Is routine indwelling catheterisation of the bladder for caesarean section necessary? A systematic review
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CRD summary
This review concluded that not using indwelling urinary catheters for caesarean section was linked with a lower rate of urinary tract infection, and no increase in urinary retention and intraoperative difficulties. The authors’ conclusions reflect the evidence, but as this review was published in 2011 more up-to-date evidence may be available.

Authors’ objectives
To evaluate the necessity for a routine indwelling urinary catheter during caesarean section, and to determine its effects on the clinical outcomes.

Searching
Eight databases (including MEDLINE and EMBASE) were searched to May 2010 with no language restrictions. Search terms were reported. Reference lists of retrieved articles were manually searched.

Study selection
Randomised and non-randomised controlled trials that compared indwelling urinary catheters before surgery versus no catheter, for elective or emergency caesarean section, were included. The primary outcomes were urinary tract infections, postpartum urinary retention, intraoperative difficulties, and operative complications. Secondary outcomes were operating time, need for re-catheterisation, discomfort at first voiding, time until first voiding, time until ambulation, and length of hospital stay.

The included trials were conducted in Egypt, Iran or Sri Lanka. Where reported, the mean participant age ranged from 27 to 28 years. Uncatheterised women were told to void immediately or in the hour before surgery. Two trials reported that catheterised women remained catheterised for 12 hours after surgery; in the remaining trial the catheter was removed at the end of surgery.

Two reviewers independently selected studies for inclusion in the review. Any disagreements were resolved through discussion and with a third reviewer, if necessary.

Assessment of study quality
The risks of bias in the trials were assessed using Cochrane Collaboration criteria for randomisation, allocation concealment, blinding, incomplete outcome data, selective outcome reporting, and other bias.

Multiple reviewers assessed the quality of the trials.

Data extraction
The data for dichotomous outcomes were extracted to calculate relative risks, and the data for continuous outcomes were extracted to calculate mean differences. All effects were estimated with 95% confidence intervals.

Two reviewers independently extracted the data. Any disagreements were resolved through discussion.

Methods of synthesis
The results from randomised and non-randomised trials were analysed separately and reported as subgroup analyses. Statistical heterogeneity was assessed using I², with values of 50% or more indicating significance. In the absence of significant heterogeneity, the effect estimates and 95% confidence intervals were pooled using fixed-effect models. Where significant heterogeneity was present, the estimates were not pooled but were synthesised in a narrative.

Results of the review
Two randomised controlled trials (RCTs; 690 participants) and one non-randomised controlled trial (NCT; 394 participants) were identified. The authors concluded that routine indwelling catheterisation was not necessary for caesarean section, as it was associated with a lower rate of urinary tract infection and no increase in urinary retention or intraoperative difficulties.
participants) were included. One trial reported adequate allocation concealment and all three reported complete outcome data (no loss of participants). None of the trials adequately described their randomisation and blinding. Selective outcome reporting was found in one trial, and other bias was found in another.

**Individual trials:** Compared with catheterisation, without the catheter there was a statistically significant lower incidence of urinary tract infection (one RCT and one NCT). No statistically significant differences were found between trial groups in the rates of urinary retention (one RCT and one NCT), and intraoperative difficulties (one RCT). The non-randomised trial reported 23 cases (6.7%) of post-partum uterine atony leading to haemorrhage; of these, 17 (4.9%) had received a metal catheter immediately after surgery. It also found no significant difference between groups in operating time in minutes. One randomised trial found a statistically significant association between discomfort at first voiding and indwelling catheters; the other randomised trial found statistically significant lower rates of discomfort in uncatheterised women than catheterised women. One randomised trial reported significantly less time until first voiding without a catheter than with one. Two randomised trials reported statistically significant shorter hospital stays when urinary catheters were not used. None of the trials reported the number of catheterised women who needed re-catheterisation.

**Pooled analysis:** Compared with urinary catheters, having no catheter was associated with a statistically significant shorter time until ambulation (MD -6.01 hours, 95% CI -6.68 to -5.35; two RCTs; τ²=0).

**Cost information**
One randomised trial reported that the total cost incurred after surgery with catheterisation (116.28 Egyptian pounds) was double that incurred without a catheter (54.02 Egyptian pounds).

**Authors’ conclusions**
Not using indwelling urinary catheters for caesarean section was linked with a lower rate of urinary tract infection, and no increase in urinary retention and intraoperative difficulties.

**CRD commentary**
The review question was clear and supported by sufficiently replicable inclusion criteria. An extensive range of databases was searched with no language restrictions, reducing the likelihood of relevant studies being missed. The review processes were performed in duplicate, minimising the risks of reviewer error and bias. Suitable quality assessment criteria were employed. The authors acknowledged the risks of bias within the individual trials and stated that their results should be interpreted with caution.

The evidence for each outcome often came from one trial, for example for intraoperative difficulties, and the need for re-catheterisation. The evidence for urinary retention was limited by the very few events that were reported; the trials were likely to have been underpowered to detect any difference. The authors pointed out a possible conflict between this review's findings and a recommendation from the National Institute for Health and Care Excellence (NICE), which specified that women undergoing caesarean section with regional anaesthesia should have an indwelling urinary catheter to prevent bladder overdistension. In this review, the two trials that reported frequent use of regional anaesthesia found that some outcomes were better for uncatheterised women, such as discomfort at first voiding, time until first voiding, time until ambulation, and length of hospital stay.

The authors’ conclusions reflect the evidence, but only a small amount of evidence was available for synthesis and since this review was published in 2011, more up-to-date evidence might be available.

**Implications of the review for practice and research**

**Practice:** The authors stated that routine indwelling catheterisation for caesarean delivery in haemodynamically stable women was unnecessary and could be harmful.

**Research:** The authors stated that future randomised controlled trials should have larger samples and rigorous methods. Further investigation was needed to confirm this review’s findings and to examine how the avoidance of catheterisation might affect intraoperative difficulties, postoperative complications, and long-term safety.

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