A randomized trial of misoprostol and oxytocin for induction of labor: safety and efficacy

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The drug misoprostol, a prostaglandin E1 analogue for cervical ripening and labour induction.

Type of intervention
Treatment

Economic study type
Cost-effectiveness analysis (although data relating to costs and effectiveness were not expressly related).

Study population
Misoprostol was considered suitable for women requiring induction of labour except for those with, amongst others, multiple gestation, abnormal foetal heart rate, non-vertex presentation asthma or allergy to misoprostol, contraindication to vaginal delivery, or previous uterine surgery.

Setting
A hospital department at a US university.

Dates to which data relate
Patients scheduled for induction of labour between 1 June 1995 and 30 April 1996 were evaluated for possible inclusion into the study. No dates were provided for resources or prices.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing (type of delivery, length of time in labour and length of stay in newborn nursery) appeared to have been undertaken on this patient sample except for the length of time epidural analgesia was maintained during labour which was based on an assumption. It is not clear whether these data were collected prospectively or retrospectively.

Study sample
During the study period, 344 women underwent induction of labour of whom 130 were recruited to the study. The authors did not explain this discrepancy. Four women who agreed to participate were excluded because of deviations to the protocol, including one woman who withdrew from the study before receiving misoprostol. Therefore 60 patients were included in the misoprostol group and 66 in the oxytocin group. Subjects were reportedly assigned to groups according to a computer-generated random schedule. Subjects assigned to misoprostol received 100 micrograms every four hours until adequate uterine contractions were achieved. Those assigned to oxytocin received an infusion of 1
mU/minute increased by 1 m/U every 30 minutes until adequate uterine contractions were achieved. Power calculations were made based on the expected induction to delivery interval which suggested 45 patients in each group would be required.

**Study design**
This was a randomised controlled trial conducted at a single centre. No blinding of the assessors was reported, neither was there any follow-up.

**Analysis of effectiveness**
The analysis was based on intention to treat. The primary health outcome was the induction to delivery interval. Secondary outcomes considered included intrapartum complications, rate of caesarian and vaginal deliveries, indications of foetal compromise and admittance to the NICU. Groups were shown to be comparable except with regard to gestational age, with those in the oxytocin group being 1.3 weeks less (p<0.02) and with regard to a Bishop score of less than three which was more common in the misoprostol group (58% versus 38% p<0.05).

**Effectiveness results**
Median induction to delivery interval was significantly shorter in the misoprostol group (585 versus 885 minutes, p<0.001). There were no adverse maternal effects, except for one case of bronchospasm. Uterine tachysystole was however more common in those receiving misoprostol (70% versus 11%, p<0.001). The overall incidence of non-reassuring foetal surveillance did not differ significantly, neither was there a significant difference in the incidence of meconium staining of the amniotic fluid. The total caesarian rates were also comparable across the two groups. Subjects in the misoprostol group were, however significantly more likely to have a vaginal delivery within 24 hours of the start of induction (77% versus 55%, p<0.002) whilst epidural analgesia was used more frequently in women receiving oxytocin (73 versus 50%, p<0.025). There was no significant difference in the reasons for or rates of admission to the NICU.

**Clinical conclusions**
The authors reported a significantly reduced induction to delivery interval although the higher incidence of tachysystole among women receiving misoprostol was a cause for concern.

**Modelling**
No modelling was used.

**Measure of benefits used in the economic analysis**
No summary benefit measure was used by the authors. Therefore the benefits were assumed to be equal to the effectiveness results.

**Direct costs**
Hospital charges, as a proxy for costs, were calculated, based on known hospital fees for individual services. Quantities and costs were not analysed separately. The estimation of quantities appears to have been based upon the study sample, although charge calculations for epidural analgesia were based on estimates. Charges were not imputed for the NICU since, according to the authors, NICU admissions were not likely to be associated with the method of induction. The costs of the intervention and comparator themselves were excluded. No price dates were stated.

**Statistical analysis of costs**
P values were calculated on hospital charges.
Indirect Costs
Indirect costs were not measured.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
No summary benefit measure was used by the authors. Therefore the benefits were assumed to be equal to the effectiveness results.

Cost results
The total charges for the misoprostol group were $124,882 or $2,081 (+/- 984) per patient as compared to $172,637 or $2,616 (+/- 1,035) in the oxytocin group, (p<0.005).

Synthesis of costs and benefits
Costs and benefits were not combined.

Authors' conclusions
The authors concluded that in the misoprostol group, a faster induction to labour interval, a greater proportion of vaginal deliveries and a reduced use of epidural analgesia were observed, although the increased incidence of uterine tachysystole among those receiving misoprostol gave rise to concern. These generally positive results need re-confirming by other studies together with further studies to evaluate the optimal misoprostol dose, dose interval and total number of doses required, who can best benefit from misoprostol and possible longer term effects. The authors could not explain the reduced need for epidural analgesia among those receiving misoprostol found in this study.

CRD COMMENTARY - Selection of comparators
This study was a randomised controlled trial and the reason for the choice of comparator is clear.

Validity of estimate of measure of benefit
The authors acknowledged that selection bias cannot be ruled out since only 38% of those undergoing induction of labour during the study period were actually recruited into the study. The authors were not able to explain the cause of this discrepancy. Also, although power calculations were made to detect a reduction in the induction to labour period, the samples were too small to detect any difference in the need for caesarian sections. There was no follow-up of the patients.

Validity of estimate of costs
Resource quantities were regrettably not presented separately from the overall hospital charges, which were used as a proxy for costs. The study ignored the costs of the intervention and comparator themselves so we have no data on the relative expense of the actual treatments. Lastly, price dates were not given.

Other issues
The hospital charges used may not be representative and may not be generalisable to other health care settings. Since
the quantities and prices were not listed separately it is not possible for policy makers to compare costs with their own health care settings.

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None stated.

Bibliographic details

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Other publications of related interest

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