RUPTURE OF MEMBRANES BEFORE THE ONSET OF SPONTANEOUS LABOUR INCREASES THE LIKELIHOOD OF INSTRUMENTAL DELIVERY

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SUMMARY

We studied obstetric outcome in 350 consecutive nulliparous women in spontaneous labour and term pregnancy. Women who presented with rupture of membranes before the onset of contractions were more likely to deliver by forceps compared with those in whom contractions preceded rupture of membranes. This increased likelihood of instrumental delivery was significant with and without the use of extradural analgesia in labour (P < 0.05 and P < 0.001, respectively). Furthermore, significantly more women with premature rupture of membranes received extradural analgesia in labour (P < 0.01). We conclude that any study which aims to examine the influence of extradural analgesia on the outcome of delivery should include premature rupture of membranes as a bias factor.

KEY WORDS

Anaesthesia: obstetric, instrumental delivery. Anaesthetic technique, extradural.

The use of extradural analgesia in labour may increase the likelihood of instrumental delivery [1, 2]. Clinicians have studied ways of reducing the rate of instrumental intervention either by adopting different methods of managing labour in a mother with extradural analgesia [3] or by altering the constituents of the extradural injection [4]. The fundamental assumption in such studies is that all other factors which may bias the mode of delivery have been taken into consideration. It was the impression of one of the authors (A.K.) that rupture of membranes at term (ROM) before the onset of regular contractions increased the likelihood of subsequent instrumental intervention. We believe that this factor has not been considered previously when analysing the influence of extradural analgesia on instrumental intervention. In this study we have compared the outcome of labour in relation to the time of rupture of membranes.

PATIENTS AND METHODS

This study was carried out at the maternity unit of the Norfolk & Norwich Hospital where we reviewed the labour records of 350 consecutive nulliparous women with singleton pregnancies of greater than 36 weeks gestation and cephalic presentation. Care was taken to avoid influencing the usual obstetric and anaesthetic management decisions of the unit. Data for each patient were collected after delivery. All the women studied had spontaneous onset of labour. Patients with fulminating pre-eclampsia, those who presented with profound fetal distress requiring intervention before the onset of labour and those who had induction of labour were excluded.

According to the standard policy of our unit, patients who requested lumbar extradural analgesia in labour were seen by the duty obstetric anaesthetist who inserted the extradural catheter and gave the first dose of bupivacaine. Subsequently, intermittent top-ups of 0.25% plain bupivacaine 8—10 ml were administered as required by the attending midwife to maintain analgesia throughout labour. During the study, extradural infusions were not used. Extradural analgesia was not administered for medical reasons.

When patients are admitted with ROM to our unit, a latent period of 12-24 h is awaited for spontaneous contraction to occur before labour is induced with prostaglandins. Only patients who had spontaneous onset of contractions and in whom labour was not induced were included in this study. Patients with established uterine contractions but who required synthetic oxytocin for augmentation of labour were included.

According to the choice of analgesia used in labour, the 350 women were classified as group 1 if extradural analgesia was used (n = 93), and group 2 if regional analgesia was not used (n = 257). Each group was classified further to the labour subgroup if rupture of membranes occurred after the onset of uterine contractions (group 1, n = 62; group 2, n = 209) and the ROM subgroup if rupture of membranes preceded labour (group 1, n = 31; group 2, n = 48).

The age, height and the last clinic weight of each mother were recorded with the gestational age (confirmed by early ultrasound scan) and the birth-
weight of the baby. The time of onset of regular uterine contractions and the time of the rupture of fetal membranes were noted. In labour, the use of oxytocin for augmentation, the type of analgesia used and, where relevant, the total dose of extradural bupivacaine were recorded.

At delivery, the time and mode of delivery, the position of the vertex, the reason for any instrumental intervention and the name of the duty obstetric registrar were documented.

Data were analysed statistically using the Mann-Whitney U, unpaired Student's t and chi-square tests as appropriate. P < 0.05 was considered statistically significant.

RESULTS

Of the total 350 patients studied, 93 chose extradural analgesia in labour and of these 31 had rupture of membranes and 62 had onset of contractions before rupture of membranes. Of the 257 patients who did not have regional analgesia in labour, there were 48 in the ROM and 209 in the labour subgroups.

For the extradural group (group 1), Table I shows the maternal age, height and weight, the baby's weight and gestational age, the total dose of bupivacaine used in labour and the duration from onset of regular contraction to delivery. There was no statistical difference between the two groups for the frequency of oxytocin infusion usage to augment labour.

Table II details similar values for group 2. Within this group there was no statistical difference between the ROM and the labour subgroups for all the relevant variables listed as for group 1 above. There was no statistical difference between the two groups for the frequency of oxytocin infusion usage to augment labour.

In group 1, there were fewer spontaneous vaginal deliveries in the ROM subgroup (P < 0.05) compared with the labour subgroup (table III). All the forceps deliveries in group 1 were of the low-cavity variety.

A comparison of the mode of delivery within group 2 also shows a high incidence of intervention by forceps in the ROM subgroup (40.5%) compared with (15.8%) in the labour subgroup (P < 0.001). Two patients from group 2 required mid-cavity forceps delivery: one from each of the two subgroups.

There were 79 patients with ROM (table IV), of whom a significantly higher proportion (31 patients) received extradural analgesia compared with the labour group (P < 0.01).

There were three main indications for operative intervention: fetal distress, failure to progress, and both reasons coinciding (table V). There were more interventions for failure to progress in the ROM group compared with the labour group (P < 0.01). In the ROM group of 79 patients there were nine cases of occipito–posterior position compared with 18 of the 271 patients in the labour group (ns: chi-square test, P = 0.164).

During the study there was no difference in the number of operative interventions performed by the four duty obstetric registrars in relation to the frequency of their on-call sessions on the labour ward. Approximately 4% of all the operative interventions were shared between six consultant obstetricians (table VI).
DISCUSSION

Nulliparous women who experienced rupture of membranes before the onset of regular uterine contractions had a greater incidence of instrumental delivery than those who had rupture of membranes after onset of contractions. This increase in the likelihood of instrumental intervention is independent of the choice of analgesia used in labour. To our knowledge, this is the first study which has compared the outcome of spontaneous labour in relation to ROM.

Several studies have analysed the effect of extradural analgesia on the mode of delivery. Some clinicians have tried to achieve a reduction in the rate of forceps delivery in the presence of extradural analgesia by altering the management of the second stage [3, 5-7]. Others have used varying concentrations of extradural local anaesthetics [8], or mixtures with extradural opioids both as intermittent top-ups [8, 9] and as infusions [4, 10-12]. However, when analysing the outcome of labour, those performing these studies did not consider when rupture of membranes occurred in relation to the onset of labour. As we have demonstrated that there were significantly greater numbers of patients with ROM who received extradural analgesia in labour, future studies to determine the influence of extradural analgesia on the outcome of labour should include ROM as a bias factor.

There were significantly more interventions in the ROM group for failure to progress in labour compared with the labour group. In general, failure to progress in labour is caused most commonly by inefficient uterine contractions [13]. It is possible that spontaneous rupture of membranes before onset of contractions results in inefficient uterine action. However, it must be emphasized that our policy of oxytocin augmentation is the same whether rupture of membranes occurred before or after spontaneous contractions. Furthermore, there was no difference between the ROM and labour groups in the duration of labour as measured by the time from onset of regular contractions to delivery. The association between ROM and inefficient uterine contractions should be assessed in prospective studies using intrauterine pressure catheters.

Obstetricians have recognized the association between early rupture of membranes and malpositions for some time [14]. In our study we found a greater proportion of persistent occipito-posterior position in the group with ROM, but this difference was not significant. It would be interesting to study this association prospectively.

<table>
<thead>
<tr>
<th>Obstetrician</th>
<th>Sessions on delivery unit (%)</th>
<th>Interventions performed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registrar A</td>
<td>28.54</td>
<td>24.58</td>
</tr>
<tr>
<td>Registrar B</td>
<td>25.82</td>
<td>27.12</td>
</tr>
<tr>
<td>Registrar C</td>
<td>23.78</td>
<td>23.72</td>
</tr>
<tr>
<td>Registrar D</td>
<td>21.86</td>
<td>20.34</td>
</tr>
<tr>
<td>Consultants (x 6)</td>
<td>0</td>
<td>4.24</td>
</tr>
</tbody>
</table>

TABLE VI. Number of interventions and obstetrician's sessions on the delivery unit

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