Obstetrical anal sphincter laceration and anal incontinence 5-10 years after childbirth

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OBJECTIVE: The purpose of this study was to investigate the long-term impact of anal sphincter laceration on anal incontinence.

STUDY DESIGN: Five to 10 years after first delivery, anal incontinence and other bowel symptoms were measured with the Epidemiology of Prolapse and Incontinence Questionnaire and the short form of the Colorectal-Anal Impact Questionnaire. Obstetric exposures were assessed with review of hospital records. Symptoms and quality-of-life impact were compared among 90 women with at least 1 anal sphincter laceration, 320 women who delivered vaginally without sphincter laceration, and 527 women who delivered by cesarean delivery.

RESULTS: Women who sustained an anal sphincter laceration were most likely to report anal incontinence (odds ratio, 2.32; 95% confidence interval, 1.27–4.26) and reported the greatest negative impact on quality of life. Anal incontinence and quality-of-life scores were similar between women who delivered by cesarean section and those who delivered vaginally without sphincter laceration.

CONCLUSION: Anal sphincter laceration is associated with anal incontinence 5-10 years after delivery.

Key words: anal incontinence, cesarean delivery, obstetrical anal sphincter laceration, quality of life

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Anal incontinence is a distressing disorder that afflicts 2-24% of community-dwelling adults.[1] Obstetric anal sphincter laceration is a known risk factor for anal incontinence. Specifically, obstetric anal sphincter laceration has been associated consistently with an increased risk of anal incontinence in the first postpartum year.[2-6] Long-term outcomes for women with anal sphincter laceration are less certain, although a higher prevalence of anal incontinence has been suggested.[7-9] It is unclear whether vaginal birth, in the absence of sphincter laceration, increases a woman's risk of anal incontinence when compared with cesarean delivery. In the postpartum period, cesarean delivery is thought to protect against anal incontinence,[3] albeit incompletely.

In this study, we investigated anal incontinence after anal sphincter laceration among participants in the Mothers' Outcomes After Delivery (MOAD) study.[10] In a population of parous women 5-10 years after first delivery, we compared anal incontinence in women who had sustained at least 1 anal sphincter laceration, women who delivered vaginally without sphincter laceration, and women who delivered by cesarean section. Our goal was to compare symptoms of anal incontinence, degree of bother, and impact on quality of life across these exposure groups.

Materials and Methods

This is an analysis of baseline data that were collected for the MOAD study, which is a prospective cohort study of pelvic floor outcomes in women who have been recruited 5-10 years after delivery of their first child.[10] Institutional review board approval was obtained for this research, and all participants provided written, informed consent. Recruitment of women into the study began in 2008 and is ongoing.

This analysis was based on the original 1011 women who were enrolled in the cohort. The study design and recruitment methods have been described in detail previously.[10] To be eligible, women must have given birth to their first child at Greater Baltimore Medical Center 5-10 years before enrollment. Participants were identified from obstetrics hospital discharge records. To verify eligibility and to confirm delivery type, each hospital chart was reviewed by an obstetrician from our research team.

Exclusion criteria for the MOAD study (applied only to the index birth) included maternal age <15 or >50 years, delivery at <37 weeks' gestation, placenta previa, multiple gestation, known fetal congenital anomaly, stillbirth, previous myomectomy, and abruption. For this analysis, we also excluded 4 women with neurologic conditions that could contribute to bowel incontinence (ie, multiple sclerosis and cerebral palsy). Additionally, because we did not have access to obstetrics records for subsequent deliveries at other hospitals, we excluded multiparous women with deliveries that did not occur at our ins-

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titution, which left 937 women for this analysis.

The primary exposure of interest was obstetric anal sphincter laceration that had been documented in the hospital record at the time of delivery. Based on obstetric history of all deliveries before enrollment into MOAD, women were classified into 1 of 3 groups. The exposed group (sphincter tear group) comprised women with at least 1 clinically recognized, 3rd- or 4th-degree anal sphincter tear as defined by the American College of Obstetricians and Gynecologists.[11] There were 2 control groups. The first control group included women with at least 1 vaginal birth but without a clinically recognized anal sphincter laceration (vaginal control group). A second comparison group included women who delivered only through cesarean section (cesarean control group).

In addition to these obstetric exposures, we considered the following confounders: age at enrollment, race, maternal age at first delivery, multiparity, and obesity at the time of enrollment. Race and parity were self-reported at study enrollment. Each participant's weight and height were measured, and body mass index was calculated (weight/height^2). *Obesity* was defined as a body mass index of $\geq$30 kg/m^2.

The primary outcome was anal incontinence that was assessed at enrollment (eg, 5-10 years after the first delivery). Anal incontinence symptoms were measured with the Epidemiology of Prolapse and Incontinence Questionnaire (EPIQ), which is a validated, self-administered questionnaire.[12] The EPIQ includes 3 questions that pertain to anal incontinence: (1) "Do you lose gas from your rectum that is beyond your control?" (2) "Do you lose stool beyond your control if your stool is loose or liquid?" and (3) "Do you lose well-formed stool beyond your control?" For each symptom that is endorsed by the participant, she is asked to describe the degree of bother, which is rated with a visual analog scale that ranges from "not at all (0)" to "greatly (100)."[12] An overall anal incontinence score is calculated as the mean bother score for the 3 anal incontinence items. Previous research demonstrated that an anal incontinence score of >22.8 points is sensitive and specific for the identification of women with bothersome symptoms of anal incontinence.[12] In this research, we used the published EPIQ anal incontinence threshold (score, 22.8 points) to distinguish women with and without anal incontinence.[12]

Additional information about anal incontinence is provided by the following EPIQ items: (1) "Do you wear liners, pads, diapers, or toilet paper, or do you change your undergarments to protect your clothes from loss of stool?" (2) "Have you ever asked a doctor, nurse, or other healthcare professional for help with loss of stool or gas?" (3) "Have you had any surgery to correct the loss of stool or gas?"[12] These items do not contribute to the anal incontinence score and therefore were considered separately in this analysis.

In addition, the EPIQ includes the following questions that pertain to other aspects of bowel function: (1) "Do you ever have difficulty having a bowel movement?" (2) "Do you ever have to push on your vagina or around your rectum to have or complete a bowel movement?" (3) "How often do you use laxatives or stool softeners (not including high fiber supplements)?" For each symptom that was endorsed by the participant, women were asked to describe the frequency of occurrence and degree of bother. For these items, the degree of bother was rated with a visual analog scale that ranged from "not at all (0)" to "greatly (100)."[12]

Finally, women with bowel symptoms were asked to rate the impact on their quality of life using the short form of the Colorectal-Anal Impact Questionnaire (CRAIQ-7).[13] This validated questionnaire provides a measure of the impact of bowel symptoms on 7 domains of quality of life. The CRAIQ-7 was completed by participants answering "yes" to any of these 6 EPIQ bowel symptom questions: (1) "Do you ever have difficulty having a bowel movement?" (2) "Do you ever have to push on your vagina or around your rectum to have or complete a bowel movement?" (3) "Do you lose gas from your rectum that is beyond your control?" (4) "Do you lose stool beyond your control if your stool is loose or liquid?" (5) "Do you lose well-formed stool beyond your control?" (6) "Do you wear liners, pads, diapers, or toilet paper, or do you change your undergarments to protect your clothes from loss of stool?" Responses to the CRAIQ-7 are traditionally answered with a 4-point Likert scale with values "not at all," "somewhat," "moderately," or "quite a bit."[13] To improve consistency within our survey, we modified the response options for the CRAIQ-7 from the traditional Likert scale to a visual analog scale that matched the scale that was used for the EPIQ degree of bother questions. Thus, each item from the CRAIQ-7 was scaled from 0-100, with 100 representing the greatest impact from colorectal/anal symptoms.

Tables were generated to estimate the univariable associations between the exposure groups of interest (sphincter tear, vaginal control, and cesarean control) and possible confounders and then to compare the answers with different bowel symptom questions across the 3 groups. The analysis of CRAIQ-7 data was restricted to women who filled out the CRAIQ-7 questionnaire (ie, those who answered yes to at least 1 of the 6 EPIQ bowel symptom questions). Probability values were obtained with a Fisher exact test for categoric variables and a Kruskal-Wallis test for continuous variables. Odds ratios (ORs) were calculated with logistic regression. For all analyses, a probability value of $\leq$ .050 was considered statistically significant.

Results

Of 937 participants, 90 women had experienced at least 1 anal sphincter laceration. There were 320 women in the vaginal control group and 527 women in the cesarean control group. Of the 90 participants in the sphincter tear group, 87 women experienced 1 anal sphincter laceration; 2 women experienced 2 anal sphincter lacerations, and 1 woman experienced 3 anal sphincter lacerations. Of the 94 total anal sphincter tears, 79 tears occurred at first delivery (84%); 14 tears occurred at second delivery (15%),