

Episiotomy in the United States: has anything changed?

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OBJECTIVE: The objective of the study was to describe episiotomy rates in the United States following recommended changes in clinical practice.

STUDY DESIGN: The National Hospital Discharge Survey, a federal data set sampling inpatient hospitals, was used to obtain data based on *International Classification of Diseases, Clinical Modification*, 9th revision, diagnosis and procedure codes from 1979 to 2004. Age-adjusted rates of term, singleton, vertex, live-born spontaneous vaginal delivery, operative vaginal delivery, cesarean delivery, episiotomy, and anal sphincter laceration were calculated. Census data for 1990 for women 15-44 years of age was used for age adjustment. Regression analysis was used to evaluate trends in episiotomy.

RESULTS: The rate of episiotomy with all vaginal deliveries decreased from 60.9% in 1979 to 24.5% in 2004. Anal sphincter laceration with

spontaneous vaginal delivery declined from 5% in 1979 to 3.5% in 2004. Rates of anal sphincter laceration with operative delivery increased from 7.7% in 1979 to 15.3% in 2004. The age-adjusted rate of operative vaginal delivery declined from 8.7 in 1979 to 4.6 in 2004, whereas cesarean delivery rates increased from 8.3 in 1979 to 17.2 per 1000 women in 2004.

CONCLUSION: Routine episiotomy has declined since liberal usage has been discouraged. Anal sphincter laceration rates with spontaneous vaginal delivery have decreased, likely reflecting the decreased usage of episiotomy. The decline in operative vaginal delivery corresponds to a sharp increase in cesarean delivery, which may indicate that practitioners are favoring cesarean delivery for difficult births.

Key words: cesarean delivery, episiotomy, operative vaginal delivery

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Although episiotomy was proposed by Ould¹ as early as 1742 to facilitate “difficult deliveries,” it was not popularized until the 1920s by prominent obstetricians including DeLee² and Pomeroy.³ As the medical community began to view birth as a medical procedure performed in a hospital rather than a physiologic process occurring at home, surgical incision of the perineum (episiotomy) was advocated for the prevention of maternal injury and improvement of fetal outcomes. Purported fetal benefits included a decreased risk of asphyxia because of a shortened second stage of labor and

decreased frequency of fetal skull fractures and cephalohematomas.^{2,3}

Subsequent studies demonstrated significant risks associated with episiotomy, including anal sphincter laceration, fecal and urinary incontinence, rectovaginal fistula, perineal pain, dyspareunia, and greater blood loss as compared with vaginal delivery without episiotomy.⁴⁻⁹ A detailed review of the literature regarding the risks and benefits of episiotomy by Thacker and Banta¹⁰ concluded that there is no clearly defined evidence for the efficacy of the routine use of episiotomy and encouraged the study of episiotomy through randomized, con-

trolled trials. They further stated that “if (women) were fully informed as to the evidence for benefit and risk in the face of demonstrable risks, it is unlikely that women would readily consent to having routine episiotomies.”¹⁰ Despite the risks and increased awareness of patient autonomy, episiotomy remained one of the most commonly performed procedures in the United States in 1997.¹¹

In 1999, the Cochrane Database of Systematic Reviews presented recommendations based on a review of randomized trials comparing restrictive vs routine use of episiotomy. Based on the decreased risks of posterior perineal trauma, the decreased need for suturing, and fewer complications related to wound healing, a restrictive policy of episiotomy was recommended.¹²

The primary objective of this study was to describe the rates of episiotomy in the United States from 1979 to 2004. Secondly, we sought to compare the trends and identify variables associated with cesarean delivery, spontaneous vaginal delivery, operative vaginal delivery, episiotomy, and anal sphincter laceration.

MATERIALS AND METHODS

The National Hospital Discharge Survey (NHDS) is a federal dataset compiled by

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TABLE 1

Age-adjusted rates of spontaneous vaginal delivery, operative vaginal delivery, and cesarean delivery for women aged 15-44 years in the United States^a

Year	Spontaneous vaginal delivery	Operative vaginal delivery	Cesarean delivery	Total deliveries
1979	38.1	8.7	8.3	3,089,673
1980	39.1	8.5	8.4	3,189,203
1981	39.6	8.2	9.7	3,304,947
1982	39.7	7.5	9.7	3,315,607
1983	39.2	6.8	11.0	3,331,489
1984	36.9	6.6	11.1	3,199,389
1985	35.6	6.5	11.9	3,164,318
1986	33.9	6.1	12.1	3,052,268
1987	34.8	6.8	12.9	3,168,048
1988	33.9	6.1	12.4	3,037,831
1989	35.0	6.7	12.2	3,103,730
1990	35.7	6.8	12.5	3,234,575
1991	35.6	6.7	12.2	3,169,627
1992	34.5	6.8	12.2	3,079,451
1993	36.7	6.9	12.1	3,188,672
1994	36.3	7.0	11.3	3,105,509
1995	35.5	6.9	10.1	2,961,316
1996	39.1	6.6	10.7	3,167,437
1997	39.3	6.6	10.5	3,152,252
1998	39.9	6.9	11.7	3,279,982
1999	38.8	5.7	11.1	3,096,380
2000	37.1	5.2	11.2	3,022,345
2001	37.3	5.0	12.8	3,124,149
2002	36.8	5.0	14.1	3,179,419
2003	36.9	4.9	15.5	3,263,249
2004	36.7	4.6	17.2	3,338,268
				82,319,134

^a Age-adjusted rates per 1000 women based on 1990 United States census data. Frankman. Episiotomy in the United States: has anything changed? *Am J Obstet Gynecol* 2009.

the National Center for Health Statistics. This dataset is a national probability sample of nonfederal short-stay hospitals in the United States based on approximately 270,000 inpatient records acquired from 466 hospitals annually. The overall dataset error rate for final diagnoses and procedures is 1.0% and 0.7%, respectively.¹³

This database was used to obtain information regarding spontaneous vaginal deliveries, operative vaginal deliveries,

and cesarean deliveries between 1979 and 2004. Using *International Classification of Diseases, Clinical Modification*, 9th revision (ICD-9-CM) diagnosis and procedure codes, 3 cohorts were identified: spontaneous vaginal deliveries, operative (forceps- and vacuum-assisted) vaginal deliveries, and cesarean deliveries. Singleton, term, live-born, vertex deliveries were included in the analysis. Multiple gestations and preterm deliveries (< 37 weeks' gestational age) were ex-

cluded. Deliveries complicated by malpresentation, placenta praevia, vasa praevia, placental abruption, and uterine rupture were also excluded. Both diagnosis and procedure codes were used to reflect a change in coding practices in the late 1980s that favored the use of procedure codes.

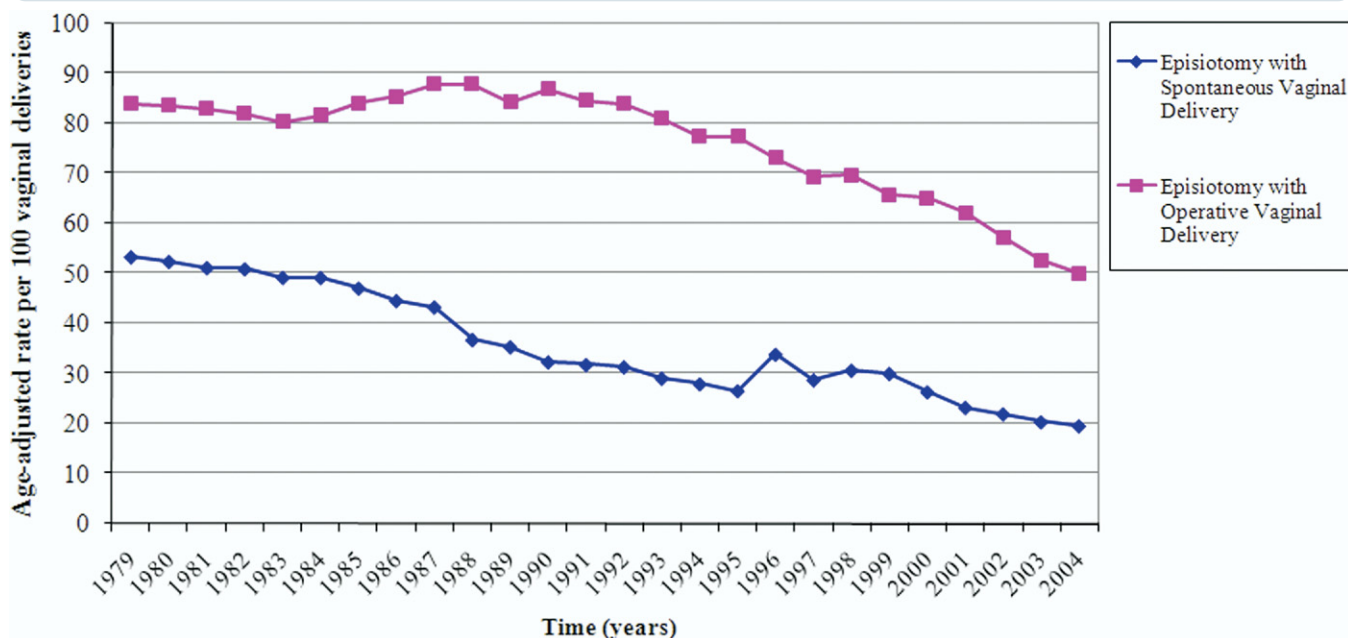
To determine episiotomy rates, ICD-9-CM codes for episiotomy (73.6 for spontaneous delivery; 72.1, 72.21, and 72.31 for forceps-assisted vaginal delivery; and 72.71 for vacuum-assisted vaginal delivery) were used. Anal sphincter laceration rates in the spontaneous and operative vaginal delivery cohorts were determined using ICD-9-CM codes for third- and fourth-degree perineal lacerations (664.20, 664.21, 664.24, 664.30, 664.31, and 664.34). Age-adjusted rates for deliveries, episiotomy, and anal sphincter laceration were calculated using 1990 census data for women 15-44 years of age. For accuracy, age adjustment and frequencies were calculated for each year from 1979 to 2004. Population weighting ratio adjustments were performed according to the NHDS study design.¹³

Univariable analysis using the χ^2 test was performed to identify demographic variables associated with episiotomy, operative vaginal delivery, and cesarean delivery. Multivariable logistic regression was used to assess factors independently associated with these procedures. Linear regression was used to assess trends in episiotomy rate over the study time period. Statistical analysis was performed using SPSS (version 15.0; SPSS, Inc, Chicago, IL). Statistical significance was evaluated at the $P < .05$ level.

RESULTS

During the study period, estimated total annual deliveries per year remained stable (3,089,673-3,338,268). Similarly, age-adjusted rates (AARs) of spontaneous vaginal delivery were stable over the study period (38.1 deliveries per 1000 women to 36.7 per 1000 women). The AARs of all operative vaginal deliveries decreased markedly from 8.7 per 1000 women in 1979 to 4.6 per 1000 women in 2004. Rates of cesarean delivery in-

FIGURE 1
Age-adjusted rates from 1979 to 2004 in the United States



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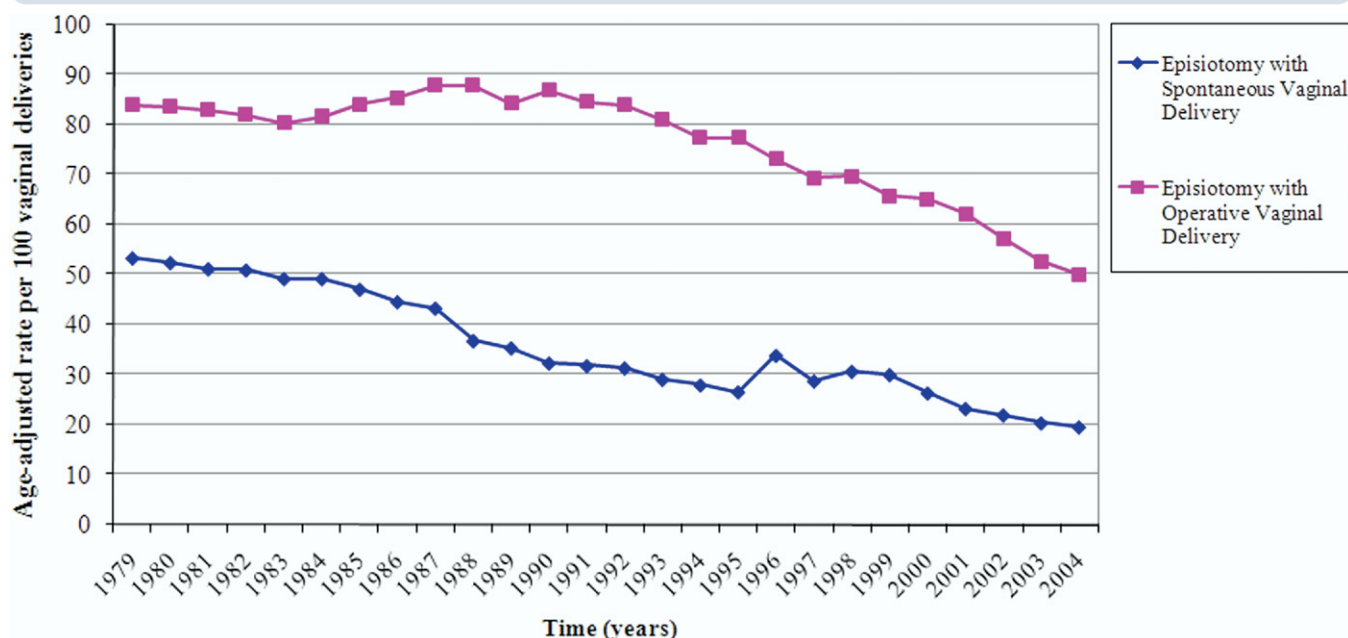
creased dramatically from 8.3 in 1979 to 17.2 in 2004 (Table 1).

Rate of episiotomy with all vaginal deliveries decreased from 60.9% in 1979 to 24.5% in 2004 (Figure 1). During the

study period, more than 26.9 million episiotomies were performed. Episiotomy with spontaneous vaginal delivery decreased, whereas episiotomy with operative vaginal delivery remained high

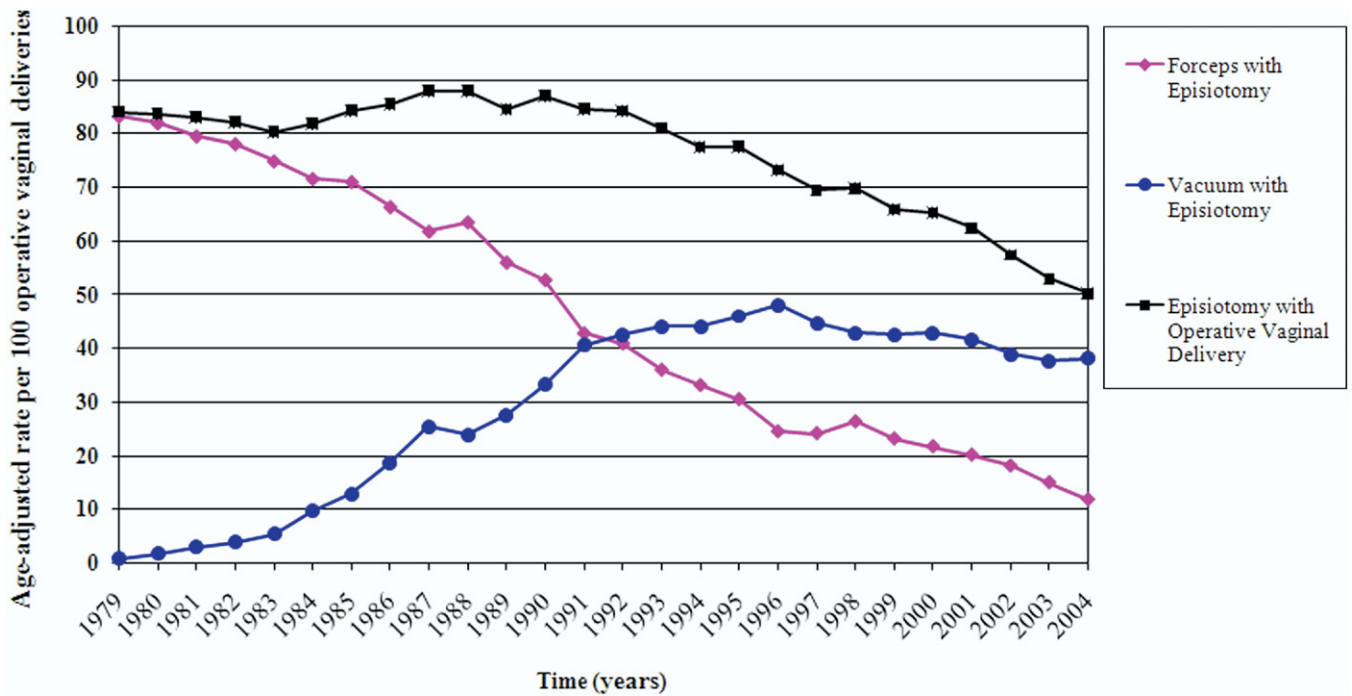
(Figure 2). Episiotomy with forceps-assisted vaginal delivery declined (83.2% in 1979 to 11.7% in 2004), whereas episiotomy with vacuum-assisted vaginal delivery increased (0.7% in 1979 to

FIGURE 2
Age-adjusted rates of episiotomy per 100 vaginal deliveries from 1979 to 2004 in the United States



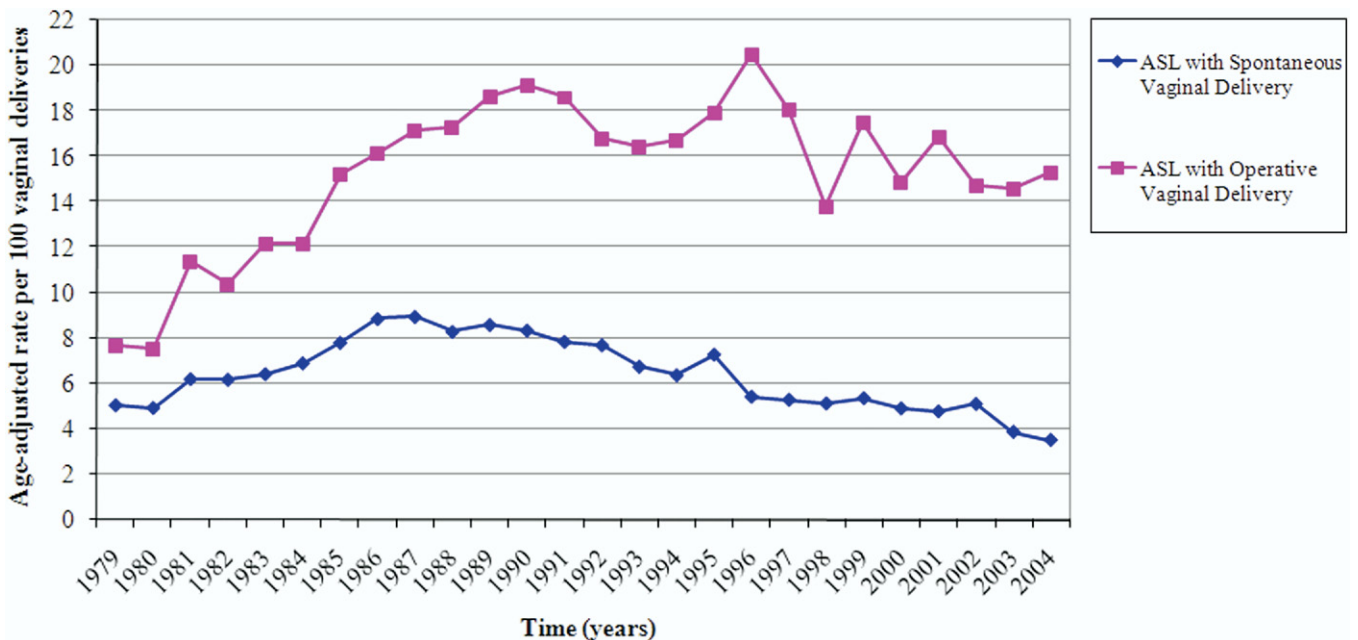
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FIGURE 3
Age-adjusted rates of episiotomy per 100 operative deliveries from 1979 to 2004 in the United States



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FIGURE 4
Age-adjusted rates of anal sphincter laceration per 100 vaginal deliveries from 1979 to 2004 in the United States



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TABLE 2
Demographic characteristics of women with vaginal and cesarean deliveries in the United States, 1979-2004

Characteristic	1979, n (%)	1991, n (%)	2004, n (%)
Age ^a	24.9 ± 5.2	26.4 ± 5.8	27.4 ± 6.1
Race			
White	2,149,068 (69.6)	1,798,859 (56.7)	1,839,898 (55.2)
African American	463,265 (15.0)	426,889 (13.5)	338,492 (10.1)
Other	0 (0)	224,885 (7.1)	248,201 (7.4)
Not stated	477,340 (15.4)	718,994 (22.7)	911,677 (27.3)
Marital status			
Married	2,428,648 (78.7)	1,408,226 (44.4)	1,308,431 (39.3)
Single	492,012 (15.9)	576,603 (18.2)	765,143 (22.9)
Divorced	41,655 (1.3)	41,429 (1.3)	32,959 (1.0)
Other	75,272 (2.4)	443,600 (14.0)	15,102 (0.4)
Not stated	52,086 (1.7)	699,769 (22.1)	1,216,633 (36.4)
Insurance			
Private	1,985,300 (64.2)	1,664,929 (52.5)	1,710,831 (51.2)
Government	560,151 (18.1)	1,073,005 (33.8)	1,351,468 (40.5)
Other	544,222 (17.7)	320,491 (10.2)	235,326 (7.1)
Not stated	0 (0)	111,202 (3.5)	40,643 (1.2)
Geographic region			
Midwest	864,600 (28.0)	718,540 (22.7)	643,213 (19.3)
Northeast	625,128 (20.2)	532,052 (16.8)	475,045 (14.2)
South	1,036,896 (33.6)	1,139,494 (35.9)	1,350,101 (40.4)
West	563,049 (18.2)	779,541 (24.6)	869,909 (26.1)

^a Mean ± standard deviation.

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38.1% in 2004; Figure 3). These changes were associated with a shift in obstetric practices favoring vacuum-assisted vaginal delivery over forceps-assisted vaginal delivery. The overall rate of forceps-assisted vaginal deliveries decreased from 8.2 per 1000 women in 1979 to 0.8 per 1000 women in 2004, and vacuum-assisted vaginal deliveries increased from 0.1 per 1000 women in 1979 to 3.7 per 1000 women in 2004.

Using linear regression, the rate of episiotomy with vaginal delivery decreased by 1.4% ($P < .001$) per year from an intercept rate in 1979 of 60.9% between 1979 and 2004. When episiotomy with spontaneous vaginal delivery was analyzed separately, episiotomy rates decreased by 1.4% ($P < .001$) per year from a rate of 53.4% in 1979 over the study

interval. Similarly, an analysis of episiotomy rates with operative vaginal delivery demonstrated a 1.2% per year decrease ($P < .001$) from a rate in 1979 of 84.0% between 1979 and 2004.

Overall AARs of anal sphincter laceration did not change between 1979 and 2004 (4.5-5.0%). When AARs of anal sphincter laceration were evaluated by vaginal delivery type, the rates were highest among women undergoing operative vaginal delivery. The AAR for anal sphincter laceration for operative vaginal delivery increased from 7.7% in 1979 to 20.5% in 1996, followed by a decrease to 15.3% in 2004. For spontaneous vaginal delivery, the rate of anal sphincter laceration increased from 5% in 1979 to a peak of 8.9% in 1987 and then steadily decreased to 3.5% in 2004 (Figure 4).

Table 2 demonstrates the demographic characteristics of women undergoing episiotomy. Data are reported at 3 time points (1979, 1991, and 2004) to characterize the population over the study period. Multivariable logistic regression demonstrated characteristics of women who underwent episiotomy. Women who delivered spontaneously and underwent episiotomy were less likely to be black (odds ratio [OR], 0.551; 95% confidence interval [CI], 0.550-0.552), single (OR, 0.660; 95% CI, 0.659-0.661), have nonpublic/nonprivate insurance (OR, 2.41; 95% CI, 2.39-2.44), and live in the Midwest (OR, 1.06; 95% CI, 1.058-1.062). Similar findings were obtained for women undergoing episiotomy with operative vaginal delivery.

COMMENT

The most important finding of this study is that episiotomy use markedly and consistently declined between 1979 and 2004. Although attention was first drawn to the risks of episiotomy more than a quarter century ago by Thacker and Banta,¹⁰ it appears that attitudes and practices of clinicians have only recently begun to reflect evidence-based recommendations. A lag between dissemination of evidence and change in clinical practice is common.¹⁴ Altering practice patterns regarding episiotomy may be particularly difficult for clinicians who trained when episiotomy was taught as an important step in performing any vaginal delivery.

Decreasing rates of episiotomy have corresponded with decreasing age-adjusted rates of anal sphincter laceration. However, rates of episiotomy and anal sphincter laceration remain high for operative vaginal delivery (50.1% and 15.3% in 2004, respectively). Episiotomy and operative vaginal delivery are 2 well known risk factors for anal sphincter laceration.¹⁵⁻¹⁷ The high rates of anal sphincter laceration associated with forceps- and vacuum-assisted vaginal deliveries are likely the direct result of continued use of episiotomy with these procedures.

Long-term consequences of severe perineal laceration may include inconti-

nence of flatus; liquid, soft, and/or solid stool; perineal pain; dyspareunia; and rectovaginal fistula.^{5,18} Persistent (up to 6-9 months after delivery) anal incontinence symptoms are present in 17-50% of women with a clinically recognized third- or fourth-degree perineal laceration with primary repair at delivery.^{4,19-22} These complications may be devastating, affecting a woman's overall health, self-esteem, and relationship with her baby and her partner. Avoidance of episiotomy is an important step to decrease anal sphincter laceration rates and the associated sequelae.

Vacuum-assisted delivery was more common than forceps-assisted vaginal delivery during the study period. It appears that vacuum-assisted vaginal delivery has become the preferred route for practitioners who perform operative vaginal delivery. We also found an overall decline in overall operative vaginal delivery. This decrease corresponds to a dramatic increase in cesarean delivery. Although we cannot draw any direct conclusions from this observation, this trend suggests that cesarean delivery may be the favored route for difficult births. Whether this reflects a training issue, a medicolegal issue, or both is unclear. Fewer providers are receiving adequate training in operative delivery, particularly forceps.²³ As fewer providers finish residency with a skill set that includes operative vaginal delivery, we are likely to observe further declining rates of forceps- and vacuum-assisted delivery. It is also possible that patients' choice of mode of delivery may be playing a role in the increasing trend of cesarean delivery.

The strengths of this study include the use of the NHDS, one of the most comprehensive, publicly funded, accessible databases available. Use of this dataset allowed us to examine trends in obstetric practice for more than 82 million deliveries during a 26-year period. Demographic variables associated with episiotomy were similar to those found by other researchers.^{11,24,25}

Several authors have raised concerns regarding the accuracy of coding for anal sphincter laceration at the time of hospital discharge. These concerns reflect general coding practices and are not limited

to this database. The overall dataset error rate for final diagnoses is 1.0% and 0.7% for procedures.¹³ Using ICD-9-CM codes, Brubaker et al²⁶ found that 23% of vaginal deliveries involving anal sphincter laceration were coded incorrectly at the time of hospital discharge. Because the NHDS relies on ICD-9-CM coding, incorrect and/or inaccurate coding of diagnoses, procedures, and complications will result in underestimates of the frequency of anal sphincter laceration and a loss of important epidemiologic information regarding delivery. Although our study may underestimate the rate of anal sphincter laceration, it is important to focus on the trends that we have identified and their associated implications for the clinical care of our patients.

The ideal rate of episiotomy remains unclear. Although rates are at an all-time low, practice patterns among small provider groups and single institutions in the United States indicate that we may be able to achieve a lower rate of episiotomy. At the University of San Francisco, the episiotomy rate for spontaneous vaginal delivery decreased from 86.8% (1976) to 10.4% (1994).²⁷ Between 1984 and 1994, this provider group also decreased episiotomy use with operative vaginal delivery from 94.4% to 35.7%.²⁸ Similarly, the overall episiotomy rate decreased from 69.6% (1983) to 19.4% (2000) at Thomas Jefferson University Hospital in Philadelphia.²⁴ Although the impetus for change and educational efforts in these institutions was not clearly different from the beliefs and knowledge regarding episiotomy in the United States, the rates of episiotomy declined more rapidly and resulted in a lower nadir in these institutions as compared with nationwide rates (Figures 1 and 2). The findings of these providers set a precedent regarding lower episiotomy rates and provide reassurance that fewer episiotomies may be performed without additional maternal or fetal morbidity.

We are encouraged by the 2006 American College of Obstetricians and Gynecologists (ACOG) practice bulletin on episiotomy, which promotes a restrictive policy regarding episiotomy use.²⁹ Edu-

cational publications such as the ACOG practice bulletins are commonly read evidence-based tools, which many clinicians use as a means to remain current on standard of care and new treatments. Ongoing publication of recommendations and issues related to episiotomy and operative vaginal delivery will assist in keeping these important issues at the forefront of clinical practice and resident education. Research regarding trends and outcomes of episiotomy, spontaneous delivery, and operative vaginal delivery is equally important in facilitating the impact of these procedures on women's health. We are hopeful that, with these ongoing efforts, the rate of episiotomy and associated sequelae will continue to decline. ■

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