitment to never leave a woman unattended in labour and to limit its maximum duration. Proponents of active management claimed that it lowered the rate of caesarean sections and instrumental deliveries, was safer for the baby (because the liquor could be inspected and prolonged labour avoided), and was popular with mothers. Opponents disputed the reduction in operative delivery and argued that amniotomy increased the risk of infection, that even in first labours oxytocin occasionally caused fetal hypoxaemia

and maternal hyponatraemia, and that many women resented the interventions. While the debate raged³⁻⁵ active management (or at least two of its components, amniotomy and oxytocin) rapidly moved into routine use, especially in the English speaking countries outside America.

An important factor in this process was the personality, and vigorous prose style, of active management's foremost advocate, Kieran O'Driscoll of Dublin, who managed to convince even the most cautious clinicians. The *BMJ*'s review in 1980 of his *Active Management* is an example of the enthusiastic reception it received: “Our era will be seen as one in which there occurred a revolution in intrapartum care centring on Dublin . . . ‘First Blast of the Trumpet against the Monstrous Regiment of Women Mismanaged in Labour’ . . . place it alongside [the obstetric classics of] Smellie and Mauriceau.”⁶ Although the reviewer reminded readers that the book was one sided and recalled the old aphorism that “an accelerated labour is as safe as a streamlined parachute,” he was correct to predict that he was reviewing a major development in medicine, destined for widespread acceptance.

Another factor in the rapid adoption of active management was the development of the partogram, which implicitly supported active management with alert and action lines.^{7,8} The idea was that if progress was slow these lines would be crossed and intervention should follow. For women already in a hospital maternity unit, the interventions were amniotomy, oxytocin, and, if these failed, caesarean delivery. The evidence that augmentation had any advantage, over and above use of the partogram itself as a guide to the need for transfer to hospital or a caesarean section, was scanty. However, clinicians had no other clear guidelines for the permissible duration of natural labour, and they were unwilling to perform caesarean sections without trying less extreme measures such as amniotomy and oxytocin. In the United States, in contrast, the inventor of the partogram, Emmanuel Friedman, argued—admittedly from equally tenuous data—that amniotomy should be avoided because he believed it slowed labour.⁹ He also recommended observation rather than oxytocin for most cases of slow progress, making an exception only for those cases in which cephalopelvic disproportion had been excluded. Since then both sides have been able to provide supporting observational data.

Observational data

The National Maternity Hospital in Dublin has been renowned for its relatively low caesarean section rate, and doctors there have also claimed to have abolished

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rotational forceps or ventouse deliveries. There have been three non-randomised studies of active management, either comparing women referred to two separate consultants¹⁰ or using historical controls,^{11, 12} all of which found that active management was associated with fewer caesarean and instrumental deliveries.

Against this is the overall experience of most of the other hospitals in the United Kingdom. Some or all of the components of active management have been widely introduced since the late 1970s, and although perinatal mortality has fallen with no obvious increase in infections, this period has also seen a steadily rising rate of caesarean sections and instrumental deliveries. Other units have reported lower caesarean section rates than Dublin with minimum interference in labour (for example, 1.4% in the Wormerveer population study in Holland¹³ and 1.3% at the Semmelweis clinic in Vienna.¹⁴ Finally, anecdotal reports of oxytocin apparently causing hypoxic brain damage, albeit usually after protocol violations, are frequent in medicolegal practice. We must conclude that non-randomised data are unlikely to give a clear answer and only properly conducted randomised controlled trials can do this.

Evidence from randomised controlled trials

In the 1970s there had been few trials, so it was hardly surprising that personalities played more part than science in the debate. Since then, however, several randomised controlled trials of the various components of active management have been carried out, and they are available (and regularly updated) in the Cochrane Collaboration pregnancy and childbirth database, from which the following data and meta-analyses have been drawn.

Amniotomy, oxytocin, the combination of amniotomy and oxytocin, and the effect of a friendly companion in labour have all been evaluated in randomised controlled trials. Oxytocin in the presence of intact membranes has not been studied, presumably because of the fear that this may cause amniotic fluid embolism. These trials have clarified, but not completely resolved, the issues. We present the evidence and argue the case for further trials to evaluate the effect of early and delayed use of oxytocin.

AMNIOTOMY

The first large trial of amniotomy¹⁵ was susceptible to bias from the use of alternate allocation and post-randomisation exclusions,¹⁶ but there have now been six relatively unbiased trials, including two multicentre studies from Canada and the United Kingdom,^{17, 18} with over 2000 participants. All the trials showed a modest decrease in the duration of labour in the group randomised to membrane rupture, but meta-analysis failed to show a substantive effect on maternal or fetal outcomes (fig 1), apart from a reduction in the rate of Apgar scores of <7 at 5 minutes in the group given early amniotomy, which is of uncertain importance.¹⁹ The only trial to measure cord lactic acid found no difference between cases and controls.²⁰

Compliance with the conservative policy was relatively poor, especially in the two multicentre studies, and although bias was avoided by analysing by intention to treat, it is possible that a more extreme policy of conservatism might have different effects. Nevertheless the trials, as performed, provide a good test of a policy of routine early amniotomy compared with relatively late amniotomy and show that such a policy is associated with a small decrease in the duration of labour, is probably not harmful to the fetus, but does not lower the rate of caesarean sections or operative vaginal deliveries.

FIG 1—Meta-analysis of the effect of early amniotomy in spontaneous first labour. Typical odds ratios (■) and 95% confidence intervals (bars) for selected maternal and fetal outcomes¹⁹

EARLY OXYTOCIN

Four randomised studies have examined the effects of oxytocin as a single intervention in spontaneous labour.²¹ In these trials the membranes, if still intact, were ruptured before or immediately after randomisation in both groups. The control groups varied, involving "ambulation" in two studies and no intended intervention in two. Oxytocin had a modest effect on reducing the duration of labour in only one of the trials in which the controls were semirecumbent, but it had no effect in the other trials. When the four trials were combined for meta-analysis (fig 2), the only statistically significant differences were in side effects: an increased incidence of hyperstimulation and of pain in the group given oxytocin. There was no significant reduction in the incidence of caesarean section or instrumental vaginal delivery with use of oxytocin, and fetal condition was the same in both groups.

FIG 2—Meta-analysis of the effect of early oxytocin in spontaneous first labour. Typical odds ratios (■) and 95% confidence intervals (bars) for selected maternal and fetal outcomes²¹

Similar problems of compliance affected these trials as the amniotomy trials, with 25-75% of the women assigned to the control groups ultimately going on to receive oxytocin. Moreover, with the exception of one trial, which has been published only in abstract, these trials are small. Thus, the possibility that oxytocin can reduce the caesarean section rate is not disproved, although a large protective effect is excluded; the notion that oxytocin, to be effective, should be given early in labour gains no support. Larger trials would also permit analysis stratified by the extent of cervical dilatation at randomisation, since the effects of oxytocin may differ according to the stage of labour.

ACTIVE MANAGEMENT PACKAGES: OXYTOCIN COMBINED WITH EARLY AMNIOTOMY

Three trials have attempted to study the package of oxytocin and amniotomy combined,²²⁻²⁴ but policies

for support in labour and diagnostic criteria for labour did not differ between the groups so that the package of active management as defined in Dublin was not evaluated. All three trials showed a modest reduction in duration of labour with the active policy, and the results of the meta-analysis²⁵ are shown in figure 3. Again, there was no statistically significant reduction in incidence of caesarean section or instrumental delivery, nor in any adverse fetal outcome, with the active policy.

Maternal outcomes

Hyperstimulation
Use of analgesia
Caesarean section
Instrumental vaginal delivery
Subjective unpleasantness
Increase in pain

Fetal outcomes

Apgar score <7 at 5 minutes
Admission to special care unit

FIG 3—Meta-analysis of the effect of early oxytocin combined with early amniotomy in spontaneous first labour. Typical odds ratios (■) and 95% confidence intervals (bars) for selected maternal and fetal outcomes²⁵

There were two unexpected, but apparently significant, effects of the active policy—namely, a reduction in uterine hyperstimulation and an increase in maternal blood transfusion. Both should be interpreted with caution since neither outcome was a prior hypothesis in any trial and therefore may simply reflect analyses of multiple end points. Although the increase in blood transfusion seems to confirm an increased risk of postpartum uterine atony reported in early non-randomised trials, it was confined to one trial which has been published only in abstract.²²

COMPANION IN LABOUR

The third component of active management is psychological—the provision of a companion, who may be qualified or unqualified, throughout labour. No fewer than 10 randomised trials, including 3336 women, have examined this issue. Meta-analysis of these trials (fig 4) supports the idea that psychological support is effective in reducing analgesia requirements, lowers the incidence of caesarean and operative vaginal delivery, and improves fetal outcome.²⁶ The effect of caesarean section is statistically significant only in those studies performed in settings where

All trials

Any analgesia
Caesarean section
Instrumental vaginal delivery
Apgar score <7 at 5 minutes
Admission to special care unit

Partners permitted

Any analgesia
Caesarean section
Instrumental vaginal delivery
Apgar score <7 at 5 minutes

Partners not permitted

Any analgesia
Caesarean section
Instrumental vaginal delivery
Apgar score <7 at 5 minutes

FIG 4—Meta-analysis of the effect of support from care givers in labour. Typical odds ratios (■) and 95% confidence intervals (bars) for selected maternal and fetal outcomes.²⁷ Results are shown for all trials combined and separately for those trials where partners were permitted to be present in labour and those where they were not permitted.

Practice implications

- Some or all of the components of active management of labour have been adopted by hospitals in the United Kingdom since the 1970s
- Perinatal mortality has fallen with no obvious increase in infections, but the rate of caesarean sections and instrumental deliveries has risen
- Several randomised controlled trials of the components have been carried out; this study analyses their results
- Provision of continuous professional support in labour seems to reduce rates of caesarean sections and operative vaginal deliveries, but early amniotomy and early oxytocin do not
- Delivery units should provide continuous professional support in labour, but amniotomy and early oxytocin need not be used routinely

partners were not usually present in labour and where it would therefore be expected that the control group got particularly little support.

DIAGNOSIS OF LABOUR

The final component of active management is taking care to diagnose labour only when progressive dilatation or effacement of the cervix is observed. This has never been evaluated by a randomised trial, and the "diagnosis" of labour is fraught with all the difficulties of trying to categorise a continuous variable. By excluding many women from the labour ward because they are not judged to be in labour, the Irish obstetricians raise the specificity of their diagnostic criteria at the expense of sensitivity; no fewer than 40% of women discharged from the labour ward on the grounds that they are not in labour return within 24 hours.²⁷ Many such women are managed in the labour ward in other hospitals and seem to have longer labours. There is evidence from observations of doctors' hypothetical decisions that simply the appearance of longer labour encourages them to intervene.²⁸

Conclusion

The evidence from the overviews supports the hypothesis that the package of active management reduces the rate of operative interventions for delivery. However, the effective ingredient seems to be the presence of a companion in labour rather than the performance of amniotomy or administration of oxytocin. Routine amniotomy has not been shown to have any important beneficial or adverse effects apart from shortening the duration of labour, and its timing should follow the patient's preference. Trials of amniotomy, with higher compliance with the allocated regimen, would be useful but will be difficult to perform. The first seven trials of early oxytocin have shown side effects but no benefit. If oxytocin had been discovered in the 1990s we would not sanction its widespread routine use and would conduct further clinical trials. Ultimately the correct management of labour is affected by cultural factors, existing patterns of care, and maternal expectations, as well as the results of controlled clinical trials. Individual clinicians may still argue, for example, that in their population amniotomy and oxytocin permit the presence of a permanent companion because of better use of staff.

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Deaths, HIV infection, abstinence, and other outcomes in a cohort of injecting drug users followed up for 10 years

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Abstract

Objective—To trace, follow up, and interview a group of patients known to be injecting drug users in order to establish current drug taking and other features related to drug use over 10 years.

Design—Descriptive follow up study of a cohort of injecting drug users established between 1982 and 1985.

Setting—General practice based patient population study initially, with later tracing of subjects throughout the United Kingdom through NHS Central Registries and current general practitioners.

Subjects—203 injecting drug users recruited up to December 1985.

Main outcome measures—Survival, cause of death, abstinence, or continued drug use; HIV status; and demographic variables.

Results—Of the 203 injecting drug users recruited into the study, over half were known to be HIV positive and 42 died of various causes (increasingly AIDS). From the start of follow up in 1990, 163 (91%) of the 180 survivors were traced, of whom 116 (71%) were interviewed. Dramatic changes had occurred in drug taking, with a move away from injecting towards oral drug use. A few patients, however, continued to inject. 90 (78%) of those interviewed had been in prison, of whom 37 (41%) had injected drugs while in prison.

Conclusions—The pattern of deaths had changed from being largely due to overdose in the early 1980s to predominantly AIDS related in later years. The reduction in deaths due to overdose may have been connected with but was not always causally related to a new approach by legal, social, and medical services. Drug use continues in a modified form in a large proportion of patients followed up. As a group,

drug users require long term support for a multiplicity of problems.

Introduction

Since HIV infection was first transmitted by injecting drug use interest has focused on known drug users. Previously mortality and morbidity outcomes such as hepatitis B and later hepatitis C and death due to overdose, violence, and infections were studied.¹⁻³ Abstinence has also been the subject of much research.⁴⁻⁶ Guidelines for clinical practice have reflected a new concern about the whole issue of drug use and HIV⁶⁻⁹ and show a change from the previous non-medical approach.¹⁰⁻¹¹ Drug use is notoriously difficult to study because of changing patterns of drug use, evolving policy, and its illegality.

The Edinburgh drug addiction study recruited a cohort of known injecting drug users between 1980 and 1985 and has followed them up continually since then. Earlier reports on this cohort showed a high seroprevalence for HIV antibody¹² and later a rapid decline in injecting drug use.¹³⁻¹⁵ A recent report showed a change to heterosexual transmission of HIV in this group.¹⁶ This paper reports a formal follow up evaluation of drug taking morbidity and mortality in the cohort up to mid-1993.

Subjects and methods

Individual drug injectors were recruited into the study after consultation with one of the doctors of the Muirhouse Medical Group. The cohort was closed at the end of 1985 and numbered 203 subjects. Follow up was carried out between January 1990 and June 1993. At the start of this study 23 of the original 203 subjects

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