Acupuncture Treatment in the Prevention of Uncomplicated Recurrent Lower Urinary Tract Infections in Adult Women

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Acute lower urinary tract infections (UTIs) are common in adult women, and as many as 6% of members of the adult female population experience 3 or more episodes during a given year.[1] In 1995, an estimated 11.3 million women in the United States received antibiotic treatment for at least 1 presumed UTI, resulting in associated costs of $1.6 billion during that year.[2] Women with frequently recurrent cystitis may need prophylactic antibacterial treatment. However, such treatment may result in development of antimicrobial resistance, which is a medical problem of increasing concern.[3]

A recent study indicated that the rate of cystitis among cystitis-prone women treated with acupuncture was one third the rate among untreated women and half the rate among women treated by sham acupuncture (shallow needling outside known acupuncture points).[4] In the present study, we sought to evaluate the effect of acupuncture treatment in preventing uncomplicated recurrent lower UTIs among adult nonpregnant women.

METHODS

We recruited 100 women aged 18 to 60 years through advertisements placed in local newspapers in Bergen, Norway. Recruitment took place over a 12-month period beginning in spring 1998. To be included in the study, women had to have had 3 or more episodes of distal urinary symptoms (i.e., dysuria and frequent urination or suprapubic discomfort) during the previous 12 months, and at least 2 of these episodes had to have been diagnosed and treated as acute lower UTIs by a medical doctor. Women were excluded if they were pregnant or were known to have a complicating illness (e.g., diabetes, cancer, obstruction of the urinary tract).

Two women failed to meet the inclusion criteria. Of the 98 women included in the study, 4 subsequently dropped out (2 in the acupuncture group and 2 in the control group).

After written informed consent had been obtained, baseline measurements had been taken, and a diagnosis had been made according to principles of traditional Chinese medicine (TCM), a closed envelope containing the patient's randomized assignment to acupuncture treatment or no treatment was opened. Participants were randomized in blocks of 4 (at a ratio of 3:1) to acupuncture treatment (n = 67) or no treatment (n = 27).

Treatment consisted of insertion of needles and obtaining of *deqi* (a sensation described as numbness, heaviness, and distention). Acupuncture points were chosen according to the patient's TCM diagnosis. Points were located on the lower abdomen or back (CV-3 or CV-4 and BL-23 or BL-28) or on the lower extremities (KI-3, SP-6, SP-9, ST-36, or LR-3). Treatments were administered twice weekly for 4 weeks.

The primary effect measure was number of occurrences of acute lower UTI during a 6-month follow-up. Residual urine was measured with the automatic Bladder BVI Scan

2500 (Diagnostic Ultrasound Corporation, Wash). Measurements were repeated at 2, 4, and 6 months.

Samples used in bacteriological examinations were collected from clean-voided urine via a dip slide (Uricult; Orion Diagnostica, Finland). Specimens were examined, by bacteriologists unaware of group assignment, at the Gade Institute, Haukeland Hospital, in Bergen, Norway. Acute lower UTI was defined as the presence of (1) the distal urinary symptoms described earlier and (2) bacteriuria (10^5 or more colony-forming units per milliliter of uropathogen or any amount of *Staphylococcus saprophyticus*).

We used Fisher exact tests and χ^2 tests (categorical data) or independent *t* tests (parametric data) to assess differences between groups; differences within groups were examined with paired *t* tests. We report incidence rates of acute lower UTIs in the observation period as number of episodes per person-month, and results of comparisons between groups as incidence rate ratios (IRRs).

RESULTS

As can be seen in Table 1, there were no statistical differences between groups in regard to mean age or mean number of acute lower UTIs in the preceding 12 months. Following treatment, 73% of women in the acupuncture group were free of UTIs during the 6-month observation period, as compared with 52% of women in the control group ($P = .08$). During the observation period, half as many UTI episodes per person-month occurred in the acupuncture group as in the control group (IRR = 0.45; 95% confidence interval [CI] = 0.23, 0.86; $P \leq .05$; Table 1).

Several episodes of acute distal urinary symptoms were noted in which bacterial cultures either were not obtained or were negative. One third as many episodes per person-month occurred in the acupuncture group as in the control group (IRR = 0.30; 95% CI = 0.16, 0.58; $P \leq .01$; Table 1).

Women in the acupuncture group experienced a 50% reduction in residual urine after 6 months relative to baseline (35.4 vs 18.2 mL; $P \leq .01$), whereas women in the untreated group exhibited no significant change in residual urine (35.5 vs 38.8 mL). As can be seen in Table 2, the number of women in the treated group with residual urine levels below 10 mL had doubled by the 6-month follow-up, compared with no change among women in the untreated group ($P \leq .05$).

TABLE 1—Background Data and UTI Results During a 6-Month Observation Period: 94 Women Receiving Acupuncture Treatment for Recurrent Lower UTIs or Receiving No Treatment

	Acupuncture (n = 67)	No Treatment (n = 27)
Baseline data		
Mean age, y	38.6	39.1
Mean age at first UTI, y	14.6	14.0
Mean no. of UTIs in previous 12 months	6.2	4.9
Mean no. of weeks since most recent UTI	5.3	6.3
Mean weekly no. of sexual encounters in previous month	1.9	1.7
Main results over 6 months		
Symptomatic lower UTI (with bacteriuria)		
No. of patients without symptoms	49	14
No. of UTIs[a]	18	18
Incidence rate[b]	0.049	0.108
Incidence rate ratio (95% CI)	0.45 (0.23, 0.86)	
UTI symptoms without bacteriuria		
No. of patients without symptoms	52	10
No. of symptomatic episodes	14	21
Incidence rate[b]	0.038	0.125
Incidence rate ratio (95% CI)	0.30 (0.16, 0.58)	

Note. UTI = urinary tract infection. Differences between groups are shown as incidence rate ratios and 95% confidence intervals (CIs).
[a]No participants had more than 2 episodes over the 6-month observation period.
[b]Calculated as number of UTIs per person-month.

DISCUSSION

Our results showed that acupuncture reduced the recurrence rate among cystitis-prone women to half the rate among untreated women. Also, women in the acupuncture group exhibited reductions in residual urine. The finding that 50% of women in the untreated group became free of cystitis over the study period may reflect regression to the mean, as observed in other studies focusing on recurrent UTIs.[4,5]

Typically, only 10% of a normal adult female population without specific urinary symptoms will have residual urine levels above 10 mL[7]; 75% of our participants had levels above 10 mL at study entry. Residual urine is a risk factor in the pathogenesis of recurrent lower UTIs among postmenopausal women.[8,9] Our data indicate that this also may be the case among adult women in general.

In summary, our results, as well as previous findings,[4] indicate that acupuncture treatment may be effective in preventing recurrent lower UTIs in healthy adult women. ■

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Contributors

T. Alraek prepared the study protocol, recruited and treated patients, took part in the data analysis, and

TABLE 2—Residual Urine Levels During a 6-Month Observation Period: 94 Women Receiving Acupuncture Treatment (A) for Recurrent Lower Urinary Tract Infections or Receiving No Treatment (C)

	Baseline, No.		2 Months, No.		4 Months, No.		6 Months, No.	
Residual Urine, mL	A (n = 62)	C (n = 27)	A (n = 64)	C (n = 25)	A (n = 53)	C (n = 18)	A (n = 61)	C (n = 23)
≤10	15	5	26	9	25	8	32	5*
11–30	20	10	17	7	17	2	14	9
31–100	24	9	14	7	10	7	14	7
>100	3	3	7	2	1	1	1	2

*$P \leq .05$ (vs acupuncture group).

wrote the brief. L.I.F. Soedal and S.U. Fagerheim participated in the data analysis and in preparation of the brief. A. Digranes conducted urinalyses and contributed to the study protocol. A. Baerheim supervised the study and contributed in all phases.

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Human Participant Protection

This study was approved by the Regional Ethical Committee and the Norwegian Data Inspectorate.

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