

Title: Lower Urinary Tract Injury in the United States, 1979-2006

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Objectives: To determine age-adjusted rates (AAR) of lower urinary tract (LUT) injury in the US and the incidence of LUT injury among women undergoing selected inpatient gynecologic and obstetric (Ob) procedures.

Methods: The National Hospital Discharge Survey, a federal dataset sampling inpatient hospitals, was used to obtain data based on ICD-9-CM diagnosis and procedure codes from 1979-2006. AAR of nonOb bladder and ureteral injuries were calculated for women > 18 years of age using 1990 census data. Incidence of LUT injury was calculated for hysterectomy (abdominal-TAH, vaginal-TVH, supracervical-SCH, and laparoscopic-assisted-LAVH), spontaneous vaginal delivery (SVD), operative vaginal delivery (OVD), and cesarean delivery (CD). The primary diagnosis was considered when assessing injury-associated disease classes.

Results: AAR of nonOb bladder injury and ureteral injury per 100,000 women decreased from 13.0 to 4.9 and 6.3 to 2.5, respectively, from 1979-2006. AAR of inpatient gynecologic procedures per 1000 women decreased from 34.9 (1979) to 11.8 (2006). Among women undergoing hysterectomy, the incidence of bladder injury was highest in women undergoing LAVH (13.8 per 1000). Lower incidence of bladder injury was observed with TAH (7.0 per 1000 women), SCH (6.2 per 1000 women), and TVH

(5.8 per 1000 women). Ureteral injury recognized at time of hysterectomy was most common with TAH (1.1 per 1000) and least common with LAVH (0 per 1000). The incidence of ureteral injury with SCH and TVH was 0.4 per 1000 women and 0.5 per 1000 women, respectively. Pelvic organ prolapse and urinary incontinence were the most common primary diagnoses in women with nonOb bladder injury (Table 1).

Urethral or bladder injury occurred at the time of SVD in 10.3 per 1000 women and 4.8 per 1000 women with OVD. Trends in bladder injury at the time of CD are described in Figure 1.

Conclusion: NonOb bladder and ureteral injuries at time of inpatient surgical procedures have decreased from 1979-2006. This corresponds with a sharp decrease in inpatient gynecologic procedures. Risk of bladder injury at time of hysterectomy appears to be highest in women undergoing LAVH. Ureteral injury at time of hysterectomy is likely grossly underestimated due to a lack of intraoperative recognition and not coding error. Despite a sharp increase in cesarean delivery, bladder injuries have remained stable reflecting a lower risk profile for cesarean delivery than previously suspected.

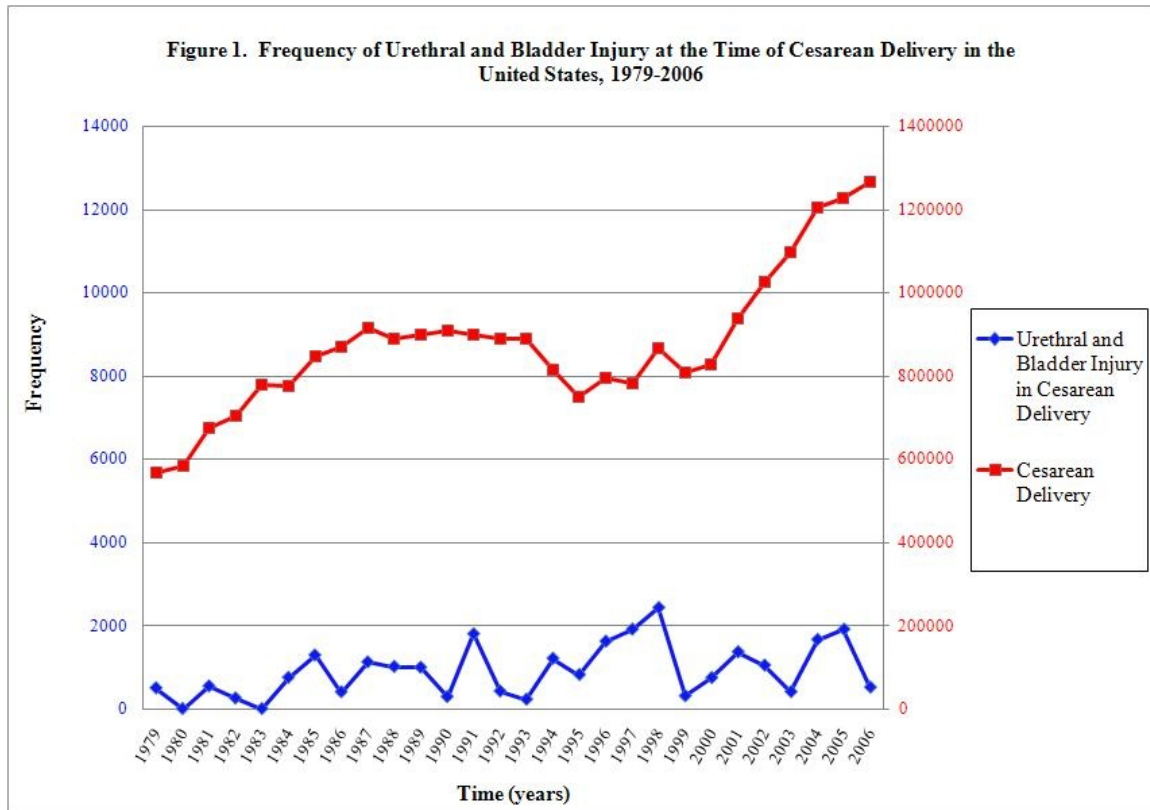


Table 1. Primary diagnoses in women with nonobstetric bladder and ureteral injuries, 1979-2006

Primary diagnosis	Nonobstetric bladder injury (N = 315,755)	Ureteral injury (N = 109,589)
Urinary incontinence	68,690 (21.8%)	1,251 (1.1%)
Pelvic organ prolapse	56,417 (17.9%)	4,298 (3.9%)
Fibroids	38,233 (12.1%)	3,907 (3.6%)
Gynecologic malignancy/neoplasm/dysplasia*	25,556 (8.1%)	8,218 (7.5%)
Endometriosis	12,862 (4.1%)	4,362 (4.0%)
Trauma	9,395 (3.0%)	267 (0.2%)
Non-gynecologic abdominal malignancy/neoplasm/dysplasia†	2,350 (0.7%)	3,523 (3.2%)

*excluding fibroids

†excluding urinary tract malignancy or neoplasm