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**Presenting/Contact Author:** Holly E Richter, PhD, MD

**Department/Institution:** Obstetrics & Gynecology, University of Alabama at Birmingham

**Address:** 618 20th Street South, NHB 219

**City/State/Zip/Country:** Birmingham, Alabama, 35233, United States

**Phone:** 1-205-934-7874 **Fax:** 1-205-975-8893 **E-mail:** hrichter@uabmc.edu

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**Your abstract may be considered as newsworthy:** Yes, my abstract contains new or exceptional research data.

**Sponsoring Author:** Richard Parker

**Sponsor Phone:** 1-205- 934-6294

**Title:** ULTRASOUND AND MAGNETIC RESONANCE IMAGING OF THE ANAL SPHINCTER AFTER FIRST DELIVERY: RELATIONSHIP TO FECAL INCONTINENCE SYMPTOMS

Holly E Richter, PhD, MD<sup>1\*</sup>. <sup>1</sup>For the Pelvic Floor Disorders Network, University of Alabama at Birmingham, Birmingham, Alabama, United States, 35249.

Objective: To relate symptoms of fecal incontinence (FI) to endoanal ultrasound and magnetic resonance imaging (MRI) findings in a cohort of primiparous women.

Method: 257 primiparous women at 6 clinical sites underwent assessment of the internal anal sphincter (IAS) and external anal sphincter (EAS) by standardized endoanal ultrasound and magnetic resonance imaging (MRI) examination with external array imaging coils studies 6-12 months after delivery. Ultrasound and MRI were performed and reviewed by investigators blinded to delivery mode and symptoms. Subjects underwent vaginal delivery *with* a clinically evident anal sphincter tear (sphincter tear group, n=109), vaginal delivery *without* a clinically evident sphincter tear (vaginal control, n=109) or cesarean delivery without labor (cesarean control, n=39). All subjects completed the Fecal Incontinence Severity Index (FISI) to assess presence and severity of fecal incontinence (FI) symptoms.

Continuous measures were compared by Mann Whitney tests. Dichotomous measures were compared by Fisher's exact test.

**Results:** The mean age of the sphincter tear group was  $27.5 \pm 6.2$  years and 72.5% were Caucasian. There were no significant differences in age and race among the cohorts. By ultrasound, 34% of the sphincter tear group exhibited IAS defects compared to 3% of the vaginal controls ( $p < 0.0001$ ) and 10% of the cesarean controls. EAS defects were identified in 51% of the sphincter tear group compared to 31% of vaginal controls ( $p = 0.0043$ ) and 28% of cesarean controls. Both IAS and EAS defects were identified in 26% of the sphincter tear group and 2% of the vaginal controls ( $p < 0.0001$ ) and 5% of cesarean controls. In the sphincter tear group, women with IAS defects were more than 4 times more likely to experience FI (adjusted OR 4.3, 95% CI 1.9-9.9); women with EAS defects had a two-fold increased risk of FI (adjusted OR 2.1, 95% CI 0.95-4.5) although this did not reach statistical significance.

In the sphincter tear group, FI severity was higher with an ultrasound detected IAS defect (FISI score  $6.9 \pm 8.4$  versus  $3.3 \pm 6.1$ ,  $p = 0.012$ ) or EAS defect ( $6.2 \pm 8.4$  versus  $2.7 \pm 5.0$ ,  $p = 0.012$ ). Subjects with both IAS and EAS defects by ultrasound had the most severe symptoms (FISI score  $7.6 \pm 8.2$  versus  $3.4 \pm 6.5$ ,  $p = 0.0015$ ). MRI studies utilizing external array imaging coils had limited ability to identify sphincter defects.

**Conclusion:** IAS defects are associated with an increased risk of FI symptoms. Endoanal ultrasound is superior to MRI with external array imaging coils for the evaluation of the anal sphincter.

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