Elective repeat Cesarean delivery versus trial of labor: a meta-analysis of the literature from 1989 to 1999

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Authors' objectives
To compare trial of labour with elective repeat Caesarean section among women with previous Caesarean delivery.

Searching
MEDLINE and EMBASE were searched from 1989 to 1999 for studies published in the English language, using combinations of the following MeSH terms: 'vaginal birth after cesarean', 'trial of labor', 'trial of scar' and 'uterine rupture'. The reference lists of studies identified on MEDLINE were examined. In addition, the Cochrane Collaboration Pregnancy and Childbirth Database was searched.

Study selection
Controlled trials from developed countries that presented original data were eligible. Retrospective cohort and prospective cohort designs were included.

Specific interventions included in the review
Studies reporting truly elective Caesarean section deliveries were eligible for inclusion. Comparisons of trials of labour with elective Caesarean sections were included, and oral prostaglandin treatment was permitted.

Participants included in the review
Women with one to three previous Caesarean deliveries were included. Other inclusion criteria, where stated, varied among studies and included one or more of the following: singleton pregnancy; cephalic presentation; cephalic or breech presentation; low transverse scar or unknown scar; term; estimated foetal weight less than 4,000 g; less than 41 weeks; no gestational diabetes; and low-segment scar. Studies in which women in the elective repeat Caesarean section delivery group were considered suitable for a trial of labour were eligible. Studies that examined special groups such as women with twins, breech-presenting foetuses, and previous low vertical uterine incisions, were excluded.

Outcomes assessed in the review
Studies had to assess at least one of the following outcomes: uterine rupture (symptomatic, required surgical repair, or involved extrusion of foetal parts); maternal mortality; foetal or neonatal mortality; 5-minute Apgar score less than 7; maternal febrile morbidity; maternal transfusion; and hysterectomy. The numbers of women in the elective Caesarean repeat delivery and trial of labour groups had to be available directly from the text or by calculation.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
Validity was assessed and scored using criteria based on those defined by Realini and Goldzieher (see Other Publications of Related Interest no.1). The modified criteria evaluated were: equal demographic susceptibility; equal clinical susceptibility; adherence monitoring; analysis of drop-outs; representative nature of the population; and prospective or retrospective cohort. Each parameter of quality was assigned a score of 0, 1 or 2. The scores were totalled for each study (maximum 7), then used to categorise the studies as either high (score 6 or 7) or intermediate (score 4 or 5) quality. Two reviewers independently scored studies on the basis of the validity criteria. Scores were in agreement for 13 of the 15 studies, and any disagreements were resolved by consensus.
Data extraction
Two authors independently extracted the data, and any disagreements were resolved by consensus. Data from the primary studies were used to construct 2x2 tables; when required, the authors of the studies were contacted to clarify the data. Information tabulated in the review included the following: the author and year of publication, the period during which the data were obtained, study location, the number of previous Caesarean deliveries, and other inclusion criteria.

Methods of synthesis
How were the studies combined?
The probability of a successful trial of labour was estimated using a weighted average of proportions from the individual studies. Pooled odds ratios (OR) and 95% confidence intervals (CIs) were calculated using the Peto-modified Mantel-Haenszel method, and confirmed using the random-effects method of DerSimonian and Laird (see Other Publications of Related Interest nos.2-3).

How were differences between studies investigated?
Statistical heterogeneity was assessed. The results from random-effects and fixed-effect models were compared, and subgroup analyses were conducted to examine the influence of study quality and study design on the outcomes. The analysis of the neonatal mortality outcome was repeated after exclusion of perinatal deaths attributable to intra-uterine death before onset of labour, lethal anomalies, and prematurity (less than 28 weeks' gestation).

Results of the review
Fifteen controlled trials (47,682 women) were included.

The mean proportion of women achieving a successful vaginal birth was 72.3% (95% CI: 71.8, 72.8).

Uterine rupture (11 controlled trials, 39,116 women).

The rupture rates were significantly increased in women undergoing trial of labour than in those undergoing elective Caesarean delivery; the OR was 2.10 (95% CI: 1.45, 3.05). The rates were also significantly increased after pooling 5 prospective cohort trials (OR 2.06, 95% CI: 1.40, 3.04), but not after pooling the 6 retrospective cohort studies.

Maternal mortality (8 controlled trials, 45,244 women).

There were 3 maternal deaths among 27,504 women undergoing trial of labour, and no maternal deaths among 17,740 women undergoing repeat Caesarean delivery. All 3 deaths were in women undergoing Caesarean section after a trial of labour: 2 resulted from thromboembolic complications, whilst the other occurred after aspiration of gastric contents on anaesthesia. There was no statistically significant difference between the intervention groups, either for all studies combined (OR 1.52, 95% CI: 0.36, 6.38), or for separate analyses of prospective and retrospective studies.

Neonatal mortality (11 controlled trials, 39,525 women).

The rates were significantly increased in women undergoing trial of labour, compared with elective Caesarean delivery; the OR was 1.71 (95% CI: 1.28, 2.28). The rates were also significantly increased after pooling 6 prospective cohort trials (OR 1.75, 95% CI: 1.30, 2.34), but not after pooling the 5 retrospective cohort studies. The analysis was repeated after excluding those perinatal deaths attributable to intra-uterine death before onset of labour, lethal anomalies, and prematurity (9 controlled trials). The results showed that neonatal mortality remained significantly increased in women undergoing trial of labour, compared with elective Caesarean delivery; the OR was 2.05 (95% CI: 1.17, 3.57).

Five-minute Apgar score less than 7 (7 controlled trials, 3,313 women).

The rates were significantly increased in women undergoing trial of labour, compared with elective Caesarean delivery; the OR was 2.24 (95% CI: 1.29, 3.88). The rates were also significantly increased after pooling 2 prospective cohort trials (OR 2.27, 95% CI: 1.16, 4.71), but not after pooling the 5 retrospective cohort studies.
Maternal febrile morbidity (9 controlled trial, 45,061 women).

The rates were significantly decreased in women undergoing trial of labour, compared with elective Caesarean delivery; the OR was 0.70 (95% CI: 0.64, 0.77). The results were consistent across all studies.

Hysterectomy (6 controlled trials, 44,123 women).

The rates were significantly decreased in women undergoing trial of labour, compared with elective Caesarean delivery; the OR was 0.39 (95% CI: 0.27, 0.57). The results were consistent across all 5 prospective studies (OR 0.38, 95% CI: 0.26, 0.56).

High-quality studies (6 controlled trials).

For all outcomes other than the 5-minute Apgar scores (only 1 trial), the subgroup analysis confirmed the results of the total analyses.

The authors reported that their review had several limitations: there was a lack of information regarding long-term neurologic outcomes among children; there was an absence of data to allow controlling for prematurity in determining the Apgar outcome; all the data came from non-randomised studies, thus limiting the evidence.

Authors' conclusions
A trial of labour may result in small increases in the uterine rupture rate, and in foetal and neonatal mortality, with respect to repeat Caesarean section. Maternal morbidity, including febrile morbidity, and the need for transfusion or hysterectomy may be reduced with a trial of labour.

CRD commentary
The aims were stated and the inclusion criteria were defined in terms of the study design, participants and outcome. By limiting the search to studies published in the English language, as identified in two databases, other relevant studies may have been omitted. In addition, there was no attempt to locate unpublished material, thus raising the possibility of publication bias. Details of the excluded studies, and the reasons for their exclusion, were tabulated. However, the methods used to select the studies were not described. Validity was formally assessed and scored using defined criteria; the methods for which were described. The data were pooled in a meta-analysis. Statistical heterogeneity was assessed, although it does not appear to have been reported. The influence of various factors (e.g. validity and study design) on the outcome was examined. The authors considered the limitations of the review in the text.

The evidence presented supports the authors' conclusions, though as acknowledged by the authors, the evidence is based on observational studies. Hence, the results should be considered with caution.

Implications of the review for practice and research
Practice: The authors state that either a trial of labour or elective repeat Caesarean section may be a reasonable option for women with at least one previous Caesarean delivery.

Research: The authors state that a randomised controlled trial would be useful.

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Other publications of related interest

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.