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THE EFFECT OF FLUID INTAKE ON URINARY SYMPTOMS IN WOMEN

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ABSTRACT

Purpose: We determined the effect of caffeine restriction and fluid manipulation in the treatment of patients with urodynamic stress incontinence and detrusor overactivity.

Materials and Methods: This was a 4-week randomized, prospective, observational crossover study in 110 women with urodynamic stress incontinence (USI) or idiopathic detrusor overactivity (IDO) to determine the effect of caffeine restriction, and of increasing and decreasing fluid intake on urinary symptoms. Data were recorded in a urinary diary for the entire study period on urgency episodes, frequency, pad weight increase, wetting episodes and quality of life.

Results: A total of 69 women with a mean age of 54.8 years completed the study, including 39 with USI and 30 with IDO. In the IDO group decreasing fluid intake significantly decreased voiding frequency, urgency and wetting episodes with improved quality of life. In the USI group there was a significant decrease in wetting episodes when fluid intake was decreased. Changing from caffeine containing to decaffeinated drinks produced no improvement in symptoms.

Conclusions: Conservative and life-style interventions are first line treatments in the management of incontinence and storage lower urinary tract symptoms. This study shows that a decrease in fluid intake improves some of these symptoms in patients with USI and IDO and, therefore, it should be considered when treating such patients.

KEY WORDS: bladder; urinary incontinence, stress; urodynamics; caffeine

Lower urinary tract symptoms, including urgency and incontinence, are common in women.[1] Urinary incontinence, which is the complaint of involuntary leakage of urine,[2] has a published prevalence of between 8%[3] and 69%,[1] and it is recognized to affect quality of life.[4] Incontinence in women may be due to stress incontinence, urge incontinence or a mixed picture of each type.[1] The prevalence of other urinary symptoms in women is less well known but urgency has been reported in 61% of women registered with 1 general practice who participated in a prevalence study of urinary symptoms.[1]

Stress urinary incontinence is the complaint of involuntary leakage on effort, exertion, sneezing or coughing. Mixed urinary incontinence is the complaint of involuntary leakage associated with urgency and also with exertion, effort, sneezing or coughing.[2] Overactive bladder syndrome is defined as urgency with or without urge incontinence, usually with frequency and nocturia. It is suggestive of urodynamic detrusor overactivity[2] (DO).

There are various treatment options for stress incontinence and the overactive bladder. Treatment options range from simple measures, such as advice given concerning lifestyle, to surgery. The International Consultation on Incontinence suggested that in women conservative and medical treatment for urinary incontinence can be commenced in uncomplicated cases by family physicians and specialist nurses based on an empirical diagnosis rather than on a urodynamic diagnosis.[5]

Therefore, simple measures are usually advised in the primary health care setting before consideration is given to medical or surgical forms of treatment.[6] One of the first issues considered when someone presents for incontinence treatment is fluid intake. Indeed, self-regulation of fluid intake is one of the commonest methods used by women to control urinary symptoms.[7] Although regulation of the type and amount of fluid intake is commonly advocated by health professionals, there is little evidence, other than anecdotal, to support this. In a retrospective descriptive study of community dwelling women 55 years and older Wyman et al found only a modest correlation between fluid intake and incontinence.[8] Likewise Griffiths et al reported that fluid restriction yielded only a small decrease in nocturnal episodes of incontinence.[9] A study of Dowd et al of the effect of increasing or decreasing fluid intake showed no improvement in symptoms, although there was nonadherence to the protocol in a significant proportion of women.[10]

There are few studies of the effect of caffeine intake on urinary symptoms in women. A study of the effect of restricting caffeine intake indicated that incontinence episodes decreased when caffeine intake was reduced.[11] Similarly a study of the relationship between DO and caffeine intake showed that women with DO had a larger caffeine intake than those without DO.[12]

Although fluid manipulation is widely practiced to control urinary symptoms, there is little evidence of its efficacy in the literature with few prospective randomized trials published. With the increasing move toward evidence based medicine we determined the role of fluid manipulation in the management of urinary symptoms in women.

MATERIALS AND METHODS

A prospective, observational, randomized crossover study was performed in women with urodynamically proven stress incontinence (USI) or idiopathic DO (IDO) to determine the effect of caffeine restriction, and of increasing and decreasing fluid intake on urinary symptoms. Women were recruited into this study following urodynamic diagnosis of lower urinary tract symptoms and before starting any treatment. Women in the IDO group had been referred for investigation of symptoms of frequency, urgency and urgency incontinence, and women with USI had been referred because of leakage secondary to coughing and exercise. The USI group was naïve

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to surgery. Urodynamic diagnoses were made according to International Continence Society definitions.[2] Exclusion criteria were urinary tract infection, hepatic, cardiac or renal disease and diabetes mellitus. Women who were receiving antidepressants, anticholinergics or diuretics were also excluded.

The study lasted 4 weeks, including a baseline week (week 1), followed by 3 weeks of caffeine restriction. In the first week of caffeine restriction (week 2) women were asked to drink normally. During weeks 3 and 4 women increased decaffeinated fluids to 3 l daily (20 cups) (week 3 or 4) or decreased decaffeinated fluids to 750 ml (5 cups) daily (week 3 or 4). Women were randomized in the order in which they increased and decreased fluids. Urine osmolality was measured at 3 times during the last day of each week to assess compliance.

Detailed urinary diaries that included information concerning episodes of urgency and leakage were kept for each day of the 4-week study period. A reason for randomizing the order of increased or decreased fluid intake was to counter the placebo effect of keeping urinary diaries. A 24-hour pad test was completed at the end of each week as well as a shortened version of the Bristol Female Lower Urinary Tract Symptoms symptom questionnaire.[13] The questionnaire was shortened from 34 to 10 questions for completion on a weekly basis. The 10 questions used concerned urinary frequency, urgency, stress incontinence, urge incontinence, pad use and quality of life. Women were asked to keep to their usual exercise levels while undergoing the pad test. The effect on quality of life was determined by comparing answers to the question, "Overall, how much do your urinary symptoms interfere with your life?"

The original sample size of 80 women provided 80% power to detect differences of about a third of an SD or significant at the 2-sided 5% level.[14] The paired samples t and Wilcoxon signed ranks tests were used to test for differences between treatments. Data on the 2 diagnostic groups (USI and IDO) were analyzed separately.

RESULTS

A total of 110 women were approached to enter the study, of whom 26 refused. There were 15 dropouts during the study, including 9 women with USI and 6 with IDO. A total of 69 women completed the study, including 39 with USI and 30 with IDO. Because this study was designed to assess the effect of fluid manipulation and caffeine restriction in women with troublesome symptoms, diagnostic groups were initially analyzed as a whole. Mean age of the women was 54.8 years (range 31 to 76). Mean fluid intake was 1,639 ml for week 1, 1,630 ml for week 2, 2,673 ml for the week of increasing fluids and 872 ml for the week of decreasing fluids. Mean osmolality was reported to be 498 mOsm/kg for the baseline week, 521 mOsm/kg for the week of caffeine restriction, 636 mOsm/kg for the week of decreasing fluids and 399 mOsm/kg for the week of increasing fluids. The table shows the median results of the different recorded episodes, that is urgency, voiding frequency, 24-hour pad weight and wetting episodes, in the USI and IDO groups.

There was no significant difference between the baseline week (week 1) and the caffeine-free week (week 2) in the USI or the IDO groups for any outcome measures episodes (urgency, frequency, pad weight increase, daily wetting episodes and quality of life). There was also no significant difference in the 24-hour pad weight increase in women with USI or IDO in any of the 4 weeks.

In the USI group the number of wetting episodes in the baseline week was significantly greater when compared with that of week 3 or 4 with decreased decaffeinated fluids ($p = 0.006$). However, there was no significant difference between week 2 with the same fluid intake but caffeine restriction and the other 2 weeks of caffeine restriction whether fluids were increased or decreased ($p = 0.426$ and 1.000, respectively). There were also more statistically significant wetting episodes in the week of increasing fluids compared with the week of decreasing fluids ($p = 0.006$). There were significant differences in the IDO group between the baseline week and the fluid decrease week (week 3 or 4) ($p = 0.006$) and between the caffeine-free week (week 2) and the fluid increase week (week 3 or 4) ($p < 0.003$).

In the IDO group increasing fluid intake (week 3 or 4) significantly increased voiding frequency and urgency episodes (each $p < 0.003$). Decreasing fluid intake (week 3 or 4) significantly decreased voiding frequency (weeks 1 and 2 $p < 0.003$) and urgency episodes (weeks 1 and 2 $p = 0.006$ and 0.042, respectively). Similar statistically significant effects on voiding frequency were seen in the USI group.

Decreasing fluid intake (week 3 or 4) showed significant improvement in quality of life compared with the baseline week (week 1) in women with IDO or USI (each $p < 0.003$). However, there was no difference in quality of life impact among any of the other weeks in the IDO or USI group. The mean impact of urinary symptoms remained as "a little" on daily life for the study period.

DISCUSSION

Conservative treatment and life-style interventions are first line treatment in patients with USI and IDO. However, there is little evidence in the literature as to the effect of fluid manipulation on stress incontinence or on overactive bladder symptoms.

This study shows that changing to decaffeinated fluids made no difference in storage lower urinary tract symptoms. In patients with IDO decreasing fluid intake improved the symptoms of urgency, frequency and urge incontinence, and increasing fluid made symptoms worse. However, there were no statistical differences in 24-hour pad losses among the different weeks in the IDO group. This was probably because the degree of leakage at each episode of incontinence is variable for IDO. In this type of study the frequency/volume chart is an essential measurement instrument. It is believed that there is a bladder training effect while completing urinary diaries and, therefore, the study design randomized the order

Voiding frequency, 24-hour pad weight and wetting episodes in patients with USI and IDO for all 4 weeks

	Median Baseline Wk (IQR)	Median CF Wk (IQR)	Median CF + Increasing Fluids (IQR)	Median CF + Decreasing Fluids (IQR)
USI group (39 pts):				
Voiding frequency	7.2 (6.2–8.4)	7 (5.9–8.9)	8.3 (7–10.9)	6.3 (5–7.1)
24-Hr pad wt increase (gm)	7.6 (3.3–18.3)	7.1 (2.7–12.1)	7.9 (4–19.7)	6.9 (3.1–13.9)
No. daily wetting episodes	1.6 (0.6–2.8)	0.8 (0.1–1.9)	0.7 (0.3–3)	0.5 (0.2–2.1)
IDO group (30 pts):				
No. urgency episodes	5.2 (3–7.7)	5.4 (2.8–8.7)	7.6 (3.9–9.4)	4.3 (2.6–5.7)
Voiding frequency	9.0 (7.8–10.9)	8.9 (7.4–11.1)	10.8 (9.3–14.4)	7.7 (6.7–9.3)
24-Hr pad wt increase (gm)	5.9 (3.4–13.5)	5.6 (3.9–10.4)	12.1 (4.4–26)	4.4 (3.1–15.5)
No. daily wetting episodes	0.9 (0.4–2)	0.6 (0.2–1.8)	1.1 (0.2–3)	0.5 (0.2–1.2)

of fluid increase and decrease in an effort to minimize this effect. There was also an improvement in quality of life in patients who decreased fluid intake. However fluid restriction may cause troublesome constipation,[15] especially in elderly patients. Therefore, a balance must be established between the benefits of fluid restriction and the possible side effects that may result from fluid restriction in some patients.

In patients with USI decreasing fluid intake improved incontinence and frequency episodes when comparing the week of decreased fluids with the baseline week or the week of increased fluids. On the other hand, there was no increase in wetting episodes when the week of increasing fluids was compared with the baseline week. Increasing fluid in this group only increased frequency with no effect on the other outcome measures. This is perhaps only what would be expected because frequency is not usually a complaint in women with USI. We were surprised that asking women to substitute decaffeinated drinks for caffeine containing drinks that they were ingesting in the baseline week made no difference. However, we asked women to maintain a similar fluid intake from baseline into week 2. In the clinical situation it may be that the request to stop drinking caffeine containing beverages produces improvement because of a decrease in fluid intake rather than by the withdrawal of caffeine, which after all is only a mild diuretic.

CONCLUSIONS

This study shows that decreasing fluids improved urinary symptoms in women with IDO and USI. While patients clearly must maintain an adequate daily fluid intake to avoid dehydration, women with USI and IDO should be advised to drink less fluid to improve symptoms as part of conservative treatment. This advice is perhaps at variance with the current fashionable view that advocates the consumption of large amounts of fluid to improve health. However, to our knowledge this fashion has no evidence base.

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