

# BMJ Open Acupuncture for urinary incontinence after stroke: a protocol for systematic review

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## ABSTRACT

**Introduction:** The aim of this study, which will include randomised controlled trials (RCTs), is to assess the efficacy and safety of acupuncture for patients with stroke and urinary incontinence.

**Methods and analysis:** RCTs will be searched electronically in the MEDLINE, EMBASE, Cochrane CENTRAL, CINAHL and four Chinese medical databases from their inception to present. Manual retrieval will also be conducted. RCTs will be included if acupuncture was evaluated as the sole or adjunct treatment for patients with stroke and urinary incontinence. The primary outcome will be measured by using the pad-weighting test. The secondary outcomes will include urination diary, bladder capacity, clinical symptom scores, the number of patients healed completely in trial follow-up period and adverse events. The study selection, data extraction and evaluation of study quality will be performed independently by two researchers. The methodological quality of the included trials will be assessed by using the Cochrane risk-of-bias criteria and the Standards for Reporting Interventions in Controlled Trials of Acupuncture (STRICTA) checklist.

**Dissemination:** This systematic review will assess the current evidence of acupuncture treatment for patients with stroke and urinary incontinence. The findings of this study will be published through a peer-reviewed journal and presented at a relevant conference.

**Trial registration number:** CRD42014015611.

## INTRODUCTION

Urinary incontinence (UI) is defined by the International Continence Society (ICS) as involuntary leakage of urine, which causes hygienic or social problems.<sup>1</sup> It is often classified as stress UI (SUI), urgency UI (UUI) and mixed UI (MUI).<sup>2</sup> SUI differs from UUI. It is defined as an involuntary leakage from the urethra when the abdominal pressure is raised. However, UUI occurs with a sudden sensation of the need to urinate, and then followed by immediate leakage of a large volume of urine.<sup>3</sup> MUI is a combination of the both.

UI affects 32–79% of patients hospitalised for stroke,<sup>4–6</sup> 25% of patients at hospital discharge and 15% of patients after 1 year.<sup>7</sup> A report indicated that the more severe the stroke, the greater the likelihood of UI.<sup>8</sup> In addition, the risk factors of UI include older age, female sex, speech difficulties, motor weakness, visual field defects and cognitive impairment.<sup>9</sup>

Acupuncture is defined as the stimulation of specific acupuncture points, or acupoints, on the skin of the body by using thin disposable needles.<sup>10</sup> When performed by qualified acupuncturists, it often has an excellent safety profile, with rare serious adverse events.<sup>11–12</sup> Acupuncture is often used for treating various conditions such as neck pain,<sup>13</sup> knee pain,<sup>14</sup> stroke rehabilitation<sup>15</sup> and UI.<sup>16</sup>

Acupuncture has thousands of years of history to treat diseases. According to the theory of traditional Chinese medicine, UI is mainly resulted from kidneys' *qi* deficiency, which often causes bladder dysfunction to control urine. Thus, the objective of acupuncture is to reinforce *qi* of kidneys and promote the bladder function recovery. Currently, acupuncture as a popular intervention is used to treat patients with stroke and UI.<sup>17–18</sup> Its efficacy and safety have been assessed in several randomised controlled trials (RCTs).<sup>17–18</sup> One study found that electroacupuncture (EA) could significantly alleviate UI and increase bladder capacity of patients with stroke, which had better efficacy than indwelling catheter therapy.<sup>17</sup> The other study concluded that EA could lower the severity of UI and improve clinical symptoms of micturition in patients with stroke.<sup>18</sup>

Previous systematic reviews found limited results supporting acupuncture as an effective treatment method for UI.<sup>19–21</sup> However, only two studies specifically focused on the acupuncture for UI after stroke.<sup>19–20</sup> Moreover, both studies failed to search and include Chinese databases, and most

included RCTs that suffered from poor quality. This systematic review aims to update the previous systematic review and to further critically assess the efficacy and safety of acupuncture in the treatment of UI after stroke.

## Objectives

This study aims to include RCTs to evaluate the efficacy and safety of acupuncture intervention for UI after stroke.

## METHODS

### Study registration

Our systematic review protocol is registered in PROSPERO 2014 (CRD42014015611; <http://www.crd.york.ac.uk/PROSPERO/>). This manuscript is reported according to the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) statement guidelines.<sup>22</sup>

### Criteria for considering studies for this review

#### Type of studies

All RCTs except cluster randomised trials and crossover studies that compared acupuncture with either sham acupuncture or non-acupuncture intervention in patients with stroke and UI will be included in the review.

#### Type of participants

Patients diagnosed with UI<sup>23</sup> after stroke will be the focus of the review, without restrictions on age, sex or race.

#### Types of interventions

Any type of acupuncture therapy (as the sole treatment or a significant adjunct (reflects the efficacy and safety of acupuncture) to other treatments), such as EA, manual acupuncture used in an experimental group will be included. Control interventions with either sham acupuncture or no acupuncture treatment will also be included. Studies with the following comparisons will be included:

Acupuncture compared with either a sham acupuncture or a non-acupuncture intervention;

Acupuncture plus other interventions (non-acupuncture) compared with other treatments (the same as the acupuncture group);

In this study, significant adjunct will be defined as the acupuncture plus other non-acupuncture interventions versus other non-acupuncture interventions (the same as the previous treatments), which can reflect the efficacy and safety of acupuncture, but it does not reflect the efficacy of acupuncture combined with other interventions.

#### Types of outcome measures

##### Primary outcomes

The primary outcome will be measured by using the pad-weighting test.<sup>24 25</sup> This test is a non-invasive method

of detecting and quantifying severity of urine leakage. The 4th International Consultation on Incontinence defined pad testing as ‘an optional test for evaluation of urinary incontinence’.<sup>1 25</sup>

### Secondary outcomes

The secondary outcomes will be measured through urination diary, bladder capacity, clinical symptom scores, the number of patients healed completely in trial follow-up period and adverse events.

### Search methods for identification of studies

#### Electronic searches

The following eight databases will be searched from their inception to present: MEDLINE, EMBASE, Cochrane CENTRAL, CINAHL, the Chinese Biomedical Literature Database, the China National Knowledge Infrastructure, VIP Information and Wanfang Data. The search terms will consist of three parts: stroke (eg, ‘stroke’, ‘apoplexy’ or ‘cerebral vascular’), UI (eg, ‘urinary incontinence’, ‘urinary tract’ or ‘urination disorders’ or ‘urinary bladder’) and acupuncture (eg, ‘acupuncture’, or ‘manual acupuncture’, or ‘electroacupuncture’, or ‘scalp acupuncture’). The words to be used in the search in the Chinese databases have the same meaning as those used in the English databases. The search strategy for CENTRAL is shown in [table 1](#).

#### Searching other resources

The reference lists of previously published reviews related to UI after stroke and acupuncture will be manually searched to avoid missing eligible trials, such as

**Table 1** Search strategy used in CENTRAL database

Number	Search terms
1	MeSH descriptor: [stroke] explode all trees
2	((apoplexy*) or (cerebro next vascular*) or (cerebral*)):ti, ab, kw
3	or 1–2
4	MeSH descriptor: [urinary incontinence] explode all trees
5	((urinary tract) or (urination disorders) or (urinary bladder*)):ti, ab, kw
6	or 4–5
7	MeSH descriptor: [acupuncture] explode all trees
8	MeSH descriptor: [acupuncture therapy] explode all trees
9	((manual acupuncture) or (manual next acupuncture*) or (electroacupuncture) or (electro next acupuncture*) or (scalp acupuncture*) or (scalp next acupuncture*)):ti, ab, kw
10	or 7–9
11	3 and 6 and 10

This search strategy will be modified as required for other electronic databases.

previous review published in journal *Experimental and Therapeutic Medicine* by Paik SH.<sup>19</sup>

## Data collection and analysis

### Selection of studies

Two reviewers (JY and NY) will independently screen the titles and abstracts of existing literature for potentially relevant studies according to the inclusion and exclusion criteria. The remaining studies will be read in full text after the exclusion of the duplicated and apparently irrelevant studies. Any disagreement will be discussed by consensus with a third reviewer (ZS). The primary selection process will be presented in the PRISMA flow diagram (figure 1).

### Data extraction

The following data will be independently extracted by the two review authors (JY and QZ) into a predefined data extraction sheet: first author, publication year, country of origin, characteristics of the participants, study size, randomisation, allocation concealment and blinding; acupuncture intervention, control intervention, main outcomes and adverse effects, follow-up,

withdrawals, conflicts of interest, and the Standards for Reporting Interventions in Controlled Trials of Acupuncture (STRICTA) checklist.

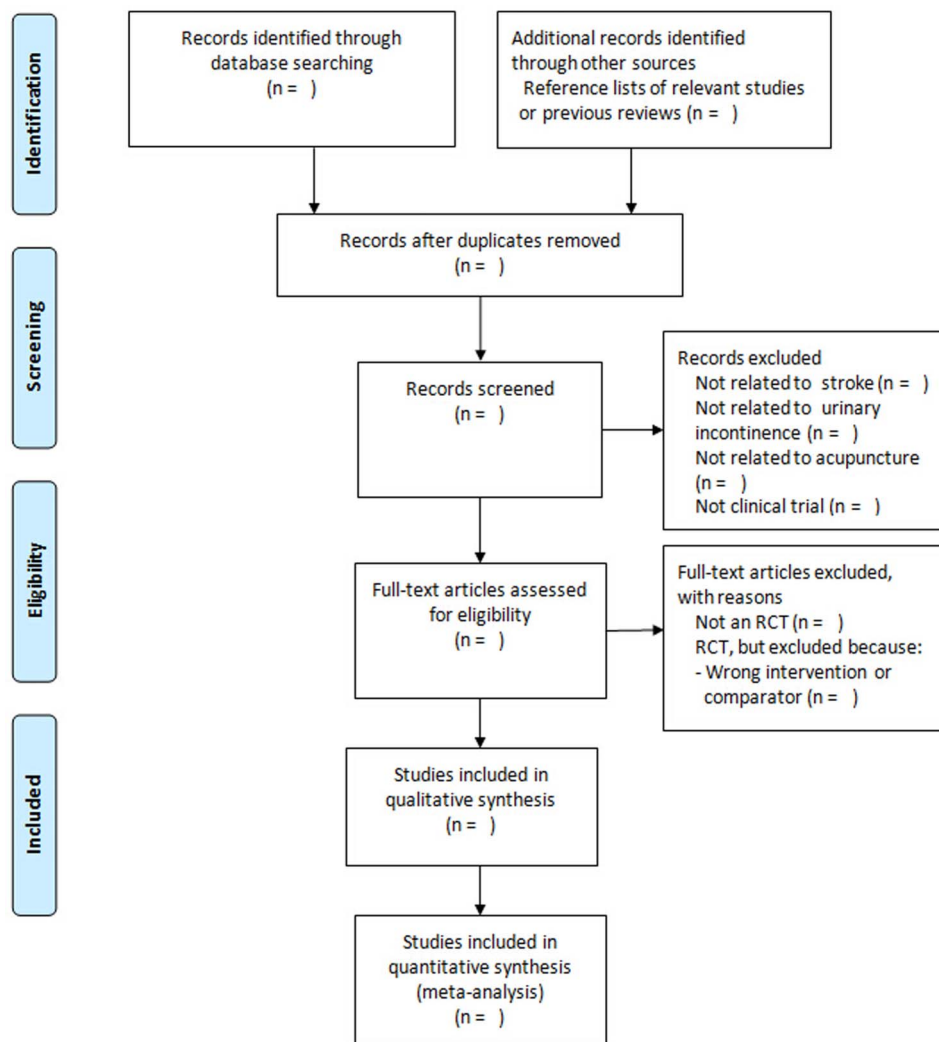
### Quality assessment

Quality assessment of each RCT will be independently conducted by the two reviewers (YH. and NY) by using the Cochrane Risk of Bias Tool<sup>26</sup> and completeness of STRICTA checklist. This tool addresses seven specific domains, including sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective outcome reporting and other issues (eg, extreme baseline imbalance).<sup>26</sup> All discrepancies will be resolved by discussion and consensus with the third author (SR).

### Measures of treatment effect

For continuous data (eg, pad-weighing test, urination diary, bladder capacity and clinical symptom scores), the mean difference (MD) with the corresponding 95% CIs will be used. Other forms of data will be changed into MD values. In addition, if it is necessary, we will use

**Figure 1** Flow diagram of the trial selection process. RCT, randomised controlled trial.



standardised mean differences (SMDs). For dichotomous data (eg, the number of patients healed completely in trial follow-up period and adverse events), we will use risk ratio (RR) with the corresponding 95% CIs. Other dichotomous data will be converted into RR values.

### Unit of analysis issues

Cluster-randomised trials and crossover studies will not be included because of the lack of an appropriate design for these research objectives. If more than one acupuncture arms are reported, we will carry out multiple meta-analyses using one treatment arm, respectively. If multiple non-acupuncture control groups are used, we will combine all control group results and carry out pooled analyses of all control groups against the intervention group. If there are multiple assessment time points in a study, we will only pool data from one time point that is closest to the other included studies.

### Missing data

Whenever possible, we will request the corresponding author for missing data mainly regarding the primary outcomes. If the missing data cannot be obtained, we will exclude such studies and only analyse the available data and address the potential impact of missing data in the discussion.

### Assessment of heterogeneity

If it is possible, the random-effects or fixed-effects model will be used in the meta-analysis. The statistical heterogeneity in each meta-analysis will be investigated by using the  $I^2$  and  $\chi^2$  tests.<sup>27</sup> If trials are homogenous (ie,  $I^2 \leq 50\%$ , the cut-off point for our  $I^2$  statistics),<sup>28</sup> the fixed-effects model will be used to pool the data. Otherwise, the random-effects model will be used. If the heterogeneity remains significant, we will consider a subgroup analysis and a meta-regression to locate the heterogeneity sources. If it still does not work out, then the findings will be discussed as a narrative summary.

### Assessment of reporting biases

Funnel plots will be constructed to evaluate the publication bias, if the studies included are sufficient (at least 10 trials).<sup>29</sup>

### Data synthesis

We will use Review Manager V.5.3 (Review Manager (RevMan); Computer program, Version 5.3, Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014; <http://tech.cochrane.org/revman>) in our meta-analysis. We will calculate the RR with the 95% CIs for the dichotomous data and SMD with the 95% CIs for the continuous data. Where outcome data are measured by using different scales, SMD will be used.<sup>30</sup> Otherwise, for the data measured on the same scale and for which the same units are used, the weighted mean differences (WMDs) will be used. If heterogeneity is not high ( $I^2 \leq 50\%$ ), the RR,

WMD or SMD will be calculated by using the fixed-effects model. Otherwise, the random-effects model will be used. If it is not possible to conduct any meta-analysis, the results will be reported as the narrative description.

### Subgroup analysis

A subgroup analysis will be performed based on the type of acupuncture, type of control and different outcomes.

### Sensitivity analysis

A sensitivity analysis will be performed to evaluate the robustness of our results by removing the impact of high risk of bias if heterogeneity remains after subgroup analysis. The meta-analysis will be repeated after the trials with high risk of bias are excluded. In addition, we will also assess whether the statistical model (random-effects vs fixed-effects model) will affect the results.

## DISCUSSION

To the best of our knowledge, our study will be the first systematic review and meta-analysis to evaluate the efficacy and safety of acupuncture in the treatment of UI after stroke. The results of this study will provide a summary of the current evidence related to the efficacy and safety of acupuncture in patients with UI after stroke. The evidence will provide important information and will also benefit practitioners, patients and health policy-makers, as well as the future research regarding the use of acupuncture.

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