**Abstract**

**Objective:** To determine whether it is possible to predict the risk of ureteral endometriosis (UE) using a mathematical model based on preoperative findings.

**Design:** Prospective observational study conducted between January 2017 and April 2020.

**Setting:** Tertiary-level academic referral center.

Patient(s): Three hundred consecutive women of reproductive age with a diagnosis of posterior deep infiltrating endometriosis (DIE) scheduled for laparoscopic surgery.

**Intervention(s):** Before surgery, anamnestic data and the severity of endometriosis-related symptoms were evaluated, and all patients underwent a complete gynecological examination. Transvaginal and transabdominal ultrasound were performed to map the endometriotic lesion. Ureteral involvement was surgically and histologically confirmed.

**Main outcome measure(s):** To select important risk factors for UE and determine a suitable functional form for continuous predictors, we used the multivariable fractional polynomial.

**Results:** UE was surgically found in 145 women (48.3%). Based on our multivariable polynomial mathematical model, UE was significantly associated with adenomyosis, parametrial involvement, and previous surgery for endometriosis. A posterior DIE nodule with a transverse diameter >1.8 cm was associated with a higher probability of ureteral involvement.

**Conclusions:** Posterior DIE nodule with a transverse diameter >1.8 cm, adenomyosis, parametrial involvement, and previous surgery for endometriosis appear to be good predictors of UE.