Many other constituents may influence bacterial and viral growth.[9 10]

Some of the effects of human milk on the intestinal flora are the results of properties that are unlikely to be changed by sterilisation. Antimicrobial proteins such as lysozyme, lactoferrin, and immune globulins, however, have important protective functions, and recent animal experiments also suggest a role for the milk leucocytes in protecting against neonatal enterocolitis.[11] Until the clinically important host protective factors in milk have been identified, high-risk infants should receive milk that is changed as little as possible from its natural state.

Our data show that a standard method of sterilising human milk destroyed IgA and lactoferrin, two of the important antimicrobial proteins in milk. Gamma-irradiation also sterilised effectively but partially denatured the IgA and lactoferrin; it may also render the milk mutagenic.[12] In contrast, pasteurisation sterilised the milk effectively even after heavy bacterial contamination but had little effect on the levels of IgA, lactoferrin, or antibody to *E coli*.

It seems desirable to avoid any sterilisation procedure,[9] and our bacteriological findings suggest that important bacterial contamination of the milk is rare. If sterilisation is considered necessary a balance must be struck between effective sterilisation and damage to the milk. We think that present methods of high-temperature sterilisation cause unnecessary damage, and consider that the possible clinical benefits of using unsterilised or pasteurised human milk for feeding infants at risk of infection should be further assessed.

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Lumbar epidural analgesia in labour: relation to fetal malposition and instrumental delivery

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Summary

The incidence of instrumental delivery and malposition immediately before delivery was compared in patients who were given lumbar epidural analgesia and those who were not. Instrumental delivery was five times more common and a malposition of the fetal head was more than three times as common in the epidural group as in women who did not receive regional analgesia. Similar incidences were found even when the epidural was electively chosen before labour in the absence of medical indications. The instrumental delivery rate was affected by parity, the length of the second stage of labour, and the return of sensation by the second stage but not by other factors studied. The high incidence (20%) of malposition associated with epidural analgesia was not affected by any of the factors studied.

The psychological and physical disadvantages of malposition and instrumental delivery have yet to be assessed. In the meantime, when there are no medical indications for epidural analgesia, the advantages of pain relief should be weighed against those of a normal spontaneous delivery.

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Introduction

In Britain over the last 10 years there has been a rapid increase in the number of lumbar epidural blocks given in labour—a rate of 80% being reached in some units.[1] This increase is associated with improved obstetric anaesthetic services and the advantages of epidural analgesia in labour—pain relief,[2] the control of hypertension, the lessening of fetal metabolic acidosis[3] in breech[2] and multiple delivery,[2] etc. This change in obstetric management has led to a considerable increase in the number of instrumental deliveries.[4 5] The incidence of associated malposition has been stated as being increased[6] and unchanged.[7 8]

This prospective study was designed to investigate the incidence of malposition at the end of the second stage of labour and the incidence of instrumental delivery associated with lumbar epidural analgesia. Patients receiving epidural analgesia and who had no predisposing reason to require instrumental delivery or to have a malposition of the fetal head acted as a control group. Other factors that might influence the type of delivery were also analysed in an attempt to determine the best conditions for the induction of epidural analgesia associated with the highest incidence of spontaneous delivery.

Patients and methods

All patients (558) under consultant care at the John Radcliffe Hospital, Oxford, during a 52-day period were initially included in the trial. For the purpose of studying the mechanisms of labour and mode of vaginal delivery in vertex deliveries, all women who had breech deliveries, stillbirths, or caesarean section were excluded. Eight patients who received caudal analgesia were also excluded. Of the remaining 486 patients, 211 had epidural analgesia and 275 did not.

Sixty-two of the patients who had epidural analgesia had asked to have this method of pain relief and had no other medical indication for epidural analgesia. All were over 1·60 metres tall. This group is referred to as the elective epidural group.

All 486 patients were studied prospectively. Age, parity, height, gestation, induction or augmentation of labour, indication for epidural analgesia, timing of epidural block, effectiveness of epidural block during first and second stages of labour, epidural agent used, other analgesia given, position of the fetal head during labour and at delivery, length of first and second stages of labour, mode of delivery, and the infant's birth wieght were all recorded.

The local analgesic used was 0·5% bupivacaine without adrenaline. Seven patients were given bupivaccine of differing strengths.

The total incidence of malposition at the end of the second stage of labour was defined as the total number of spontaneous occipito-posterior deliveries and deliveries requiring instrumental rotation.

The χ^2 test was used in the statistical analysis.

Results

The percentage of spontaneous deliveries, instrumental deliveries, and deliveries associated with malposition at the time of delivery are shown in table I. Epidural analgesia was associated with a significant increase ($P < 0·001$) in the incidence of both instrumental deliveries (59·3%) and cases of malposition found at the end of the second stage of labour (21·3%). The trend was the same ($P < 0·001$) in the elective epidural group. The differences between the elective epidural group and the group receiving epidural analgesia for medical reasons were not significant.

Parity—Primigravid patients were more often delivered instrumentally (71·2%) than multiparous patients (42·4%) after epidural analgesia. For all patients the increase in the proportion of instrumental deliveries over the proportion in the group without epidural analgesia was significant ($P < 0·001$), the relative increase being threefold for primigravid women and sevenfold for multiparous ones (table II). The increased incidence of malposition after epidural analgesia, however, was little affected by parity.

Timing of induction of epidural analgesia—The incidence of malposition and instrumental delivery was not significantly affected by the timing of induction of analgesia (table III).

Timing of reversal of epidural analgesia—There was no significant reduction in the number of instrumental deliveries or cases of malposition in women in whom only abdominal or perineal analgesia was maintained in the second stage. When sensation was allowed to return to all levels in the second stage, however, the overall incidence of instrumental delivery was slightly lower (39%), although the incidence of malposition remained about the same (20%).

Birthweight, induction of labour, and length of second stage—Induction of labour and birth weight did not significantly influence the incidence of malposition and instrumental delivery among the epidural group. The incidence of spontaneous delivery increased with the length of the second stage, although most spontaneous deliveries occurred during the first hour.

TABLE I—*Relation of epidural analgesia to mode of delivery and incidence of malposition at end of second stage of labour. Results are percentages*

Mode of delivery	% Of patients without epidural analgesia (n = 275)	% Of all patients with epidural analgesia (n = 211)	% Of elective epidural group (n = 62)
Spontaneous occipitoanterior	85·8	39·8	50·0
Spontaneous occipitoposterior	3·6	0·9	0
Instrumental delivery from occipito-anterior	8·0	38·9	30·6
Instrumental delivery requiring rotation	2·6	20·4	19·4
Total incidence of malposition	6·2	21·3	19·4
Total incidence of instrumental delivery	10·6	59·3	50·0

Discussion

It has been suggested that epidural analgesia has been used in the past mainly in labours with obstetric complications, and thus these labours had a predisposition to end in instrumental delivery.[1] The women who did not have regional analgesia and women who did were therefore possibly not comparable. Nevertheless, the former group may be reasonably compared with the group of healthy patients who elected before labour to have epidural analgesia and who had no predisposing reason to require instrumental delivery or have a malposition of the fetal head. Even this comparison showed a fivefold increase in the instrumental delivery rate in the elective epidural group, and the incidence of malposition remained more than three times that of the patients without regional block.

Doughty claimed that he could induce selective analgesia during labour and generally did not need a perineal block until later in labour.[1] This, he believed, contributed to a higher spontaneous delivery rate. In our experience, when perineal analgesia was delayed until late in labour, the incidence of instrumental delivery was not significantly affected.

As regards the more than threefold increase in the rate of malposition at delivery, we agree with Studd,[6] who described a 20% incidence, and cannot concur with Zador,[7] who in a small series noted no significant change in the rate of occipitoposterior

TABLE II—*Relation of parity to epidural analgesia and incidence of instrumental delivery and malposition at end of second stage of labour. Results are percentages*

	Primigravidae			Multiparae		
	Without epidural analgesia (n = 79)	All with epidural analgesia (n = 125)	Elective epidural group (n = 29)	Without epidural analgesia (n = 196)	All with epidural analgesia (n = 86)	Elective epidural group (n = 33)
Incidence of malposition (%)	8·9	24·0	17·0	5·1	17·6	21·2
Incidence of instrumental delivery (%)	21·6	71·2	61·8	6·1	42·4	39·2

TABLE III—*Incidence of malposition at end of second stage of labour and instrumental delivery in patients receiving epidural analgesia early (⩽4 cm cervical dilatation) and late (>4 cm cervical dilatation) in labour. Results are percentages*

	Early analgesia		Late analgesia	
	All with epidural analgesia (n = 138)	Elective epidural group (n = 43)	All with epidural analgesia (n = 74)	Elective epidural group (n = 19)
Incidence of malposition (%)	21·7	20·9	20·3	15·8
Incidence of instrumental delivery (%)	62·3	55·8	52·7	36·8

or transverse positions of the fetal head in the second stage of labour, nor with Potter and MacDonald,[8] who found no increase in the rate of instrumental delivery in a group of nulliparous patients who were given epidural blocks.

The increase in the malposition rate in the epidural group is probably due to the decrease in tone of the pelvic floor muscles. This will interfere with the normal mechanism of labour in that the occiput will not be so easily rotated anteriorly when the presenting part is pushed against the gutter normally formed by the unrelaxed levator ani muscles.

Nearly all the patients with a malposition at the end of the second stage of labour in our series had a Kjelland's rotation forceps delivery. Although an epidural block facilitates such manipulation because of the excellent analgesia and pelvic floor relaxation, further study is needed into the possible trauma to mother and child that might be incurred if 20% of all patients with epidural analgesia have rotation forceps deliveries. In this series, only one baby in the epidural group was admitted to the special care baby unit. This baby had a cephalohaematoma after a ventouse delivery. Two babies in the non-epidural group were admitted with birth asphyxia and both had been delivered spontaneously.

The factors associated with a lower instrumental delivery rate after epidural analgesia seem to be multiparity (although this was only relative to the incidence in primigravid patients), a second stage of at least an hour, and a return of sensation to both perineum and abdomen. Topping-up an epidural analgesic at the end of the first stage of labour increases the incidence of instrumental delivery. But the timing of the initial induction of analgesia seems to have no affect on the final outcome. The increased malposition rate after epidural analgesia was not affected by any of the factors studied and remained around 20%. Possibly a lower strength of local anaesthetic (say 0·125%)[9] might lower the incidence of vaginal operative delivery and malposition and this is worthy of further study.

Epidural analgesia therefore seems to be associated with an incidence of instrumental delivery in primigravidae of about 70% and in multiparae of about 40%. These rates may be slightly reduced by some of the changes in the management of labour mentioned above, but the associated incidence of malposition will remain high. The psychological and physical disadvantages of such an "interference" rate have not yet been fully evaluated but must be considered before a decision is made to give the patient the benefits of epidural analgesia. In the absence of any strong medical indication for regional analgesia, the patient should be made aware of the increased chance of instrumental delivery so that she herself may choose between such a method of pain relief and the considerably reduced chance of a spontaneous delivery.

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Fetal proteinuria in diagnosis of congenital nephrosis detected by raised alpha-fetoprotein in maternal serum

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Summary

High concentrations of alpha-fetoprotein (α-FP) were found at 14, 19, and 21 weeks gestation in the serum of a woman with a history of unexplained fetal death in her previous pregnancies. The α-FP concentration of the liquor also was high at 21 weeks and the pregnancy was terminated. Though the fetus was macroscopically normal, measurement of albumin, α-FP, IgG, and α_2-macroglobulin in the fetal urine showed a selective proteinuria, and congenital nephrosis was diagnosed after examination of the fetal kidneys by electron microscopy.

Possibly some fetuses reported to be "false-positive for neural tube defect" may have had renal lesions of this nature. Examination of fetal urine may be the simplest initial diagnostic procedure in any future case.

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Introduction

It is important for the role of maternal serum alpha-fetoprotein (α-FP) screening that a thorough examination be made of any fetus without neural tube defect which is the product of a pregnancy associated with high α-FP levels. It is also important for genetic counselling that a definite diagnosis is reached.

We present the results of studies made on an apparently normal fetus after termination of a pregnancy in which extremely high maternal serum and amniotic fluid α-FP concentrations had been found.