

ARE URINARY BDNF LEVELS INCREASED IN PATIENTS WITH PELVIC ORGAN PROLAPSE

Hypothesis / aims of study

BDNF expression has been demonstrated in the urothelium of animal models and is increased in conditions of inflammation [1]. The literature has reported the BDNF is increased in patients with OAB compared to controls and levels decrease with successful anticholinergic treatment [2].

The relationship between OAB and pelvic organ prolapse has been well described. Studies have shown that repair of the anterior vaginal wall resolved urgency in 70% of women as well as improving daytime frequency in almost 60% of cases. It has been suggested that descent of the trigone into the anterior vaginal wall and /or obstruction to the urethra underlies the overactivity by distending the urothelial stretch receptors and causing detrusor overactivity (DO) [3]. It could be hypothesised that this stretch of urothelial cells could result in an increase in BDNF expression and cause an increase in excitability of the nerves innervating the bladder resulting in overactivity. Furthermore in women with POP and OAB symptoms BDNF could be increased and altered following correction of the prolapse, alongside an improvement in OAB symptoms.

The aim of this study is to evaluate urinary BDNF levels in women with POP and to measure the effect of surgical correction.

Study design, materials and methods

Women referred to a tertiary urogynaecology outpatient clinic with symptomatic bothersome anterior vaginal wall prolapse symptoms were prospectively recruited. Women with no symptomatic POP or lower urinary tract symptoms formed the control group.

All symptomatic women had a detailed history and completed the ICIQ-FLUTS questionnaire and a 3 day bladder diary. Pelvic examination was performed and the degree of POP was graded according to the Baden-Walker halfway profile. Women who underwent prolapse surgery were followed up at six months.

A mid stream specimen of urine was obtained and immediately refrigerated at 4°C and centrifuged at 3000 rpm for 10 minutes. Supernatant was collected in 1ml aliquots and frozen at -80°C until further processing. Urinary BDNF levels were measured by ELISA. Urine BDNF content was normalised against the creatinine (Cr) concentration as the BDNF/Cr ratio in pg/mg.

Results

One hundred and six patients were recruited; 47 women had a grade 1 cystocele, 46 women had a grade 2 cystocele and 13 women had a grade 3 cystocele. Of these 106 women 29 had anterior vaginal wall prolapse/non-OAB and 77 had anterior vaginal wall prolapse/OAB. The mean age was 56 years ± 13 years (range 22 to 84). Mean parity was 2 and the mean BMI was 26.6. 34 women without OAB symptoms or prolapse made up the control group. The mean age in the control group was 36 years ± 9 years (range 24 to 72).

Table 1 shows the urinary BDNF levels in the control group and the various prolapse subgroups. There was no significant difference between the 2 prolapse subgroups (non OAB and OAB, p 0.11) or between the individual subgroups and the control groups. (Mann Whitney U test).

| Patient group | Urine samples | Median BDNF/Cr (pg/mg) | IQR | p value* comparison of urinary BDNF between controls and the prolapse subgroups) |
|------------------|---------------|------------------------|-----------|--|
| Controls | 34 | 6.8 | 1.9-14.85 | |
| Prolapse/non OAB | 29 | 2.1 | 0.3-10.6 | 0.06 |
| Prolapse/OAB | 77 | 4.7 | 1.1-12.9 | 0.51 |

Table 1: levels of urinary BDNF in the different patient groups

Seventeen women were followed 6 months after prolapse surgery for. Five women had an anterior and posterior vaginal wall repair, 1 woman had a sacrocolpopexy, 2 women underwent sacrohysteropexy and 9 women underwent vaginal hysterectomy and an anterior and posterior vaginal wall repair. 10 women in the surgical intervention group had prolapse/OAB.

Overactive bladder symptom scores from the ICIQ-FLUTS are shown in table 2. There was a significant decrease in urgency symptoms in women undergoing prolapse surgery.

| Urinary symptoms | Median score pre op and 95% CI | Median score post op and 95% CI | p value |
|---------------------------|--------------------------------|---------------------------------|---------|
| Urgency | 2 (1.5-2.7) | 1 (0.5-1.7) | 0.04* |
| Frequency | 0 (0.2-1.7) | 0 (0.2-1.4) | 0.8 |
| Urge urinary incontinence | 2 (0.8-2.2) | 1 (0.3-1.2) | 0.09 |

Table 2: urinary symptoms pre and 4-6 months post surgery

There was a non significant decrease in median BDNF after correction of the anterior vaginal wall prolapse (2.78pg/mg vs. 1.49pg/mg, p 0.94)

Interpretation of results

There is no significant difference in urinary BDNF between healthy controls and those with prolapse with or without OAB. Although correction of anterior vaginal wall prolapse significantly improved urgency symptoms in our small cohort of patients, there is no significant decrease in urinary BDNF after prolapse surgery.

Concluding message

Urinary BDNF does not appear to be increased in women with prolapsed and/or OAB nor is it significantly altered after prolapsed surgery. These findings may be limited by the small numbers in this study.

References

1. Neuroscience 2010 Mar 31;166(3):907-16.
2. Int Urogynecol J 2013 Jul;24(7):1065-72.
3. Int Urogynecol J Pelvic Floor Dysfunct 2007 Dec;18(12):1439-43.

Disclosures

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