

URGE INCONTINENCE: DETERMINING ENVIRONMENTAL AND OBSTETRICAL RISK FACTORS USING AN IDENTICAL TWIN STUDY DESIGN

Hypothesis / aims of study

Identical twin studies represent an ideal methodology for assessing environmental disease factors, providing 'natural control' over genetic variance that cannot be achieved within random samples of unrelated individuals. We conducted an extensive survey of pelvic symptoms at the world's largest annual gathering of twins, and investigated main environmental determinants of urge urinary incontinence (UI). Although the prevalence of urge incontinence is known to increase with age, the role of environmental and obstetrical risk factors has remained uncertain.

Study design, materials and methods

The 67-item survey was completed by 271 identical twin sister pairs (n=542). To account for correlated data within pairs, we implemented logistic regression for repeated binary measures. Numerous medical, obstetrical and demographic factors underwent univariate analysis, entering multivariate regression based on $p < 0.25$. Statistical analyses were performed using SAS.

Results

Demographics of the sample included mean age 47.5 (21-79), parity 1.8 (0-7), 45% menopausal, mean BMI 26.6, 90.3% Caucasian and 7.0% African American. UI was reported by 35% of the cohort, and by 42.9% of parous women. The risk of UI increased steadily with advancing age (OR 2.3 for age 40-49, 2.5 for 50-59, 2.7 for ≥ 60 , $p=0.001$).

In the multivariate analysis, parity represented the strongest environmental risk factor for UI, with the following odds ratios relative to nulliparous women: OR 2.4 for 1 birth, 4.4 for ≥ 2 births, $p=0.001$. Obesity, defined as $BMI \geq 30$, was the second factor significantly predictive of UI (OR 3.3, $p=0.001$) in the multivariate analysis. Among parous women, 83.8% had at least one vaginal birth and 16.2% by cesarean only. Rates of UI in these groups were 45.1% and 27.9%, respectively. The univariate analysis indicated a trend towards a lower risk of UI after 'cesarean only' versus vaginal birth (OR 0.53, $p=0.09$); however, this factor did not achieve statistical significance (OR 0.56, $p=0.20$) in the multivariate regression analysis of 173 (n=346) parous-parous twin pairs. Factors not associated with UI risk included: current or previous smoking, asthma, weight of largest baby, duration of 2nd labor stage, episiotomy, forceps, and hysterectomy.

Interpretation of results

This study represents the first application of an identical twin research design to the condition of urge incontinence. This research method provides a unique opportunity to evaluate non-genetic risk factors for disease. According to our findings, parity represents the strongest environmental predictor of urge incontinence, with a more than 4-fold increase in risk for women with two or more prior births. Obesity was the second major risk factor predictive of UI, associated with a 3-fold higher risk. Although vaginal birth mode may be associated with a higher risk of UI than cesarean, this observed trend did not reach statistical significance. Total number of pregnancies and deliveries, independent of birth mode, appears to represent the key obstetrical determinant.

Concluding message

The risk of urge incontinence rises dramatically with increasing parity, regardless of age. Parity and obesity represent major non-genetic risk factors predisposing to urge incontinence in the female population.