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## **MODE OF VAGINAL DELIVERY AND URINARY LEAKAGE: POPULATION-BASED PROSPECTIVE COHORT STUDY**

### Hypothesis / aims of study

Accurate estimates of the risks and benefits of different modes of delivery are needed to be able to correctly counsel pregnant women. Although operative delivery increases the risk of immediate pelvic floor trauma, a recent systematic review and meta-analysis found no evidence of increased risk of long-term stress urinary incontinence (SUI) among women with history of operative delivery (1). However, prior studies have neither directly compared forceps and vacuum for risk of urinary incontinence, nor assessed an impact of operative delivery on urgency urinary incontinence (UUI). We aimed to estimate and compare the effects of different kinds of vaginal deliveries on SUI and UUI, using a large prospective population based cohort study.

### Study design, materials and methods

Every citizen of one county in Norway aged 20 years or older, was invited to participate in two surveys, the first over the period 1995-97 and the second 2006-08, collecting identical information about SUI and UUI using validated items ("Do you leak urine when you cough, sneeze, laugh, or lift something heavy?" (yes/no) and "Do you have involuntary loss of urine in connection with sudden and strong urge to void?" (yes/no)), with severity defined using the Sandvik Index (slight, moderate, severe) (2). Incontinence data were linked to the Medical Birth Registry of Norway. Women who had given birth at least once before 1967, were nulliparous, pregnant or in the first postpartum year at the time of the questionnaire, or who had any cesarean deliveries were excluded. We used logistic regression to adjust for potential confounders including age, parity, body mass index, and time since delivery. Furthermore, we performed secondary analyses stratified by age (aged less than 50 vs. 50 or more).

### Results

The final analyzable sample included 11,723 women. SUI was reported by 14.9% and UUI by 9.9%. Overall in unstratified analyses including adult women of all ages, there were no statistically significant difference in the risk of SUI for each kind of operative delivery: forceps (OR 1.23, 95% CI 0.99-1.53), and vacuum (OR 0.96, 95% CI 0.75-1.22), or in the risk of UUI: forceps (OR 1.24, 95% CI 0.95-1.60), and vacuum (OR 1.13, 95% CI 0.85-1.49), when compared to spontaneous vaginal delivery (SVD) (Figure 1). In addition, there were no observed differences between vacuum and forceps for SUI (OR 1.29 95%CI 0.94-1.77) or UUI (OR 1.10, 95% CI 0.76-1.59).

For women aged <50 (Figure 2), however, there was a statistically significant difference in the risk of SUI for forceps delivery (OR 1.41, 95% CI 1.08-1.86), but not for vacuum (OR 0.86, 95% CI 0.63-1.16) when compared to SVD. For these younger women there were also near significant impact on the risk of UUI with forceps (OR 1.35, 95% CI 0.95-1.93), but not vacuum (OR 1.07, 95% CI 0.74-1.56). For women aged 50 or more, there were no measurable impacts of either type of delivery on either SUI or UUI.

Among younger women, forceps had increased risk for SUI when compared to vacuum in the direct comparisons (OR 1.66, 95% CI 1.12-2.46) (Figure 2). No significant differences were seen in the older age strata, or for UUI.

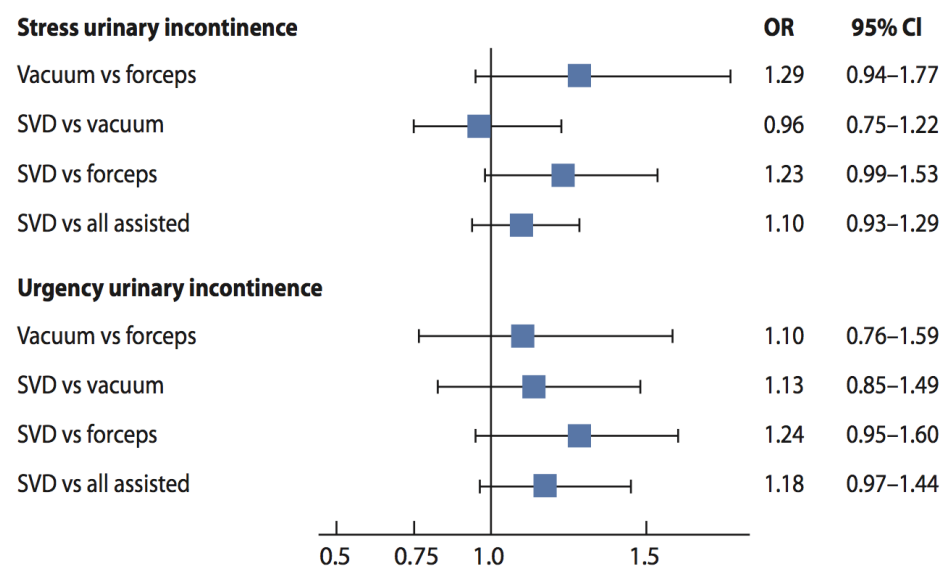
### Interpretation of results

This is the largest available study of the impact of different types of operative delivery on urinary incontinence. Consistent with data from a recent systematic review showing increased protective benefit from cesarean section only for younger women (1), we observed harmful effects of forceps delivery only for younger women. Although these data suggest that obstetricians should choose vacuum over forceps, at least when considering long-term incontinence, no randomized study is available, and we cannot infer any causal effect from these observational data. Either larger or smaller true effects than we observed are possible, and may have been obscured by differential misclassification or residual confounding, particularly confounding by indication.

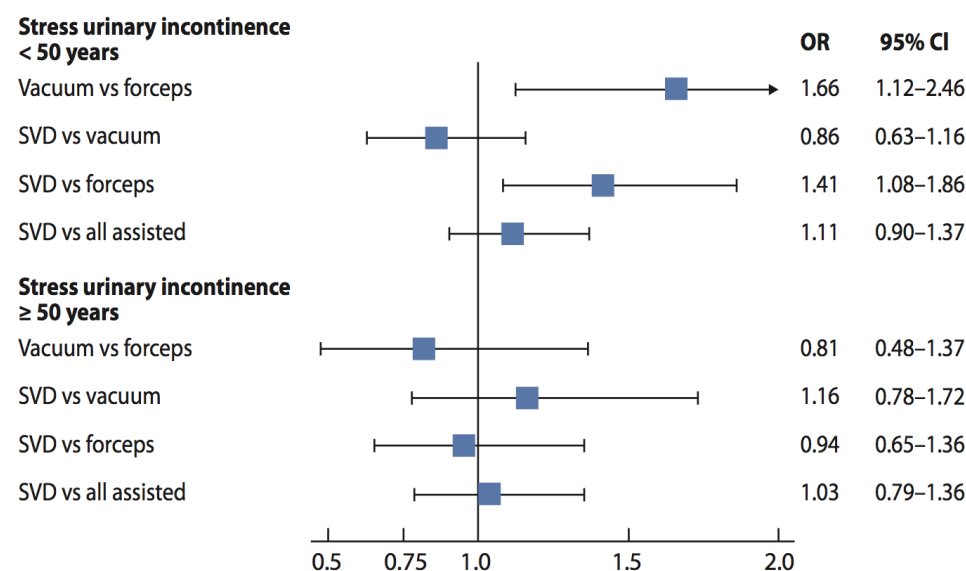
### Concluding message

Forceps delivery is associated with significant increased long term risk of stress incontinence, with a near significant increased risk of urgency incontinence, for women aged <50. In the absence of adequate randomized trials, this forms the best available evidence with which to counsel women.

**Figure 1.** Impact of mode of vaginal delivery on SUI and UUI in the multivariate analyses.



**Figure 2.** Age-stratified, less than 50 years vs, 50 years or more, impact of mode of vaginal delivery on SUI in the multivariate analyses.



#### References

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#### Disclosures

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