

STRIATED URETHRAL SPHINCTER ACTIVITY IS NOT AFFECTED BY PELVIC ORGAN PROLAPSE DESPITE CHANGES IN MAXIMAL URETHRAL CLOSURE PRESSURE.**Hypothesis / aims of study**

Advanced pelvic organ prolapse has been associated with a variety of lower urinary tract symptoms ranging from stress urinary incontinence to urinary retention. Previous authors have demonstrated increases in maximal urethral closure pressures (MUCP) in women with advanced pelvic organ prolapse when compared to women with stress urinary incontinence¹. This finding has led to speculation that anatomic effects from the prolapse on the urethra may result in a “functional urethral obstruction”, which results in urinary retention. Electromyography is the “gold standard” for evaluating neuromuscular function throughout the body. A recent study demonstrated that changes in MUCP were not as sensitive as changes in quantitative EMG during filling cystometry, suggesting that EMG more accurately reflects striated urethral sphincter activity². There are no published studies investigating the neuromuscular activity of the striated urethral sphincter using quantitative EMG in women with advanced pelvic organ prolapse. The aim of our study was to determine the relationship between MUCP and quantitative EMG of the striated urethral sphincter in women with advanced prolapse.

Study design, materials and methods

Women with stage III or IV prolapse undergoing multichannel urodynamic testing with concentric needle EMG were invited to participate in this IRB approved study. Maximum urethral closure pressures and quantitative EMG of the striated urethral sphincter were obtained at the subject’s maximum cystometric capacity with the prolapse maximally everted (unreduced) and reduced. Subjects were randomized to the order in which MUCP and EMG measurements were obtained (reduced or unreduced). Maximum urethral closure pressures were obtained on a Life-Tech urodynamic instrument (model 1106, Life-Tech, Inc, Houston, TX) with an 8F dual- microtipped catheter (Millar Instruments, Houston, TX). The proximal transducer was positioned in the urethra facing 9-o’clock with the profilometer set at a withdrawal rate of 1mm per second. A 30 gauge, concentric needle electrode was placed 5mm above the external urethral meatus at the 12 o’clock position in the striated urethral sphincter. Correct needle placement was confirmed using oscilloscope and auditory guidance. Raw EMG signals were processed by a Nicolet Viking IVp electrodiagnostic instrument (Nicolet Instrument Corporation, Madison, WI) equipped with automated motor unit analysis software programs. Quantitative EMG software was used to analyze electrical activity of the striated urethral sphincter with the prolapse reduced and unreduced. The sign test was used to evaluate differences in MUCP and quantitative EMG with the POP reduced and unreduced. Results were considered significant at the 5% level.

Results

Twenty-three women were included in the study with a mean age of 59 years (range 36-74). All had advanced prolapse (83% stage III and 17% stage IV), and most were Caucasian (83%). Sixty-four percent had urodynamic stress incontinence. Maximum urethral closure pressures with the prolapse unreduced were significantly higher than MUCP reduced; however, quantitative EMG values of the striated urethral sphincter were not different with the prolapse reduced and unreduced.

	Reduced	Unreduced	P- value
MUCP	40cmH ₂ O (31-61)*	60cmH ₂ O (46-96)*	.001
Quantitative EMG	12μV (7-15)*	11μV (9-20)*	.804

*values represent median and 25th to 75th quartile range

Interpretation of results

These findings suggest that the increase in MUCP associated with advanced prolapse is not due to an increase in the neuromuscular activity of the striated urethral sphincter. The increased urethral pressure, and possibly, urinary retention associated with advanced prolapse may be due to anatomic effects from the prolapse and not reflex activation of the striated urethral sphincter.

Concluding message

Maximum urethral closure pressures do not accurately reflect the neuromuscular activity of the striated urethral sphincter in women with advanced prolapse. Pelvic organ prolapse results in elevated MUCP, which are not related to increased neuromuscular activity in the striated urethral sphincter.

1. Richardson DA, Bent AE, Ostergard DR, The effects of uterovaginal prolapse on urethrovesical pressure dynamics. Am J Obstet Gynecol 146:901, 1983
2. Striated urethral sphincter activity does not alter urethral pressure during filling cystometry. Am J Obstet Gynecol, submitted