743

Lammers K[1], Fütterer J J[2], Prokop M[2], Vierhout M E[1], Kluivers K B[1]
1. Department of Obstetrics and Gynaecology, Radboud University Nijmegen Medical Centre, 2. Department of Radiology, Radboud University Nijmegen Medical Centre

IDENTIFYING COMMONLY ACQUIRED GYNECOLOGICAL VARIABLES RELATED TO PUBOVISCERAL AVULSION SEVERITY

Hypothesis / aims of study
Imaging is becoming increasingly important as a diagnostic tool in pelvic floor dysfunction, e.g., pelvic organ prolapse (POP). Avulsion injury of the pubovisceral muscle of the levator ani is one of the contributing factors in both POP development and recurrence of POP after surgery. These pubovisceral avulsions can be visualized using magnetic resonance (MR) imaging. So far, there is only little awareness of this type of birth injury and only a small number of urogynecology subspecialists have mastered the skill of detecting avulsion injury on imaging. The aim of this study was to identify variables that were associated with higher or lower odds of more severe pubovisceral avulsions in women with complaints of pelvic floor dysfunction.

Study design, materials and methods
This was an observational cohort study of data obtained at a tertiary urogynecology clinic in the period 2005 – 2011. Patients underwent pelvic floor MR imaging as part of routine clinical workup in case of recurrent POP or when the patients' complaints did not correlate with clinical findings. Women were included in case they had additionally returned the following questionnaires: urinary distress inventory (UDI), incontinence impact questionnaire (IIQ), and defecatory distress inventory (DDI). Baseline characteristics, data on surgical and obstetric history and pelvic organ prolapse quantification (POP-Q) measurements were obtained. All MR images were evaluated for pubovisceral avulsions by two independent observers. Women were classified as having no defect, or a minor or major pubovisceral avulsion based on an existing scoring system (1). ANOVA tests for repeated measures were used with post-hoc Bonferroni testing for inter-group comparison. All parameters with a *p* value <.20 on univariable logistic regression were entered in a multivariable ordinal logistic regression analysis. Cumulative odds ratios (OR) were hereby calculated with pubovisceral avulsion severity as outcome variable.

Results
Of the 194 women included, major and minor pubovisceral avulsions were diagnosed in 83 (43%) and 50 (26%) women, respectively, while 61 (31%) women had no visible trauma of the pubovisceral muscle. The three groups were comparable with regard to age, BMI, and previous hysterectomy and urinary incontinence surgery. Statistically significant differences were predominantly observed between the groups "no defect" and "major pubovisceral avulsion". Twenty variables were entered in the multivariable regression analysis. Table 1 outlines the variables that were associated with a higher OR of more severe pubovisceral avulsions.

Table 1. Results of the ordinal logistic regression model using pubovisceral avulsion severity as outcome variable with three ordered categories

Variables	Logistic coefficient	Standard error	OR	95% CI			*p* value
Obstetric history							
- Age at first delivery	0.133	0.064	1.14	1.01	-	1.29	**0.04**
- Episiotomy	1.595	0.502	4.93	1.84	-	13.18	**0.001**
Surgical history							
- POP surgery	2.053	0.879	7.79	1.39	-	43.64	**0.02**
- ≥3 POP surgeries	1.936	0.838	6.93	1.34	-	35.84	**0.02**
POP-Q measurements							
- C	0.169	0.075	1.18	1.02	-	1.37	**0.03**
- Bp	0.367	0.161	1.44	1.05	-	1.98	**0.02**
UDI							
- Genital prolapse	0.015	0.007	1.02	1.00	-	1.03	**0.04**

OR 95%CI, odds ratio with 95% confidence interval. *POP(-Q),* pelvic organ prolapse (quantification). *C,* most descended edge of cervix, in centimeters relative to the hymen. *Bp,* most descended edge of posterior vaginal wall, in centimeters relative to the hymen. *UDI,* urogenital distress inventory.

Interpretation of results
All seven predictors that were associated with a higher OR of more severe pubovisceral avulsions had a positive OR indicating that with increasing values of these variables, the likelihood of larger scores on pubovisceral avulsion severity increased. The model had an adjusted R^2 of 51.7% and the likelihood ratio test statistics yielded a *p* value <.001, proving that the model was valid.

Concluding message
We identified age at first delivery, episiotomy, and previous POP surgery, as well as prolapse symptoms on UDI-questionnaire and prolapse of the middle and posterior compartment based on POP-Q measurements as factors that were associated with an increased likelihood of more severe pubovisceral avulsions.

References
1. (1) Kearney R, Miller JM, Ashton-Miller JA, DeLancey JO (2006) Obstetric risk factors associated with levator ani muscle injury after vaginal birth. Obstet Gynecol 107(1):144-9