

Functional correlates of Doppler flow study of the female urethral vasculature

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Abstract

Objectives To examine the effect of individual patient factors (age, parity, body mass index, menstrual cycle, menopause, hormone replacement therapy, bladder neck position and urethral mobility) on the appearance of Doppler flow in urethral vessels, to investigate the association between the Doppler flow parameters and intrinsic urethral function, storage and voiding, and to explore differences in the urethral vasculature between subjects with and without urodynamic stress incontinence (USI). **Methods** Over a 4-year period we prospectively performed imaging studies in 355 women, including 244 who denied any lower urinary tract symptoms within the previous 3 months (Group A) and 111 who had had lower urinary tract symptoms (Group B). Studies included morphologic assessment and Doppler flow investigation of the lower urinary tract. Vascular flow velocity and vessel density in the urethral vasculature were measured. For women in Group B, multichannel urodynamic studies were also performed. **Results** The urethral vasculature has five main branches of vessels. Their appearance was not affected by the menstrual cycle or menopause except for those of the anterior vaginal vessel and anterior branch of the middle urethral vessel. Other than that of the posterior urethral vessel, in which there was a correlation with parity, the resistance index (RI) was not affected by individual patient factors. However, there was a correlation between the vascular index (VI) and individual factors such as age ($r = -0.336$, $P = 0.002$), body mass index ($r = -0.287$, $P = 0.028$), menopause ($r = -0.402$, $P < 0.001$), and hormone replacement therapy ($r = 0.392$, $P = 0.027$). Only the VI and RI of the posterior urethral vessel correlated significantly with the urethral pressure profile. In subjects with lower urinary tract symptoms, the appearance of the urethral vasculature on power Doppler imaging and the corresponding RI and VI values were not correlated with objective evidence of USI. **Conclusion** Patient factors may affect specific Doppler flow parameters of the urethral vasculature, which are related to intrinsic resting urethral closure. There is no difference in the appearance of the urethral vasculature in subjects with or without USI.