

Demographic Variations and Clinical Associations of Episiotomy and Severe Perineal Lacerations in Vaginal Delivery

Dotun Ogunyemi, MD; Brandy Manigat, MD; Jesse Marquis, MD; and Mohsen Bazargan, PhD
Los Angeles, California

Financial support: The research reported in this paper was supported by a National Institute of Health grant G12 RRO 3026-15 the National Center for Research Resources, NIH/NCRR/RCMI.

Presented at the American College of Obstetricians and Gynecology Conference 2004 (district VI, VII, IX) at Salt Lake City, UT.

Primiparity, birthweight, operative delivery and obstetrical complications contribute to episiotomy and severe perineal lacerations. Episiotomy correlates with Hispanics, while African Americans correlate with severe perineal lacerations.

Objective: The purpose of this study was to identify risk factors for both episiotomy and severe perineal lacerations in a large population from a single institution.

Study Design: This was a review of 66,224 vaginal deliveries of African Americans or Hispanics delivering between 25–44 gestational weeks between 1981–2001. Univariate and multiple regression analysis were done as indicated.

Results: Independent predictors of episiotomy were: primiparity eight-fold, forceps delivery seven-fold, vacuum delivery five-fold, shoulder dystocia 3.6-fold, macrosomia 1.8-fold, epidural analgesia 1.6-fold, postdates 1.5-fold, Hispanics 1.4-fold. Independent predictors of severe perineal lacerations were; macrosomia seven-fold, episiotomy 4.5-fold, primiparity 4.4-fold, shoulder dystocia 3.6-fold, average birthweight 3.5-fold, forceps delivery 2.6-fold, vacuum delivery two-fold, epidural analgesia two-fold, African-American 1.5-fold. Nonreassuring fetal heart rate patterns, meconium and cord accidents appeared protective.

Conclusion: Primiparous women with larger babies undergoing operative delivery with epidural analgesia are at risk for both episiotomy incisions and severe perineal lacerations. Though Hispanics are more likely to have an episiotomy, they are at significantly less risk for severe perineal lacerations compared to African Americans. Even though episiotomy is independently associated with severe perineal laceration, other factors such as macrosomia and primiparity are as important.

Key words: primiparity ■ birthweight ■ obstetrics ■ Latinos ■ African Americans

© 2006. From the Department of Obstetrics & Gynecology, Charles R. Drew University of Medicine & Science/UCLA, Los Angeles, CA. Send correspondence and reprint requests for *J Natl Med Assoc.* 2006;98:1874–1881 to: Dr. Dotun Ogunyemi, Department of Obstetrics & Gynecology, Cedars Sinai Medical Center, 8365 W. Third St., Suite 160W, Los Angeles, CA 90048; phone: (310) 423-3361; fax: (310) 423-0140; e-mail: ogunyemid@cshs.org

INTRODUCTION

Third- and fourth-degree perineal lacerations have been associated with anal incontinence.¹ Episiotomy has also been shown to be an independent risk factor for fecal and flatus incontinence.^{1,2} To reduce pregnancy-associated anal dysfunction, it may be useful to identify factors that predict both episiotomy and severe perineal lacerations.

Previous studies have shown that the rates of episiotomy have been decreasing.^{3,4} Weber concluded, in review of U.S. episiotomy rates from 1979–1997, that the rate of 39% in 1997 was too high. Goldberg et al. showed that the rate decreased in a single institution from 69.6% in 1983 to 19.4% in 2000. One of the principles behind decreased episiotomy rates has been the use of restrictive versus liberal episiotomy. Schlomer in a meta-analysis showed episiotomy rates of 60% for liberal and 27% for restricted episiotomy.² Risk factors associated with episiotomy include operative delivery, insurance status, white versus black women, younger age, category of obstetric provider, fetal macrosomia, prolonged second stage of labor and epidural analgesia.^{1,2,5,6}

Many studies have demonstrated predictors of severe perineal lacerations. Angioli et al. from University of Miami, in a review of 50,210 vaginal deliveries, concluded that advanced age, primiparity, operative delivery, macrosomia and episiotomy were independent risk factors for severe perineal lacerations.⁷ The role of episiotomy as a significant predictor of severe perineal lacerations has been confirmed by others,^{5,8-14} but a recent study by Handa looking at over 2 million vaginal deliveries showed that episiotomy was protective, but the authors raised a possibility of inconsistent documentation or coding.¹⁵ Other associations reported are epidural analgesia, provider category, infant head, dystocia,

oxytocin use.⁸⁻¹⁵ Median episiotomy has also been shown to increase risk compared to mediolateral episiotomy.^{5,7,13} The association with age is conflicting, with some showing an association with older age^{7,15,16} and others with younger age.^{1,13}

There are few reports on the influence of race on severe perineal lacerations. Howard et al. suggested that African Americans had lower severe perineal lacerations compared to Caucasians,¹⁶ while another study

showed that Hispanics and American Indians were at less risk than Caucasians,¹⁷ and Goldberg et al. showed that Hispanics and African Americans were at decreased risk while Asians were at increased risk compared to Caucasians.⁸ However, there were no independently significant differences among Caucasian, African Americans and Hispanics in the study from Miami.⁷ The Californian birth certificate database study showed that Asians were at greater risk, while Native Americans and

Table 1. Clinical and demographic correlations of episiotomy: univariate analysis (n=66,224)

Variable	Episiotomy n=20,881 (32%)	No Episiotomy n=45,343 (68%)	P Value (Odds Ratio)	95% CI
<i>Maternal Characteristics</i>				
Mean Maternal Age	22.83 (0.037)	26.21 (0.028)	<0.001	
Maternal Age Categories*				
<20 years	6203 (30%)	5,784 (12.9%)	<0.001 (2.89)	2.776, 3.01
20-34 years	13,696 (66.3%)	34,283 (76.5%)	<0.001 (0.603)	0.593, 0.637
≥35 years	765 (3.7%)	4,739 (10.6%)	<0.001 (0.326)	0.301, 0.352
Primiparity	12,796 (61%)	6,999 (16%)	<0.001 (2.184)	2.146, 2.223
Mean Gestational Age	39.28 (0.015)	38.99 (0.01)	<0.001	
Gestational Age Categories				
≤32 weeks	266 (1.3%)	1,023 (2.3%)	<0.001 (0.559)	0.488, 0.640
33-36 weeks	1,568 (7.5%)	4,101 (9%)	<0.001 (0.816)	0.768, 0.868
37-41 weeks	16,663 (79.8%)	35,750 (78.8%)	0.005 (1.06)	1.018, 1.104
≥42 weeks	2,384 (11.4%)	4,469 (9.9%)	<0.001 (1.179)	1.118, 1.243
Hispanic	18,536 (33%)	38,344 (67%)	<0.001 (1.4)	1.3, 1.4
African-American	2,345 (25%)	6,999 (75%)		
Substance Abuse	215 (1%)	1,446 (3%)	<0.001 (0.32)	0.27, 0.37
Hypertensive Disorders	556 (3%)	594 (1%)	<0.001 (2.1)	1.8, 2.3
Antepartum Vaginal Bleeding	21 (0.1%)	98 (0.2%)	<0.005 (0.465)	0.29, 0.75
Diabetes	260 (1%)	717 (2%)	0.001 (0.78)	0.68, 0.91
Infections	476 (2.3%)	777 (1.7%)	<0.001 (1.3)	1.2, 1.5
Other Medical Disorders	294 (1.4%)	510 (1.1%)	0.002 (1.3)	1.1, 1.5
<i>Labor and Delivery Characteristics</i>				
Nonreassuring Fetal Heart Rate	869 (4%)	500 (1%)	<0.001 (3.9)	3.5, 4.4
Dystocia	404 (2%)	126 (0.3%)	<0.001 (7)	5.8, 8.7
Cord Complications	523 (3%)	1,021 (2%)	0.46 (1.1)	1, 1.2
Meconium	1,377 (7%)	2,378 (5%)	<0.001 (1.3)	1.2, 3.7
Forceps Delivery	1,461 (7%)	293 (0.6%)	<0.001 (11.6)	10.2, 13.1
Vacuum Delivery	838 (4%)	3,420 (0.8%)	<0.001 (5.4)	4.8, 6.2
Shoulder Dystocia	170 (0.8%)	147 (0.3%)	<0.001 (2.5)	2, 3.1
Minimally Assisted Delivery	134 (0.6%)	3521 (8%)	<0.001 (0.077)	0.07, 0.09
Epidural Analgesia	506 (2.4%)	491 (1%)	<0.001 (2.3)	2, 2.6
Postpartum Complications	149 (0.7%)	241 (0.5%)	<0.01 (1.4)	1.1, 1.7
<i>Fetal-Neonatal Characteristics</i>				
Multiple Pregnancies	271 (1.3%)	642 (1.4%)	NS	
Mean Birthweight	3,339.4 (3.7)	3,306 (2.8)	<0.001	
Birthweight Categories				
<2,500 g	1,097 (5.3%)	3,442 (7.6%)	<0.001 (0.975)	
2,500-3,999 g	17,776 (85.1%)	37,398 (82.5%)	<0.001 (1.216)	0.971, 0.979
≥4,000 g	2,008 (9.6%)	4,502 (9.9%)	NS	1.162, 1.272
Male Gender	10,767 (32%)	22,846 (68%)	<0.01 (1.05)	1.01, 1.08
Female Gender	10,114 (31%)	22,497 (69%)		

ns: not significant; () standard error of the mean; * The total N for maternal age categories is 65470, (20644 for episiotomy and 44806 without episiotomy) 754 cases had inexplicable maternal ages and were excluded from this analysis. For the continuous variables of maternal age, gestational age and birthweight; the mean & (standard error of the mean) for each group is reported. The categorical levels are reported in separate rows and the percentages add up to 100% for each group.

African Americans were at decreased risk compared to Caucasians.¹⁵

Most of these previous studies are limited by small numbers or are multicenter database studies. Few studies have evaluated all these variables in the same cohort and in the same publication. Hence, we have used a single large population database to review all these variables in the same cohort of patients. Thus, the objective of this study was to evaluate risk factors for median episiotomy and severe perineal lacerations in a single urban institution among Hispanic and African-American mothers. Our intent was to detect “new” risk factors among African-American and Hispanic women and to either confirm or refute findings from previous studies. We hypothesized that ethnicity and other obstetrical factors may have an effect on both episiotomy and severe perineal laceration rates.

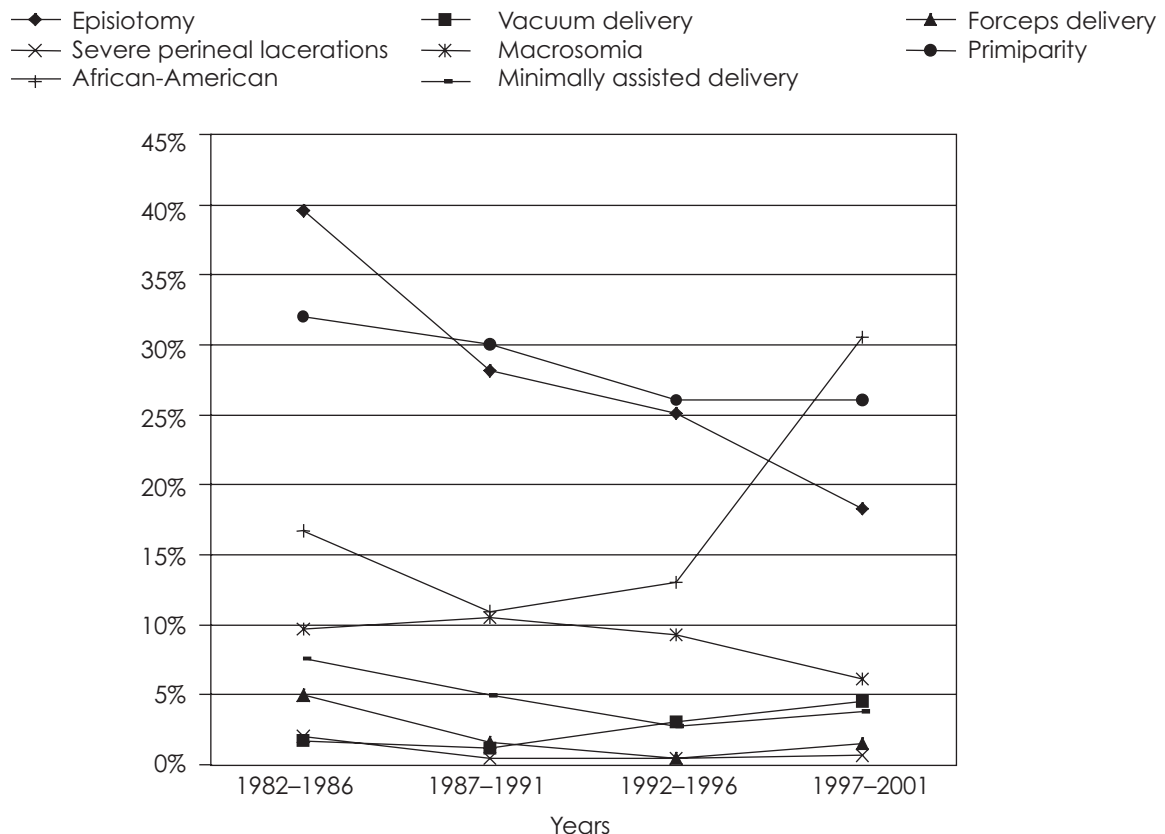
MATERIALS AND METHODS

This study is a retrospective review of deliveries performed at a single institution from January 1, 1982 to December 31, 2001. Institution review board approval was obtained. The data were obtained from the departmental electronic labor and delivery database. All cases

with incomplete records (for race, gender, birthweight, gestational age), inaccurate birthweights, major congenital anomalies, stillbirths, birthweights <500 g and cesarean delivery were excluded. The study was restricted to infants between 25–44 weeks’ gestation who were African-American or Hispanic. Caucasian and Asian births comprised <5% of births and were excluded in the analysis.

For the purpose of this study, the following classification was used. Substance abuse included women who reported the use of cocaine (approximately 85%) but included heroin, PCP and alcohol abuse. Both chronic hypertension and pregnancy-induced hypertension were grouped as hypertensive disorders. Diabetes included both gestational and pregestational diabetes. Infections included mainly chorioamnionitis, sexually transmitted diseases, confirmed vaginitis and urinary tract infections. Other medical disorders included mainly anemia, thyroid dysfunction, epilepsy, asthma and cardiac disease. Nonreassuring fetal heart rate patterns were described in the presence of prolonged decelerations, persistent decreased variability, recurrent late decelerations, persistent severe variable decelerations and sinusoidal patterns. Dystocia was the presence of the first

Figure 1. Frequency of median episiotomy, severe perineal lacerations, operative delivery, ethnicity, primiparity and macrosomia by year of delivery



stage of labor protraction, arrest or prolonged second stage of labor. Cord complications were mainly nuchal cords or cord prolapse. Meconium included any record of amniotic stained fluid with meconium. Antepartum vaginal bleeding included abruptions and indeterminate bleeding before the onset of labor. Postpartum complications were mostly cases with postpartum hemorrhage and retained placenta. Third and fourth perineal lacerations were classified as severe perineal lacerations. Minimal assisted delivery was a patient who delivered outside the hospital, in the emergency room or before a

standard delivery set-up was available. Only median episiotomy was used in this population. Throughout the period of the study, episiotomy was always used restrictively rather than routinely.

Continuous variables were analyzed by independent Student's t tests and discrete variables by Chi-squared tests. Multivariate logistic regression analysis was used to assess independent risk factors associated with episiotomy and severe perineal lacerations. For logistic regression analysis, continuous variables were analyzed as single categorical variable with multiple levels, and

Table 2. Clinical and demographic correlations of severe perineal lacerations: univariate analysis (N=66224)

Variable	Severe Perineal Lacerations n=658 (1%)	No Perineal Lacerations n=65,566 (99%)	P Value (Odds Ratio)	P Value
<i>Maternal Characteristics</i>				
Mean Maternal Age	22.12 (0.195)	25.17 (0.024)	<0.001	
Maternal Age Categories*				
<20 years	225 (34.8%)	11,762 (18.1%)	<0.001 (2.4)	2.048, 2.838
20–34 years	406 (62.8%)	47,573 (73.4%)	<0.001 (0.613)	0.522, 0.720
≥35 years	15 (2.3%)	5,489 (8.5%)	<0.001 (0.257)	0.154, 0.429
Primiparity	519 (79%)	19,276 (30%)	<0.001 (8.758)	7.268, 10.553
Mean Gestational Age (Weeks)	39.32 (0.048)	39.08 (0.009)	<0.001	
Gestational Age Categories				
32 weeks or less	1 (0.2%)	1,288 (2%)	<0.001 (0.076)	0.011, 0.540
33–36 weeks	41 (6.2%)	5,628 (8.6%)	<0.05 (0.708)	0.515, 0.972
37–41 weeks	532 (80.9%)	51,881 (79.1%)	NS	
≥42 weeks	84 (12.8%)	6,769 (10.9%)	<0.05 (1.27)	1.01, 1.6
Hispanic	543 (1%)	56,337 (99%)	<0.05 (1.3)	1.1, 1.6
African-American	115 (1.2%)	9,229 (98.8%)		
Hypertensive Disorders	27 (4%)	1,123 (2%)	<0.001 (2.5)	1.7, 3.6
Substance Abuse	4 (0.2%)	1,657 (3%)	<0.005 (0.24)	0.09, 0.63
<i>Labor & Delivery Characteristics</i>				
Nonreassuring Fetal Heart Rate	37 (6%)	1,332 (2%)	<0.001 (2.9)	2.1, 4
Meconium	24 (4%)	3,731 (6%)	<0.05 (0.67)	0.42, 0.94
Cord Complications	5 (0.8%)	1,539 (2%)	<0.005 (0.4)	0.12, 0.77
Epidural Analgesia	28 (4%)	969 (2%)	<0.001 (3)	2.1, 4.4
Shoulder Dystocia	12 (2%)	305 (0.5%)	<0.001 (4)	2.2, 7.1
Forceps Delivery	107 (16%)	1,647 (3%)	<0.001 (7.5)	6.1, 9.3
Vacuum Delivery	36 (6%)	1,149 (2%)	<0.001 (3.2)	2.3, 4.6
Episiotomy	558 (3%)	100 (0.2%)	<0.001 (12.4)	10, 15.4
Minimally Assisted Delivery	7 (1%)	3,648 (6%)	<0.001 (0.18)	0.09, 0.39
<i>Fetal-Neonatal Characteristics</i>				
Multiple Pregnancies	2 (0.3%)	911 (1.4%)	<0.05 (0.26)	0.054, 0.868
Mean Birthweight	3,489.9 (18.9)	3,315 (0.04)	<0.001	
Birthweight Categories				
<2,500 g	10 (1.5%)	4,530 (6.9%)	<0.001 (0.210)	0.112, 0.391
2,500–3,999 g	551 (83.7%)	54,623 (83.3%)	NS	
≥4,000 g	97 (14.7%)	6,413 (9.8%)	<0.001 (1.595)	1.284, 1.981
Male Gender	365 (1.1%)	33,248 (98.9%)	<0.05 (1.2)	1.04, 1.4
Female Gender	293 (9%)	32,318 (99.15)		

NS: not significant; () standard error of the mean; * The total N for maternal age categories is 65470, (646 for severe perineal lacerations and 64824 without severe perineal lacerations) 754 cases had inexplicable maternal ages and were excluded from this analysis. For the continuous variables of maternal age, gestational age and birthweight; the mean & (standard error of the mean) for each group is reported. The categorical levels are reported in separate rows and the percentages add up to 100% for each group.

the first level in the tables was used as the referent group. Data analysis was performed using SPSS® (Chicago, IL).

RESULTS

The total number of births during the study period was 90,767, and after restrictions and exclusions, there were 66,224 vaginal deliveries for analysis. The mean maternal age was 25.14 (±0.02) years, mean gestational age was 39.08 (±0.01) weeks and mean birthweight was 3,316.76 (±2.23) g. There were 19,946 (30%) primiparous and 46,278 (70%) multiparous mothers. There were 9344 (14.1%) African Americans and 56,880 (85.9%) Hispanics. Delivery was by forceps application in 1,754 (2.6%) and assisted by vacuum in 1,185 (1.8%) mothers. Median

episiotomy was performed in 20,811 (32%), 1,644 (2.5%) had first- or second-degree perineal lacerations and 658 (1%) had a severe perineal laceration.

Univariate analysis showed that the most significant risk factors for sustaining an episiotomy were forceps delivery, which increased the risk 12-fold, while dystocia increased the risk seven-fold and vacuum delivery five-fold. Other risk factors for episiotomy were nonreassuring fetal heart rate patterns, younger age, shoulder dystocia, epidural analgesia, hypertensive disorders and primiparity. Hispanics were 1.4 times at risk compared to African Americans. Patients sustaining an episiotomy had more postpartum complications. However, advanced maternal age, substance use, minimally assisted delivery, diabetes and preterm delivery seemed to

Table 3. Multivariate stepwise logistic regression analysis with episiotomy as the dependent variable

Variable	P Value	Odds Ratio	95% CI for Odds Ratio	
			Lower	Upper
Parity Categories				
Multiparity		1.000		
Primiparity	<0.001	8.013	7.664	8.378
Maternal Age Categories				
<20 years		1.000		
20–34 years	<0.005	0.917	0.870	0.965
≥35 years	<0.001	0.574	0.520	0.633
Gestational Age Categories				
≤32 weeks		1.000		
33–36 weeks	0.082	1.177	0.979	1.416
37–41 weeks	0.01	1.299	1.082	1.55
≥42 weeks	<0.001	1.457	1.203	1.764
Birthweight Categories				
<2,500 g	<0.001	1.000		
2,500–3,999 g	<0.001	1.420	1.285	1.568
≥4,000 g	<0.001	1.866	1.659	2.099
Substance Abuse				
Vacuum Delivery	<0.001	0.730	0.618	0.863
Forceps Delivery	<0.001	5.006	4.312	5.813
Epidural Analgesia	<0.001	7.189	6.207	8.327
Epidural Analgesia	<0.001	1.611	1.381	1.880
Nonprovider Delivery	<0.001	0.097	0.081	0.117
Shoulder Dystocia	<0.001	3.615	2.818	4.638
Diabetes	<0.05	1.221	1.033	1.442
Dystocia	0.052	1.281	0.998	1.644
Hypertensive Disorders	<0.01	1.220	1.054	1.411
Gender Categories				
Female		1.000		
Male	<0.05	1.047	1.007	1.089
Ethnicity Categories				
African-American		1		
Hispanics	<0.001	1.388	1.303	1.479
Year of Delivery Categories				
1982–1986		1.000		
1987–1991	<0.001	0.540	0.516	0.564
1992–1996	<0.001	0.487	0.459	0.516
1997–2001	<0.001	0.289	0.253	0.329

Odds ratio* odds ratio between subjects who had variable versus those who did not have variable being analyzed; For each category, the first group is the reference group and thus has an odds ratio of 1

protect against episiotomy (Table 1).

Univariate analysis of risk factors for severe perineal lacerations showed that episiotomy increased the risk 12 times, with forceps delivery increasing risk about eight times, shoulder dystocia about four-fold and primiparity 8.7 times. Other significant risk factors were vacuum delivery, epidural analgesia, nonreassuring fetal heart rate patterns, hypertensive disorders, young age and macrosomia. African Americans were 1.3 times at risk than Hispanics. Substance abuse, meconium, cord complications, multiple pregnancy, preterm delivery, low birthweight, minimally assisted delivery and advanced

maternal age significantly decreased the risk of sustaining a severe perineal laceration (Table 2).

There was a decrease in episiotomy rates from about 29.5% to 18% in the later years. The rates of macrosomia, forceps deliveries, primiparity and minimally assisted deliveries decreased over the years. The incidence of African Americans and vacuum deliveries increased over the years. The rate of severe perineal lacerations decreased initially from 4.9% to 1.5% in the latter years (Figure 1).

The multivariate logistic regression model to assess the significant independent predictors of episiotomy is

Table 4. Multivariate stepwise logistic regression analysis with severe perineal lacerations as the dependent variable

Variable	P Value	Odds Ratio	95% CI for Odds Ratio	
			Lower	Upper
Maternal Age Categories				
<20 years		1.000		
20–34 years	0.494	1.063	0.892	1.269
≥35 years	0.660	0.884	0.511	1.530
Ethnicity Categories				
Hispanics		1.000		
African-American	<0.001	1.542	1.243	1.913
Parity Categories				
Multiparity		1.00		
Primiparity	<0.001	4.432	3.546	5.539
Year of Delivery Categories				
1982–1986		1.000		
1987–1991	<0.001	0.229	0.184	0.285
1992–1996	<0.001	0.266	0.191	0.368
1997–2001	0.007	0.472	0.272	0.818
Multiple Pregnancy	0.241	0.430	0.105	1.765
Hypertensive Disorders	0.646	1.099	0.734	1.647
Nonreassuring FHR	0.003	0.561	0.382	0.824
Substance Abuse	0.480	0.695	0.253	1.906
Meconium	<0.01	0.540	0.356	0.819
Cord Accidents	<0.01	0.269	0.111	0.653
Epidural Analgesia	<0.005	1.947	1.294	2.931
Vacuum Delivery	<0.001	2.032	1.409	2.929
Forceps Delivery	<0.001	2.591	2.022	3.322
Shoulder Dystocia	<0.001	3.666	1.952	6.885
Gestational Age Categories				
≤32 weeks		1.000		
33–36 weeks	0.196	3.838	0.500	29.459
37–41 weeks	0.174	4.094	0.537	31.200
≥42 weeks	0.140	4.659	0.604	35.912
Birthweight Categories				
<2,500 g		1.000		
2,500–3,999 g	<0.001	3.549	1.823	6.910
≥4,000 g	<0.001	7.231	3.576	14.625
Episiotomy	<0.001	4.468	3.506	5.693
Gender Categories				
Female		1.000		
Male	0.054	1.171	0.998	1.375
Minimally Assisted Delivery	0.188	0.600	0.280	1.285

Odds ratio* odds ratio between subjects who had variable versus those who did not have variable being analyzed; For each category, the first group is the reference group and thus has an odds ratio of 1

shown in Table 3. All the variables that were significant on univariate analysis were entered into the model. This shows that primiparity independently increased the risk eight times, while forceps delivery increased risk seven-fold, vacuum delivery by five-fold and shoulder dystocia by 3.6-fold. Other significant associations were macrosomia (1.8 times), epidural analgesia (1.6 times), postdates (1.5 times) and being Mexican American (1.4 times). Advanced maternal age, substance abuse and minimally assisted delivery appeared to be independently protective.

Multivariate logistic regression model was also used to evaluate the significant independent predictors of severe perineal lacerations. Significant variables on univariate analysis were entered into the model. Table 4 shows that macrosomia was the most significant risk factor increasing risk about seven-fold, while episiotomy increased risk by 4.5 and primiparity by 4.4. Other significant predictors were shoulder dystocia (3.7-fold), average birthweight (3.6-fold), forceps delivery (2.6-fold), vacuum delivery two-fold, epidural analgesia (two-fold) and being African American (1.5-fold). Nonreassuring fetal heart rate patterns, meconium and cord complications appeared to independently decrease the risk.

Comment

The rate of 1% perineal lacerations in a population of 66,224 deliveries is lower than other previous reports—such as 15% from Quebec,¹² 5.85% from the California hospital study,¹⁵ 10% from Goldberg⁸—but closer to 2.2% reported from Miami.⁷ This may be related to a lower rate of episiotomy in this study (31% versus 36–67% reported from other institutions).^{3,5,7,12} In this population, all the patients were Medicaid or charity patients, and about 90% of deliveries were attended by residents with the remaining 10% attended by midwives who worked alongside with the residents. Thus, the low use of epidural analgesia, Medicaid insurance status of the whole population and a residency training institution status could have contributed to the low perineal laceration rate.

In this population, where restrictive episiotomy was practiced, young primipara with larger babies and post-term having obstetrical complications such as diabetes and hypertensive disorders with operative vaginal deliveries were at risk of episiotomy. Since this is a residency training program, we could not examine the effects of obstetrics provider category but we looked at minimally assisted deliveries, which showed a strong protective effect. An interesting finding was that substance abuse was an independent predictive protective factor regardless of other factors. In addition to the known association of substance abuse with lower birthweight, other possible mechanisms could be effects on uterine contractions, labor duration, pain perception and other unknown factors. Dystocia, which was predictive on univariate analysis, was not predictive on regression

analysis, suggesting that its effects are mediated through other factors.

The results agree with the findings in previous reports that birthweight, primiparity, episiotomy and operative vaginal deliveries are the most significant risk factors for perineal laceration.^{7,8,12-15} Even though episiotomy was a significant risk factor with an odds ratio (OR) of 4.5, macrosomia was an even greater predictor with an OR of 7, and primiparity was comparable with an OR of 4.4. Unlike other studies,^{1,7,13,15,16} which showed an association with age, in this study, there was no independent association with the parturient's age. Other interesting findings were that obstetrical emergencies, such as cord complications, meconium-stained amniotic fluid and nonreassuring fetal heart rate patterns, were associated with a decreased risk. Since cesarean deliveries were excluded in this analysis, it is possible that providers were more likely to perform a cesarean delivery in cases with anticipated difficult vaginal deliveries and allowed "easier obstetrical emergencies" to deliver vaginally.

While Hispanic ethnicity was an independent risk factor for episiotomy with an increased risk of 1.4 times, African Americans were actually at greater risk of 1.5-fold for severe perineal lacerations. Most previous studies have compared African Americans to Caucasians and, to our knowledge, this is the first study comparing African Americans to Hispanics. These varying rates between ethnic groups may relate to differences in perineal anatomy, connective tissue make-up and function.^{16,18}

The limitation of this study is that it is a retrospective one using labor and delivery records collected over approximately 20 years. However, the accuracy of the data is high, since the data were entered by labor and delivery nurses, reviewed by residents, presented in departmental meetings monthly and reviewed by the chief of obstetrics. Despite the time period of the study, regression analysis showed that the identified risk factors were still independently predictive.

This current study, to our knowledge, utilizes one of the largest number of cases from a single institution. Unlike previous studies, risk factors for both episiotomy and severe perineal lacerations are presented from the same population, including a detailed analysis of all obstetrical complications. It also allowed an analysis between two ethnic groups of Hispanics and African Americans.

The identification of factors that predict episiotomy and severe perineal lacerations could be used clinically to reduce pregnancy-associated anal dysfunction. The results of this study suggest that the combination of episiotomy and operative delivery should probably be avoided, especially in primipara with suspected macrosomia. Though Hispanics are more likely to have an episiotomy, they are at significantly less risk for severe perineal lacerations compared to African Americans. Thus,

more caution may be needed in African-American women in the setting of "difficult vaginal deliveries." Even though episiotomy independently increases the risk for severe perineal laceration, it should be remembered that other factors such as macrosomia and primiparity are as important. More research into anatomical factors that may explain differences in laceration rates among ethnic groups may be warranted. These data suggest that the policy of restrictive episiotomy, cautious use of operative vaginal delivery and prevention of macrosomia (by good glycemic control of diabetic pregnancies) may assist in decreasing the risk of perineal lacerations. Given that factors such as primiparity and epidural analgesia cannot not be manipulated, careful attention to the associated deliveries may also help in decreasing the risk of perineal laceration. In conclusion, recognition of prenatal and intrapartum factors that increase the risk of episiotomy and severe perineal lacerations may have clinical relevance in decreasing the risk of anal dysfunction in parturient women.

REFERENCES

1. Signorello LB, Harlow BL, Chokos AK, et al. Midline Episiotomy and Anal Incontinence: Retrospective Cohort Study. *BMJ*. 2000;320:86-390.
2. Schlomer G, Gross M, Meyer G. Effectiveness of Liberal vs Conservative Episiotomy in Vaginal Delivery with Reference to Preventing Urinary and Fecal Incontinence: a Systemic Review. *Weiner Medizinische Wochenschrift*. 2003;153(11-12):269-275.
3. Goldberg J, Holtz, Hyslop T, et al. Has the Use of Routine Episiotomy Decreased? Examination of Episiotomy Rates from 1983 to 2000. *Obstet Gynecol*. 2002;99(3):395-400.
4. Weber AM, Meyn L. Episiotomy Use in the United States, 1979-1997. *Obstet Gynecol*. 2002;100(6):1177-1182.
5. Robinson JN, Norwitz ER, Cohen AP, et al. Epidural Analgesia and Third degree Lacerations in Nulliparas. *Obstet Gynecol*. 1999;94(2):259-262.
6. Robinson JN, Norwitz ER, Cohen AP, et al. Predictors of Episiotomy Use at First Spontaneous Vaginal Delivery. *Obstet Gynecol*. 2000;96(2):214-218.
7. Angioli R, Gomez-Marin O, Cantuaria G, et al. Severe Perineal Lacerations During Vaginal Delivery: the University of Miami Experience. *Am J Obstet Gynecol*. 2000;182(5):1083-1085.
8. Goldberg J, Hyslop T, Tolosa JE, et al. Racial Differences in Severe Perineal Lacerations After Vaginal Delivery. *Am J Obstet Gynecol*. 2003;188(4):1063-1067.
9. Anthony S, Buitendijk SE, Zondervan KT, et al. Episiotomies and the Occurrence of Severe Perineal Lacerations. *Br J Obstet Gynecol*. 1994;101(2):1064-1067.
10. Poen AC, Felt-Bersma RJ, Dekker GA, et al. Third Degree Obstetric Perineal Tears: Risk Factors and the Preventive Role of Mediolateral Episiotomy. *Br J Obstet Gynecol*. 1997;104(5):563-566.
11. Bodner-Adler B, Bodner K, Kaider A, et al. Risk Factors for Third-Degree Perineal Tears in Vaginal Delivery, with an Analysis of Episiotomy Types. *J Reprod Med*. 2001;46(8):752-756.
12. Labrecque M, Baillargeon L, Dollaire M, et al. Association Between Median Episiotomy and Severe Perineal Lacerations in Primiparous Women. *Can Med Assoc J*. 1997;156(6):797-802.
13. Riskin-Mashiah S, O'Brian-Smith E, Wilkins IA. Risk Factors for Severe Perineal Tear: Can We Do Better? *Am J Perinatol*. 2002;19(5):225-234.
14. Buchhave P, Flatow L, Rydhstroem H, et al. Risk Factors for Rupture of Anal Sphincter. *E L Obstet Gynecol Reprod Biology*. 1999;87(2):129-132.
15. Handa VL, Danielsen BH, Gilbert WM. Obstet Anal Sphincter Lacerations. *Obstet Gynecol*. 2001;98:225-230.
16. Howard D, Davies PS, Delancey JO, et al. Differences in Perineal Lacerations in Black and White Primiparas. *Obstet Gynecol*. 2000;96(4):622-624.
17. Lydon-Rochelle MT, Albers L, Teaf D. Perineal Outcomes and Nurse Midwifery Management. *J Nurse Midwifery*. 1995;40:13-18.
18. Graham CA, Mallett VT. Race as a Predictor of Urinary Incontinence and Pelvic Organ Prolapse. *Am J Obstet Gynecol*. 2001;185:116-120. ■

We Welcome Your Comments

The *Journal of the National Medical Association* welcomes your Letters to the Editor about articles that appear in the *JNMA* or issues relevant to minority healthcare. Address correspondence to EditorJNMA@nmanet.org.

