Cost-effectiveness analysis of prostaglandin E2 gel for the induction of labour at term

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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.

CRD summary
The objective was to estimate the cost-effectiveness of prostaglandin E2 (dinoprostone) vaginal gel for the induction of labour in women at term of pregnancy. This study concluded that the gel was likely to be more cost-effective than prostaglandin E2 tablets. On the whole, the methods seem to have been appropriate and the conclusions reached by the authors appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to estimate the cost-effectiveness of prostaglandin E2 (dinoprostone) vaginal gel for the induction of labour in women at term of pregnancy.

Interventions
Vaginal prostaglandin E2 gel 1mg or 2mg was compared with prostaglandin E2 tablets 3mg. Each treatment was administered every six hours.

Location/setting
UK/secondary care.

Methods
Analytical approach:
The analysis was based on one clinical trial (Taher, et al. 2011, see ‘Other Publications of Related Interest’ below for bibliographic details). The authors stated that the perspective was that of the UK NHS. The time horizon was the period from patient randomisation until hospital discharge.

Effectiveness data:
The evidence came from a randomised controlled trial. The population was women with a singleton or multiple pregnancy, presenting as cephalic between 36 and 41 weeks of gestation, with a modified Bishop score of less than seven, for whom the attending obstetrician deemed that induced labour was necessary. There were 81 women randomised to the gel group and 83 to the tablets group. The main clinical effectiveness estimate was the induction of labour and delivery.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The primary outcome measure was the time between the induction of labour (treatment) and delivery, in minutes. Secondary outcomes included the requirement for oxytocin, incidence of uterine hyperstimulation, incidence of intrapartum foetal blood sampling, epidural requirement, mode of delivery, blood loss at delivery, incidence of maternal pyrexia, perineal lacerations requiring suturing, one- and five-minute Apgar scores, and the need for admission to neonatal care.

Cost data:
The main cost categories were antenatal care, labour care, assisted delivery or caesarean section, maternal
complications, postnatal care, maternal high-dependency care, neonatal care, and drugs or medications. Occupancy of maternity and neonatal wards, resource use estimates, and daily costs were estimated by interviewing the trial hospital's staff and using its electronic data collection systems. The costs for each level of neonatal care were national Department of Health reference costs. Drug and medication costs were from the British National Formulary. All costs were in UK pounds sterling (£) at 2008 prices, adjusted using the NHS Hospital and Community Health Services pay and price index.

Analysis of uncertainty:
To capture the impact of uncertainty different scenarios were considered. The results were presented with bootstrap 95% confidence intervals, and cost-effectiveness acceptability curves were constructed, for each scenario.

Results
The gel was associated with a reduced interval between induction and delivery (median of 1,400 minutes with the gel compared with 1,780 minutes with the tablets; mean of 1,711 with the gel compared with 2,765 minutes with the tablets). Failure of induction was significantly higher with the tablets. There were no statistically significant differences in any of the secondary outcomes, between the two groups.

The costs were not significantly higher for the gel, at £2,257.80 for the gel and £1,627.35 for the tablets (incremental cost £630.45).

The incremental cost per hour less from induction to delivery, using the gel compared with the tablets, was estimated to be £36. At a cost-effectiveness threshold of £100 per hour of care avoided, the probability that the gel was cost-effective was estimated to be 0.83. The mean net benefit to the health services was estimated to be £1,121 (95% CI 1,133 to 3,379).

The results were sensitive to the inclusion of neonatal costs and variation of the cost-effectiveness threshold. Excluding the neonatal costs increased the probability that the gel was cost-effective to 0.99, at a cost-effectiveness threshold of £100 per hour of care avoided.

Authors' conclusions
This authors concluded that prostaglandin E2 gel was likely to be more cost-effective than tablets for the induction of labour at term.

CRD commentary
Interventions:
The interventions appear to have been appropriate comparators and should be generalisable to other settings. The authors reported that prostaglandin treatment appeared to be the usual practice in the UK. Prostaglandins were available as suppositories or pessaries, as well as gel and tablets. The tablets, gel, and pessaries had been found to be equally efficacious, but it would have been useful to include these comparators to assess their cost-effectiveness.

Effectiveness/benefits:
The effectiveness data were from a randomised controlled trial and should be of high quality. The details of this trial were published in another article, which should be consulted to assess the quality of the data (Taher, et al. 2011). The measure of benefit was specific to labour induction and will not be generalisable to other studies. The authors acknowledged the limitation that the effectiveness of the gel was not measured in terms of a preference-based outcome, such as quality-adjusted life-years, which would have been more useful for comparisons.

Costs:
The perspective was clearly stated and it appears that all the relevant categories of costs were included. The methods used to estimate the resource use were clearly presented, with details of their external validation. The unit costs were clearly presented in tables. The cost sources appear to have been appropriate and the costs were appropriately adjusted for inflation. Discounting was not necessary as the time horizon was less than one year.

Analysis and results:
The analytic approach appears to have been appropriate. The results were well presented and the analysis of uncertainty was reasonable, including several scenarios. The authors noted some limitations to their study, such as the perspective, time horizon, and cost-effectiveness threshold. The NHS perspective excluded those costs borne by family members and informal carers. The time horizon was short and did not consider the costs and health consequences that might accrue following hospital discharge. There was no accepted cost-effectiveness threshold for the benefit measure, making it difficult to assess the cost-effectiveness of the gel compared with other interventions.

**Concluding remarks:**
On the whole, the methods seem to have been appropriate and the conclusions reached by the authors appear to be valid.

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