

Original Article

Acupuncture in haemodialysis patients at the Quchi (LI11) acupoint for refractory uraemic pruritus

Chou Che-yi, Cheng Yu Wen, Kao Min-Tsung and Huang Chiu-Ching

Division of Nephrology, Department of Medicine, China Medical University Hospital, Taichung, Taiwan

Abstract

Background. Uraemic pruritus is a common problem in end-stage renal failure patients. Traditional therapies produce marginal or no results. Acupuncture has been reported to be effective. The aim of this randomized, controlled study was to validate a single acupoint for relieving uraemic pruritus.

Methods. We randomized 40 patients with refractory uraemic pruritus into two groups. In group 1 ($n=20$), acupuncture was applied unilaterally at the Quchi (LI11) acupoint thrice weekly for 1 month. In group 2 (controls, $n=20$), acupuncture was applied at a non-acupoint 2 cm lateral to Quchi (LI11) thrice weekly for 1 month. Subjects responded to a pruritus score questionnaire given before and at the end of the 1 month treatment and at a 3 months follow-up. The results of the pruritus scores were analysed with the repeated measures general linear model to examine the effect of acupuncture on pruritus scores.

Results. In group 1, pruritus scores before and after acupuncture and at the 3 month follow-up were 38.3 ± 4.3 , 17.3 ± 5.5 and 16.5 ± 4.9 , and in group 2 (controls) they were 38.3 ± 4.3 , 37.5 ± 3.2 and 37.1 ± 5 , respectively. Laboratory tests showed no significant differences between the two groups. Pruritus scores were significantly lower after acupuncture and at the 3 month follow-up, $P < 0.001$.

Conclusions. Acupuncture at the Quchi (LI11) acupoint is an easy, safe and effective means of relieving uraemic pruritus.

Keywords: acupoint; acupuncture; end-stage renal disease; haemodialysis; pruritus score; refractory uraemic pruritus; Quchi (LI11)

Introduction

Uraemic pruritus is a common problem in patients with end-stage renal failure on haemodialysis. Its estimated prevalence is 30–50% [1]. Traditional therapies, including intensive dialysis, lower dialysate calcium (2.5 or 3.0 mEq/l) [2], lowering dialysate magnesium [3] and dietary management [4], have been marginally effective. Acupoint injection, at San Yin Jiao (SP6), Xuehai (SP10), Zusanli (ST36) and Quchi (LI11) acupoints, has been reported [5] to be effective in uraemic pruritus. Duo also reported that an electric needle is effective at two similar points [6]. The aim of this study was to design a randomized controlled trial to evaluate the effectiveness of needling the single acupoint, Quchi (LI11). We chose that single point for the following reasons: (i) the above studies showed that two, or fewer, acupoints may also be effective in uraemic pruritus; (ii) the acupoint Quchi (LI11) was used in both of these two previous studies; and (iii) Quchi (LI11) is close to the haemodialysis needle puncture site, but not too close for acupuncture there to interfere with haemodialysis.

Subjects and methods

Each patient included in the study gave written informed consent. The following inclusion criteria were applied: intact parathyroid hormone (iPTH) < 600 pg/ml, $Kt/V > 1.2$, serum phosphate < 6 mg/dl, and the presence of refractory uraemic pruritus. We randomly assigned 40 patients to either the Quchi (LI11) group (group 1) or the non-acupoint group (group 2).

Refractory uraemic pruritus was defined if the patient failed to respond to following treatments: (i) avoiding food containing high amounts of phosphate; (ii) haemodialysis with a dialysate containing 3.0 or 2.5 mEq/l of calcium; and (iii) changing the dialyser or increasing blood flow. All patients were dialysed for 4h, three times a week. The dialysers were F7, F8 (single-use) or F70s, F80s (multi-use). All patients continued previous medications during the study, including antihistamines and phosphate binders.

Correspondence and offprint requests to: Cheng Yu Wen, MD, No. 2, Yude Rd, North District, Taichung City 40461, Taiwan. Email: cyzhou@www.cmuh.org.tw

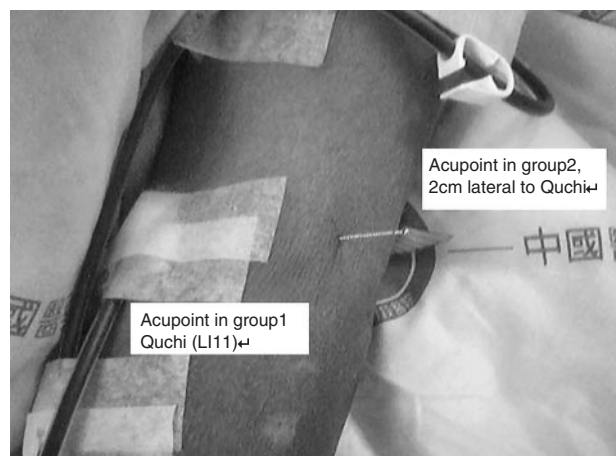


Fig. 1. The location of the Quchi (LI11) acupoint in group 1, and the non-acupoint used in group 2 (control group).

A questionnaire, copied and translated from a previous study [7], was administered before and after acupuncture and 3 months after stopping acupuncture. The severity, distribution and frequency of pruritus and of pruritus-related sleep disturbance were graded as follows.

Severity. A slight itching sensation without the need to scratch received 1 point; with the need to scratch, but without excoriations, 2 points; scratching accompanied by excoriation, 4 points; and pruritus causing overwhelming restlessness, 5 points.

Distribution. Itching at less than two locations received 1 point; at more than two locations, 2 points; and generalized itching 3 points. The score of severity and distribution of pruritus was recorded in the morning and afternoon and multiplied separately so that a maximum of 30 points could be achieved.

Sleep disturbance. Each episode of awakening because of itching received 2 points (maximum 10 points), and each scratching episode during the night that led to excoriation received 1 point (maximum 5 points). The score of sleep disturbance and the severity–distribution product were added to arrive at the final pruritus score (maximum 45 points).

The questionnaire fulfilled the requirements of the pruritus scoring system [8]. The questionnaire was translated from another source [7], and haemodialysis nurses helped patients complete the questionnaire. To avoid personal bias, two different nurses administered the same questionnaire to the same patient. If the pruritus scores differed by >5 points, a third nurse repeated the questionnaire. A mean pruritus score was calculated from the two or three scores obtained. To avoid observer error, all the nurses who administered the questionnaire were blinded to the patient's group assignment.

In group 1, thrice weekly for a month, a 1-inch 34-gauge acupuncture needle was inserted at Quchi (LI11) (Figure 1), left in place for 1 h and then removed. In group 2, a 1-inch 34-gauge needle was inserted 2 cm lateral to the Quchi (LI11) acupoint, also thrice weekly for 1 month, and left in place for 1 h. The acupoint Quchi (LI11) is located at the lateral end of the elbow crease, midway between the biceps brachii tendon and the lateral epicondyle of the humerus. For the

purpose of blinding patients, and nurses, the control non-acupoint chosen for use in group 2 was located 2 cm lateral to the Quchi (LI11), lateral to the humeral epicondyle. (The skin fold over the non-acupoint needed to be pinched before insertion of the needle.) Because the two needling points are close, patients and nurses could not recognize the difference.

Statistical analysis

Continuous and ordinal data were analysed using the Student *t*-test. Categorical data were analysed by Fisher's exact test and the χ^2 test. For the repeated measures, the repeated measures general linear module was employed to examine the effect of acupuncture on pruritus scores before and after acupuncture and at the 3 month follow-up.

Results

Between October 1, 2003 and October 31, 2004, we enrolled 40 patients (from 315 chronic haemodialysis patients) and assigned them either to group 1 or to group 2 (control). Their clinical and biochemical data are listed in Table 1. There were no significant differences in their underlying diseases, sex, duration of haemodialysis, Kt/V and the dialyser membrane used. The pruritus score was analysed in an analysis of variance with the time of measurement (before acupuncture vs after acupuncture vs at the 3 month follow-up) as a within-subjects factor. The effect of the time of measurement on differences between-pruritus scores was significant, $F(1.77, 67.13) = 117.24$, $P < 0.001$. Acupuncture at Quchi was effective in reducing the pruritus score from a mean of 38.2 (SD = 4.8) pre-treatment to a mean of 17.3 (SD = 5.5, $P < 0.001$) immediately following treatment. The improvement was maintained at 3 months (mean = 16.55, SD = 4.8, $P < 0.001$). The mean pruritus scores of the 40 patients before and after acupuncture and at the 3 month follow-up are shown in Figure 2.

Discussion

Pruritus is a nociceptive sensation transmitted centrally from the periphery by the unmyelinated, large, slowly conductive C fibres. The release of endogenous opiate-like substances may blunt the peripheral and central perception of itching [9]. The 'gate theory' suggests that acupuncture generates impulses, which, carried by the smaller, myelinated, and rapidly conductive beta and delta fibres, reach the spinal cord. There, opiate-like substances are released that block the slower C fibre impulses [10].

The findings of Gao *et al.* [11] suggest that fewer acupoints may relieve pruritus in uraemic pruritus; however, there was no control group for comparison in their study. The studies of Gao *et al.* and Shapiro and Stockard [5] had no control group. Some biochemical parameters have been reported

Table 1. Clinical and biochemical parameters and the pruritus scores of the 40 patients enrolled in the study

	Group 1	Group 2	Difference
Age (years)	62.4 ± 9.1	63.2 ± 7.5	NS
Body weight (after haemodialysis) (kg)	61.8 ± 12.6	59.6 ± 11.2	NS
Disease underlying ESRD			
CGN	7 (35%)	8 (40%)	NS
DM	6 (30%)	7 (35%)	NS
HTN	5 (25%)	3 (15%)	NS
PKD	1 (5%)	0	NS
Others	1 (5%)	2 (10%)	NS
Duration of haemodialysis (months)	59.8 ± 52.8	61.3 ± 53.2	NS
Sex (female/male)	11/9	10/10	NS
Dialyser (single-use/multi-use)	14/6	15/5	NS
Kt/V	1.47 ± 0.3	1.43 ± 0.4	NS
Surface area of dialyser membrane (m ²)	1.88 ± 0.27	1.92 ± 0.35	NS
Alkaline phosphatase (IU/l)	71.6 ± 34.9	73.82 ± 28.5	NS
Urea (mg/dl)	84.6 ± 19.9	91.2 ± 10.5	NS
Creatinine (mg/dl)	11.5 ± 2.6	10.6 ± 3.1	NS
Calcium (mg/dl)	9.6 ± 0.7	8.5 ± 1.1	NS
Phosphate (mg/dl)	4.1 ± 1.3	4.8 ± 0.8	NS
Magnesium (mg/dl)	3 ± 0.5	3.2 ± 0.6	NS
iPTH (pg/ml)	217.3 ± 123	223.5 ± 162	NS

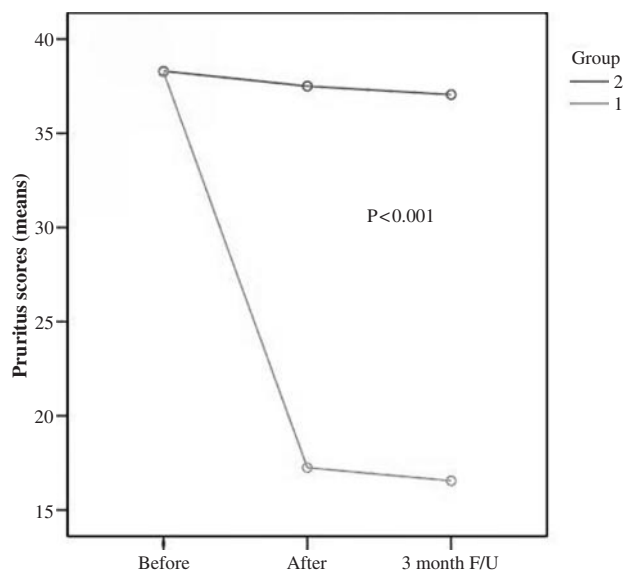
Values are expressed as mean ± SD or patient numbers (percentage). NS = no significant difference; CGN = chronic glomerulonephritis; DM = diabetes mellitus; HTN = hypertensive nephropathy; ESRD = end-stage renal disease; PKD = polycystic kidney disease; others = lupus nephritis (in group 1), contrast media nephropathy, transitional cell carcinoma (post-nephrectomy); iPTH = intact parathyroid hormone.

to be associated with the development of uraemic pruritus—including magnesium [13], iPTH [14], phosphate [12] and calcium [2]. We measured those parameters in this study in all patients before and after the studied intervention; there were no significant difference before and after acupuncture. Therefore, any effectiveness of acupuncture is not related to changes in magnesium, iPTH, phosphate or calcium.

The only complication of acupuncture in our study was elbow soreness, of which two patients in group 1 and one patient in group 2 complained. Their symptoms resolved spontaneously after 1 day. In addition, minimal bleeding induced by the acupuncture procedure was noted (in three patients in group 2, but none in group 1). This is a common occurrence in acupuncture, because non-visible vessels may be punctured accidentally. Every enrolled patient tolerated the procedure and finished the 1 month course of treatment.

Conclusions

Acupuncture at the single Quchi (LI11) acupoint for 1 h thrice weekly for 1 month is an easy, safe and

**Fig. 2.** The plot of mean pruritus scores before and after acupuncture and at the 3 month follow-up in groups 1 and 2.**Table 2.** Pruritus scores of the 40 patients before and after acupuncture and at the 3 month follow-up

	Before	After	At 3 months
Group 1 (n = 20)	38.2 ± 4.8	17.3 ± 5.5	16.5 ± 4.9
Group 2 (n = 20)	38.5 ± 3.2	37.5 ± 3.2	36.5 ± 4.6

Values are expressed as mean ± SD.

effective way to manage refractory uraemic pruritus in patients on haemodialysis.

Conflict of interest statement. None declared.

References

1. Urbonas A, Schwartz RA, Szepietowski JC. Uremic pruritus—an update. *Am J Nephrol* 2001; 21: 343–350
2. Kyriazis J, Glotsos J. Dialysate calcium concentration of ≤ 1.25 mmol/l: is it effective in suppressing uremic pruritus? *Nephron* 2000; 84: 85–86
3. Graf H, Kovarik J, Stummvoll HK *et al.* Disappearance of uremic pruritus after lowering dialysate magnesium concentration. *Br Med J* 1979; 2: 1478–1479
4. Bouton-Jones JM, Sisson JGP, Harrison ET. Itching in renal failure. *Lancet* 1974; 1: 355
5. Shapiro R, Stockard H. Successful treatment of uremic pruritus: the acupuncture approach revisited. *Dial Transplant* 2003; 32: 257–265
6. Duo LJ. Electrical needle therapy of uremic pruritus. *Nephron* 1987; 47: 179–183
7. Pauli-Magnus C, Mikus G, Alschner DM *et al.* Naltrexone does not relieve uremic pruritus: results of a randomized,

- double-blind, placebo-controlled crossover study. *J Am Soc Nephrol* 2000; 11: 514–519
8. Yosipovitch G, Zucker I, Boner G *et al.* A questionnaire for the assessment of pruritus: validation in uremic patients. *Acta Derm Venereol* 2001; 81:108–11
 9. Pomeranz BH. Brain opiates at work in acupuncture? *New Scientist* 1977; 6: 12–13
 10. Melzack R, Wall PD. Pain mechanism: a new theory. *Science* 1965; 150: 971–979
 11. Gao H, Zhang W, Wang Y. Acupuncture treatment for 34 cases of uremic cutaneous pruritus. *J Tradit Chin Med* 2002; 22: 29–30
 12. Hiroshige K, Kuroiwa A. Uremic pruritus. *Int J Artif Org* 1996; 19: 265–267
 13. Akizawa T, Suzuki M, Akiba T, Nishizawa Y, Kurokawa K. Clinical effects of maxacalcitol on secondary hyperparathyroidism of uremic patients. *Am J Kidney Dis* 2001; 38 [4 Suppl 1]: S147–S151

Received for publication: 4.2.05
Accepted in revised form: 19.4.05