Cochrane Library

Cochrane Database of Systematic Reviews

Acupuncture for vascular dementia (Review)

Peng W, Wang Y, Zhang Y, Liang CM

Peng W, Wang Y, Zhang Y, Liang CM.
Acupuncture for vascular dementia.
Cochrane Database of Systematic Reviews 2007, Issue 2. Art. No.: CD004987.
DOI: 10.1002/14651858.CD004987.pub2.

www.cochranelibrary.com

WILEY

TABLE OF CONTENTS

[Intervention Review]

Acupuncture for vascular dementia

Weina Peng[1], Yang Wang[1], Yan Zhang[1], Cui Mei Liang[1]

[1]Department of Acupuncture and Moxibustion, Guang An Men Hospital, China Academy of Chinese Medical Sciences, Beijing, China

Contact: Weina Peng, Department of Acupuncture and Moxibustion, Guang An Men Hospital, China Academy of Chinese Medical Sciences, No. 5, Bei Xian Ge Street, Beijing, 100053, China. wnpeng@hotmail.com.

Editorial group: Cochrane Dementia and Cognitive Improvement Group.
Publication status and date: Edited (no change to conclusions), published in Issue 5, 2012.

Citation: Peng W, Wang Y, Zhang Y, Liang CM. Acupuncture for vascular dementia. *Cochrane Database of Systematic Reviews* 2007, Issue 2. Art. No.: CD004987. DOI: 10.1002/14651858.CD004987.pub2.

ABSTRACT

Background

Dementia is a widespread condition characterized by acquired global impairment of intellect, memory and personality, but without impairment of consciousness. There is no definitive treatment for vascular dementia. Acupuncture is an ancient Chinese method that has been used for the prevention and treatment of diseases over three-thousand years. Many kinds of acupuncture methods such as body acupuncture, scalp acupuncture and electroacupuncture are in use for the treatment of vascular dementia in hospitals in China. Body acupuncture and electroacupuncture are the most commonly used.

Objectives

To assess the efficacy and possible adverse effects of acupuncture therapy for treating vascular dementia.

Search methods

We searched ALOIS, the Cochrane Dementia and Cognitive Improvement Group Specialized Register, on 24 January 2011 using the terms and tags created for records of studies in dementia using acupuncture. ALOIS contains records of clinical trials identified from monthly searches of a number of major healthcare databases, numerous trial registries and grey literature sources.

In addition, the Allied and Complementary Medicine Database was searched and the web was searched using the search engine Copernic.

Selection criteria

Randomized controlled trials (RCTs) testing acupuncture therapy in the treatment of vascular dementia were eligible for inclusion, regardless of language and publication type. Studies with inadequate randomisation were excluded.

Studies were excluded if participants were receiving any treatment for their vascular dementia other than the acupuncture intervention or control treatment.

Data collection and analysis

Studies were selected for inclusion and data were extracted by two review authors working independently.
Comparisons were made between patients treated with acupuncture and controls, on an intention-to-treat basis where possible. If possible, data from different trials were pooled and overall estimates of the treatment difference were calculated. Weighted or standardised mean differences or odds ratios were used, as appropriate.

Main results

In the absence of any suitable randomized placebo-controlled trials in this area, we were unable to perform a meta-analysis.

Authors' conclusions

The effectiveness of acupuncture for vascular dementia is uncertain. More evidence is required to show that vascular dementia can be treated effectively by acupuncture. There are no RCTs and high quality trials are few. Randomized double-blind placebo-controlled trials are urgently needed.

PLAIN LANGUAGE SUMMARY

Acupuncture to treat vascular dementia

There is no evidence from randomized controlled trials to determine whether acupuncture provides any effect when treating people with vascular dementia. Acupuncture is used to treat vascular dementia, but because no randomized controlled trials of acupuncture versus placebo were found its efficacy and safety could not be analysed in this review. There is a need for randomized placebo-controlled trials of acupuncture for people with vascular dementia.

BACKGROUND

Dementia is a widespread condition characterized by acquired global impairment of intellect, memory and personality, but not impairment of consciousness. The prevalence of moderate and severe dementia is approximately 5% in people aged 65 years and over (Jorm 1987; Williams 2003). Vascular dementia is defined as loss of cognitive function resulting from ischaemic, hypoperfusive, or haemorrhagic brain lesions due to cerebrovascular disease or cardiovascular pathology (Roman 2003). The frequency varies depending on the study population, screening methodology, diagnostic criteria, and time period (Gorelick 1994). In the United States and Europe it is generally believed that vascular dementia is the second leading cause (10% to 20% of cases) (Udea 1992) of progressive and irreversible dementia, while Alzheimer's disease is the leading cause (50% to 60% of cases). However, in many Asian and developing countries, researchers have found the opposite (Tian 1997). In China, vascular dementia accounts for more than 68% of the total number of people aged over 65 years with dementia (Huang 1998).The causes of death are complications of dementia, cardiovascular disease, and miscellaneous causes, including malignancy (Roman 2003).

The average duration of vascular dementia is five years, the survival rate being much lower than for patients with Alzheimer's disease (Hebert 1995). The risk of vascular dementia has been examined with respect to age, gender, race and ethnicity (Gorelick 1997), education level (Gorelick 1993; Tatemichi 1992), genetic factors (Bousser 1994; Slooter 1997), atherogenic risk factors (Desmond 1993; Gorelick 1997; Skoog 1998; Yoshitake 1995), stoke-related factors (Charletta 1995; Tatemichi 1993), periventricular white matter lesions (Gorelick 1997; Pantoni 1997), silent cerebral infarcts (Gorelick 1997; Meyer 1994), heart rhythm abnormalities (Skoog 1998), and other factors (Lindsay 1997; Skoog 1998). Among these factors age, hypertension, genetic factors, and stroke-related characteristics are the only well documented risk factors for vascular dementia at present (Gorelick 1997).

A set of eight vascular dementia subgroups has been established by Loeb and Meyer (Loeb 1996):
(1) multi-infarct dementias;
(2) strategically placed infarctions causing dementia;
(3) multiple subcortical lacunar lesions;
(4) Binswanger's disease;
(5) mixtures of two or more of the above vascular dementia subtypes;
(6) haemorrhagic lesions causing dementia;
(7) subcortical dementias due to cerebral autosomally dominant arteriolopathy with subcortical infarcts and leuko-encephalopathy (CADASIL);
(8) mixtures of Alzheimer's disease and vascular dementia.

The neuropathologic substrate of vascular dementia in relation to subcortical white matter changes, either focal infarcts or widespread diffuse changes, which has been emphasized (Erkinjuntii 1996). It is believed that these lesions may be an important cause of vascular dementia (Nyenhuis 1998).

Neuropsychological research on vascular dementia has attempted to define the pattern of cognitive impairments and to compare it with the patterns of other dementia syndromes (Benthem 1997; Bogdanoff 1997; Starkstein 1996; Villardita 1993). However, much of this work has been difficult to replicate (Gfeller 1991; Metter 1993). Neuropathologic findings show that patients with vascular dementia demonstrate more psychiatric impairment, which differs in different ethnic groups (Sultzer 1993), including more behavioural retardation, depression, and anxiety.

Treatment

So far there is no definitive medical or surgical treatment for vascular dementia. Most of the current approaches to treatment focus on the mobilization of remaining cognitive and functional capacities as well as the possible prevention of further disease progression. The aim of therapy is to optimize patients' autonomy, activities of daily living, and quality of life. The prevention of stroke is also an important aim, to prevent further morbidity and mortality in patients with vascular dementia (Gorelick 1994).

In the field of medication, drugs with well-proven effects are still lacking. There are many kinds of Chinese herbal medicines, such as Yizhi capsule, and self-made decoctions are used for treating vascular dementia in China (Libin 2011; Shihao 2010; Taixiang 2005) but there is no firm conclusions about their effectiveness.

Acupuncture for vascular dementia

Acupuncture is an ancient Chinese method which has been used for both the prevention and treatment of diseases for over 3000 years (Ulett 1998). It is becoming increasingly popular in high-income countries as a therapy for a wide variety of disorders, most of which are chronic and difficult to manage with conventional treatments (Helene 2001). At the same time, its mechanism of action remains uncertain (Lo 2003). In Traditional Chinese Medicine, the general principles of acupuncture treatment include regulating the Yin and Yang, strengthening body resistance and eliminating pathogenic factors, and distinguishing the primary physical and pathological factors from the secondary ones (Lu 2000). In recent years many reports have shown that acupuncture has effects on the pituitary gland and adrenal cortex system, the sympathetic nervous and adrenal medulla system, the pituitary gland and thyroid gland system, and the posterior pituitary system (Lu 2000).

Many kinds of acupuncture methods, such as body acupuncture, scalp acupuncture and electroacupuncture, are in use for the treatment of vascular dementia in hospitals in China. Body acupuncture is a generalised term for acupuncture and is in common use with reference to acupuncture therapy. It means treating disease by applying acupuncture to points along the channels of the human body. Scalp acupuncture is a therapeutic method for treating diseases associated with the nervous system by using acupuncture needles along the surface of the head. Electroacupuncture is a therapeutic method combining acupuncture with electrical stimulation. Acupuncture therapy combined with medication is also used. Body acupuncture and electroacupuncture are the most commonly used techniques. However, the effectiveness and side-effects of acupuncture for vascular dementia have not been systematically reviewed.

OBJECTIVES

To assess the efficacy and possible adverse effects of acupuncture therapy for treating vascular dementia.

METHODS

Criteria for considering studies for this review

Types of studies

Randomized controlled trials testing acupuncture therapy in the treatment of vascular dementia were eligible for inclusion, regardless of language and publication type. Studies with inadequate randomization were excluded.

Studies were excluded if participants were receiving any treatment for their vascular dementia other than the acupuncture intervention or control treatment.

Types of participants

Participants of any age, sex, or ethnicity with a diagnosis of vascular dementia according to accepted criteria (such as Alzheimer's Disease Diagnostic and Treatment Centers (ADDTC); National Institute of Neurological Disorders and Stroke–Association Internationale pour la Recherche et l'Enseignement en Neurosciences (NINDS-AIREN); Statistical Classification of Diseases, 10th Revision (ICD-10); and Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)) were eligible for inclusion. Participants living in their own homes or in residential care settings, and accessed through hospital inpatient or outpatient departments, were eligible for inclusion. If studies also included participants with other forms of dementia, then they could only be included if the patients with vascular dementia were reported separately.

Types of interventions

Research comparing any type of acupuncture therapy with placebo or no intervention was considered. Acupuncture therapy could mean body acupuncture, scalp acupuncture or electroacupuncture.
If sham (placebo) acupuncture was used, this would be defined as the needling of non-acupuncture points without needle manipulation, done either proximally or distally, or both, to the true acupuncture.

Types of outcome measures

1. Cognitive function
2. Activities of daily living
3. Behaviour
4. Quality of life
5. Mood
6. Safety as measured by incidence and severity of adverse effects

Search methods for identification of studies

Electronic searches

We searched ALOIS (www.medicine.ox.ac.uk/alois), the Cochrane Dementia and Cognitive Improvement Group Specialized Register, on 24 January 2011. The search terms used were: acupuncture, ACU.

ALOIS is a study-based register and is maintained by the Trials Search Co-ordinator for the Cochrane Dementia and Cognitive Improvement Group (CDCIG). It contains studies in the areas of dementia prevention, dementia treatment, and cognitive enhancement in healthy people.

The studies are identified from the following.

1. Monthly searches of a number of major healthcare databases: MEDLINE, EMBASE, CINAHL, PsycINFO, and LILACS.
2. Monthly searches of a number of trial registers: ISRCTN; UMIN (Japan's Trial Register); the WHO portal (which covers ClinicalTrials.gov; ISRCTN; the Chinese Clinical Trials Register; the German Clinical Trials Register; the Iranian Registry of Clinical Trials; the Netherlands National Trials Register; plus others).
3. Quarterly search of the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*).
4. Six-monthly searches of a number of grey literature sources: ISI Web of Knowledge Conference Proceedings; Index to Theses; Australasian Digital Theses.

To view a list of all sources searched for ALOIS see About ALOIS on the ALOIS website.

Details of the search strategies used for the retrieval of reports of trials from the healthcare databases, CENTRAL and conference proceedings can be viewed in the 'methods used in reviews' section within the editorial information about the Dementia and Cognitive Improvement Group.

Additional searches were performed in many of the sources listed above to cover the timeframe from the last searches performed for ALOIS to ensure that the search for the review was as up-to-date and as comprehensive as possible. The search strategies used can be seen in Appendix 1.

The latest search (January 2011) retrieved a total of 274 results. After a first assessment and de-duplication of these results the authors were left with 39 references to further assess.

Searching other resources

1. AMED (Allied and Complementary Medicine Database) (1985 to 2005/07), using the term: acupunct* And dement*.

2. Copernic, the super search engine, using the terms: acupuncture dementia.

3. Handsearches
The following journals published in Chinese were searched: Chinese Acupuncture and moxibustion (1981 to 2003), Journal of Clinical Acupuncture and Moxibustion (1985 to 2003), Journal of Traditional Chinese Medicine (1960 to 2003), New Journal of Traditional Chinese Medicine (1969 to 2003), Shanghai Journal of Acupuncture and Moxibustion (1982 to 2003), Research of Acupuncture and Moxibustion (1976 to 2003). Conference proceedings in Chinese that were relevant to this topic were also handsearched.

4. References from published studies
These were checked for further trials.

Data collection and analysis

Selection of studies

Titles and abstracts identified from the searches were checked by two review authors (YW and CL). If it was clear that the study did not refer to a randomized controlled trial in vascular dementia, it was excluded. If it was not clear from the abstract and title, then the

full text of the study was obtained for an independent assessment by two review authors (YW and YZ). The review authors decided whether trials fitted the inclusion criteria. Any disagreement was resolved by discussion between the authors, with referral to a third review author (WP) if necessary. Excluded studies were listed and reasons for exclusion were stated.

Assessment of risk of bias in included studies

The following three areas were to be addressed, since there is some evidence that these are associated with biased estimates of treatment effect (Juni 2001):
a) randomisation (method of generation and concealment of allocation);
b) masking (blinding of observers and participants to the treatment allocation);
c) loss to follow-up (presence of dropouts and withdrawals, and the analysis of these).

The quality assessment was to include an evaluation of the following components for each included study. Each component was categorised as 'Adequate', 'Unclear', or 'Inadequate'. The randomization criteria were as suggested by Juni 2001.

- Randomization (allocation generation) - adequate when the allocation sequence protects against biased allocation to the comparison groups.
- Randomization (allocation concealment) - adequate when clinicians and participants are unaware of future allocations.
- Masking - adequate when the outcome assessor is unaware of the allocation.
- Loss to follow-up - adequate when more than 80% of participants are followed up, then analyzed in the groups to which they were originally randomized (intention to treat).

A description of the quality of each study was given based on a summary of these components. Studies with adequate information were included and studies with inadequate information were excluded. If there was insufficient information to rate risk of bias items, then study authors were contacted for further information.

Data extraction and management

This was to be performed by two review authors (YW and YZ), who independently entered data onto a data extraction form. Discrepancies were to be resolved by a third review author (WP). Missing data were to be obtained from authors by e-mail or phone call. Data were to be checked and entered into RevMan by two review authors (YW and CL).

Data were to be extracted from the published reports. The summary statistics for continuous data required for each trial and each outcome were the mean change from baseline, the standard error of the mean change, and the number of patients for each treatment group at each assessment. Where changes from baseline were not reported, the mean, standard deviation, and the number of patients for each treatment group at each time point were to be extracted, if available.

The outcomes measured in clinical trials of dementia and cognitive impairment often arise from ordinal rating scales. Where the rating scales used in the trials had a reasonably large number of categories (more than 10) the intention was that data would be treated as continuous outcomes arising from a normal distribution.

For binary data the numbers in each treatment group and the numbers experiencing the outcome of interest were to be sought.

The baseline assessment was defined as the latest available assessment prior to randomization, but no longer than two months prior.

For each outcome measure, data were to be sought on every patient randomized. To allow an intention-to-treat analysis, the data were to be sought irrespective of compliance, whether or not the patient was subsequently deemed ineligible or otherwise excluded from treatment or follow-up. If intention-to-treat data were not available in the publications, 'on-treatment' or the data of those who completed the trial were to be sought and indicated as such.

Measures of treatment effect

Meta-analysis requires the combination of data from trials that may not use the same rating scale to assess an outcome. The measure of the treatment difference for any outcome would be the weighted mean difference when the pooled trials use the same rating scale or test, and the standardised mean difference, which is the absolute mean difference divided by the standard deviation, when they used different rating scales or tests.

For binary outcomes, such as clinical improvement or no clinical improvement, the odds ratio was to be used to measure treatment effect. A weighted estimate of the typical treatment effect across trials was to be calculated.

Unit of analysis issues

In studies where a cross-over design was used, only data from the first treatment phase after randomization were eligible for inclusion.

Assessment of heterogeneity

Heterogeneity was to be assessed using the I^2 statistic.

Data synthesis

Duration of trials may vary considerably. If the range was considered too great to combine all trials into one meta-analysis, trials with similar durations would be grouped together and a separate meta-analysis would be conducted for each duration of treatment. Some trials might contribute data to more than one time period if multiple assessments were done. Data that had been recorded after treatment of less than two weeks would be considered as reflecting short-term benefit. This would be analyzed separately from data that had been recorded for over a period of one month, which reflects a reasonable minimal time period to capture some aspect of disease chronicity.

Overall estimates of the treatment difference were to be presented. In all cases the overall estimate from a fixed-effect model would be presented and a test for heterogeneity using an I^2 statistic would be performed. If, however, there was evidence of heterogeneity of the treatment effect between trials then either only homogeneous results would be pooled or a random-effects model would be used (in which case the confidence intervals would be broader than those of a fixed-effect model).

Studies relating to adverse effects were to be described qualitatively.

Subgroup analysis and investigation of heterogeneity

Subgroup analysis would be performed where adequate information was given in included studies. The subgroups would be body acupuncture, scalp acupuncture, and electroacupuncture.

Sensitivity analysis

Sensitivity analyses were intended to examine the effects of excluding those studies with lower methodological quality. If there are adequate number of studies, we will conduct a sensitivity analysis to check the robustness of the conclusions.

Assessment of reporting biases

If enough studies were found, then potential reporting biases would be investigated using the funnel plot or other analytical methods according to Egger 1997

RESULTS

Description of studies

Results of the search

CDCIG searches found 32 studies and the authors retrieved 120 studies by electronic searching and handsearches up to December 2008. Excluding duplicate publications, 146 different studies were identified. All of the studies except nine were published in Chinese. Authors of studies which lacked information about trial design and procedure were contacted.

A further CDCIG search found 39 studies (from Jan 2009 to Jan 2011). Excluding duplicate publications, 35 different studies were identified.

Included studies

None of the trials met the requirements for inclusion in this review.

Excluded studies

Only 28 studies out of 181 trials were RCTs of acupuncture for vascular dementia. All of them were excluded upon further scrutiny. (Table 1)

The reasons for exclusion were as follows.
1) Twenty-one studies used inadequate control methods: the control group of 14 studies received some type of Western medicine including aniracetam capsules (Lai 1997; Zhou 2008), nimodipine (Chen 2000; Liu 2008), dihydroergotoxine (DHET) (Li 2001a), hydergine (Jiang 1998; Zhao 2000; Wang 2007a; Yu 2007), low molecular weight dextran plus composite Salvia injection (Liu 2004), huperzine A tablets (Cao 2007; Wang 2008), abu nidal plus hydergine (Wang 2007), duxil (Liu 2008a); two studies compared acupuncture plus duxil with duxil (Chu 2008; Li 2008); one study (Wang 2007c) compared acupuncture plus Xinkang capsules with Xinkang capsules; two studies divided participants into three groups comparing acupuncture with acupuncture plus nimodipine (Zhang 2008) or Xinnaojing drip (Peng 2008) and the same medicine; two studies were comparisons of two acupuncture methods (Yu 2006; Huang 2007).

2) Four studies were inadequately randomized, using allocation by entry sequence (Liu 1997; Lai 1998; Gao 2001) or the drawing of lots (Lun 2003).

3) Three studies had inadequate control methods and inadequate randomization: two of them compared acupuncture with duxil and used inadequate methods of allocation concealment (Liu 2007; Niu 2007), the other compared acupuncture plus cerebrolysin via intravenous drip with the same medicine and allocated treatment by entry sequence (Wang 2007b).

Risk of bias in included studies

We did not identify any suitable trials for inclusion.

Effects of interventions

In the absence of any suitable randomized placebo-controlled trials in this area, we were unable to perform a meta-analysis.

DISCUSSION

Methodological limitations of trials

1) Twenty-eight studies mentioned randomization, but just two described the randomization procedure and allocation concealment in detail. Both of these were adequately randomized, using block randomization (Yu 2007) and computer randomization (Zhang 2008). Authors of the remaining 26 studies were asked to describe their methods of randomization and allocation. E-mail and telephone correspondence with the authors revealed that 15 studies used adequate randomization and seven studies did not. The authors of final four studies could not be contacted.

Methods of sequence generation used in the additional 15 adequately randomized studies were: random number table randomization (Zhao 2000; Liu 2004; Huang 2007; Wang 2007a; Wang 2007c;Chu 2008; Liu 2008; Li 2008; Liu 2008a; Wang 2008), computer randomization (Lai 1997; Jiang 1998; Chen 2000; Yu 2006) and block randomization (Li 2001a). All of these studies used adequate allocation concealment.

Problems with randomization in the seven studies where this was judged inadequate were: pseudo-random allocation by entry sequence (Liu 1997; Lai 1998; Gao 2001; Wang 2007b) and inadequate allocation concealment (Lun 2003; Liu 2007; Niu 2007).

Only one study report (Yu 2006) mentioned blinding of participants and data analysts. By contacting authors we found that data analysts were blinded in a further 21 studies.

2) Twenty-four studies used methods with uncertain efficacy as controls. The various control interventions used are listed above under 'Excluded studies'. None of these interventions has convincing evidence of efficacy, making it impossible to draw conclusions about the efficacy of acupuncture. For example, it is possible that these 'control' interventions made patients worse than a placebo would have done, thereby leading to an apparent treatment effect. Placebo or no intervention would have been an appropriate control. Sixteen studies compared acupuncture with drug treatment.

Four studies compared acupuncture plus a drug treatment (duxil (Chu 2008; Li 2008), intravenous cerebrolysin (Wang 2007b), Xinkiang (Wang 2007c)) with acupuncture alone. It is difficult to

assess the efficacy of acupuncture if acupuncture is combined with drugs in the intervention group. An interaction between drugs and acupuncture is possible.

Two studies had both of the above limitations, by dividing participants into three groups: acupuncture, drug (nimodipine (Zhang 2008), Xinnaojing drip (Peng 2008)) and acupuncture plus drug.

The final two studies (Yu 2006; Huang 2007) compared two acupuncture methods.

3) None of the studies used comprehensive sets of outcome measures. Quality of life and mood are absent. Only one of the studies (Zhang 2008) mentioned adverse events or side effects. It described only one participant experiencing dizziness and nausea, which resolved shortly after removal of the needles.

4)The number of participants in individual studies is generally low, ranging from 10 to 82 patients. That cannot give powerful evidence on the effectiveness of acupuncture for vascular dementia.

AUTHORS' CONCLUSIONS

Implications for practice

There is currently no evidence available from sufficiently high quality randomized controlled trials (RCTs) to allow assessment of the efficacy of acupuncture in the treatment of vascular dementia.

Implications for research

Although acupuncture is widely used to treat vascular dementia in China, and many relevant clinical studies were completed and published, true RCTs and high quality trials are non-existent. Randomised double-blind controlled trials are urgently needed. It is important to design trials with placebo and no intervention as control interventions in acupuncture clinical trials.
Outcome measures that include cognition, behaviour, quality of life, activities of daily living and mood outcomes should be evaluated. Adverse events should be critically assessed by standardized monitoring and more attention should be paid to the possible long-term adverse effects of acupuncture.

ACKNOWLEDGEMENTS

We thank Associate Professor Wu Taixiang, the Chinese Cochrane Centre, International Clinical Epidemiology Training Center, the Cochrane Dementia and Cognitive Improvement Group, who were of invaluable help throughout the review. We are most grateful to them for their advice and support.

REFERENCES

References to studies excluded from this review

Cao 2007 *{published data only}*

Cao JM, Bi QL, Zhao JW. Clinical observation of the treatment of vascular dementia by 'xing nao hua tan' acupuncture. *Henan Traditional Chinese Medicine* September 2007;**27**(9):29-30.

Chen 2000 *{published data only}*

Chen Zhenhu, Jiang Ganghui, Lai Xinsheng. Observation of clinical effect of electroacupuncture on vascular dementia. *Journal of Clinical Acupuncture and Moxibustion.* 2000;**16**(12):18-20.

Chu 2008 *{published data only}*

Chu JM, Bao YH, Zou C. Effect of long-time retention of scalp needle on the abilities of cognition, daily living activity and P300 in vascular dementia patients. *Acupuncture Research* 2008;**33**(5):334-8.

Gao 2001 *{published data only}*

Gao H, Yan L, Liu B, Wang Y, Wei X, Sun L, Cui H. Clinical study on treatment of senile vascular dementia by acupuncture. *Journal of Traditional Chinese Medicine* 2001;**21**(2):103-9.

Huang 2007 *{published data only}*

Huang Y, Lai XS, Tang AW. Comparative study of the specificities of needling acupoints DU20, DU26 and HT7 in intervening vascular dementia in different areas in the brain on the basis of scale assessment and cerebral functional imaging. *Chinese Journal of Integrative Medicine* June 2007;**13(2)**:103-108.

Jiang 1998 *{published data only}*

Jiang G, Lai X, Mo F. Effect of electoacupuncture on vascular dementia. *Journal of Guangzhou University of TCM* 1998;**15**(2):110-3.

Lai 1997 *{published data only}*

Lai XS. [Observation on curative effects of senile vascular dementia treated by acupuncture]. *Chinese Acupuncture and Moxibustion* 1997;**17**(4):201-2.

Lai 1998 *{published data only}*

Lai X, Mo F, Jiang G. [Observation of clinical effect of acupuncture on vascular dementia and its influence on superoxide dismutase, lipid peroxide and nitric oxide]. *Zhongguo zhong xi yi jie he za zhi Zhongguo Zhongxiyi jiehe zazhi; Chinese Journal of Integrated Traditional and Western Medicine. Zhongguo Zhong xi yi jie he xue hui, Zhongguo Zhong yi yan jiu yuan zhu ban* 1998;**18**(11):648-51.

Li 2001a *{published data only}*

Li JQ, Mo FZ, Lai XS, et al. Effect of electroacupuncture and dihydroergotoxine on patients with vascular dementia. *Chinese Journal of Rehabilitation Theory and Practice* 2001;**7**(2):73-5.

Li 2008 *{published data only}*

Li ZP. Clinical observation on treatment of vascular dementia with tongue acupuncture principally. *Journal of Clinical Acupuncture and Moxibustion* 2008;**24**(7):29-30.

Liu 1997 *{published data only}*

Liu HA, Hou DF, Diao ZY, Wang Y. [Observation on the clinical curative effects of turbit clearing and intelligence-improving acupuncture therapy on vascular dementia and the study onits mechanisms]. *Chinese Acupuncture and Moxibustion* 1997;**17**(9):521-5.

Liu 2004 *{published data only}*

Liu Q, Tang L, He J. Effects of acupuncture on hemorheology, blood lipid content and nail fold microcirculation in multiple infarct dementia patients. *Journal of Traditional Chinese Medicine* 2004;**24**(3):219-23.

Liu 2007 *{published data only}*

Liu ZB, Niu WM. Observation on therapeutic effect of puncturing with needles in alignment at the hairline region on vascular dementia. *Zhongguo Zhen Jiu* 2007;**27**(6):412-4.

Liu 2008 *{published data only}*

Liu YC, Zhang HX, Chen GH, Wu WL, Hu JJ, Wan WJ, Ma CY. Therapeutic effects of scalp-acupuncture in patients with vascular dementia induced by cerebral infarction: a randomized controlled trial. *Zhong Xi Yi Jie He Xue Bao* 2008;**6**(8):806-9.

Liu 2008a *{published data only}*

Liu ZB, Niu WM, Yang XH, Niu XM. Clinical investigation on electroacupuncture treatment of vascular dementia with 'Xiusanzhen'. *Zhen Ci Yan Jiu* 2008;**33**(2):131-4.

Lun 2003 *{published data only}*

Lun X, Rong L, Yang WH. [Observation on efficacy of CT positioning scalp circum-needling combined with Chinese herbal medicine in treating poly-infarctional vascular dementia]. *Zhongguo zhong xi yi jie he za zhi Zhongguo Zhongxiyi jiehe zazhi; Chinese Journal of Integrated Traditional and Western Medicine. Zhongguo Zhong xi yi jie he xue hui, Zhongguo Zhong yi yan jiu yuan zhu ban* 2003;**23**(6):423-5.

Niu 2007 *{published data only}*

Niu WM, Liu HY. Clinical study of treatment of vascular dementia with lasting scalp acupunture. *Shanghai Zhen Jiu* October 2007;**26**(10):4-5.

Peng 2008 *{published data only}*

Peng CL, Qing LH. The influence of acupuncture combine with medicine about MMSE, ADL of MID patient. *Clinical Journal of Traditional Chinese Medicine* 2008;**20**(4):394-5.

Wang 2007 *{published data only}*

Wang HM. Observation of clinical effect of electroacupuncture on vascular dementia. *Tianjin Journal of Traditional Chinese Medicine* 2007;**24**(3):218-20.

Wang 2007a *{published data only}*

Wang LC, Zhang YL, Jin D, Guo JK, Zhang LC. Investigation of vascular dementia treated by head-acupoint. *Hebei Zhongyi* October 2007;**29**(10):293-6.

Wang 2007b *{published data only}*

Wang CX. Clinical effects observations on 30 cases of VD by 'Xing Nao Tiao Shen' acupuncture method. *Zhongguo Zhongyi Jizheng* 2007;**16**(7):789-90.

Wang 2007c *{published data only}*

Wang JM, Wang MP, Du J, Cai J, Yu ZY, Zheng JX. Clinical research on effect of acupuncture and Kangxin capsule in treating 'shen xu xue yu xing' vascular dementia. *Chinese Journal of Integrative Medicine on Cardio-cerebrovascular Disease* 2007;**5**(5):398-9.

Wang 2008 *{published data only}*

Wang LC, Chen YY, Liu HY, Wang ZY, Lu Z, Wang RY. Clinical study on the influence of cluster needling on scalp point about changes of intelligences and CGRP content of MID Patient. *Chinese Journal of Information on TCM* January 2008;**15**(1):14-6.

Yu 2006 *{published data only}*

Yu JC, Zhang XZ, Liu CZ, Meng YC, Han JX. Effect of acupuncture treatment on vascular dementia. *Neurological research* January 2006;**28**:97-103.

Yu 2007 *{published data only}*

Yu T, Shi JW, Han JX. Clinical observation about treatment of mild and moderate vascular dementia with acupuncture. *Liaoning Zhong Yi Za Zhi* 2007;**34**:978-80.

Zhang 2008 *{published data only}*

Zhang H, Zhao L, Liu J, He CQ, Hu KM. RCT research on scalp electric acupuncture improving cognition function of vascular dementia patients. *Journal of Chengdu University of TCM* 2008;**31**(3):9-12.

Zhao 2000 *{published data only}*

Zhao Jianxin, Tian Yuanxiang, Cheng Yingwu, et al. Clinical observation on treating vascular dementia with kidney - Supplementing & Mind - Clearing Acupuncture Method.. *Hebei Journal of TCM* 2000;**22**(11):844-6.

Zhou 2008 *{published data only}*

Zhou T, Yang J. Clinical observation of puncturing with needles in allied Jingxue on vascular dementia. *China Practice Medicine* May 2008;**13**(15):123-5.

Additional references

Benthem 1997

Benthem PW, Jone S, Hodegs JR. A compairison of semantic memory in vascular dementia and dementia of the Alzheimer type. *International Journal of Geriatric Psychiatry* 1997;**12**:575-80.

Bogdanoff 1997

Bogdanoff B, Gitlin H, Notman L. Neuropsychological comparisons between subjects with ischaemic vascular dementia, Parkinson's disease and Alzheimer's disease. *Neurology* 1997;**48**:A231-2.

Bousser 1994

Bousser MG, Tournier-Lasserve E. Summary of the proceedings of the First International Workshop on CADASIL. *Stroke* 1994;**25**:704-7.

Charletta 1995

Charletta D, Gorelick PB, Dollear T. CT and MRI findings among African Americans with Altheimer's disease, vascular dementia and stroke without dementia. *Neurology* 1995;**45**:1456-61.

Desmond 1993

Desmond DW, Tatemichi TK, Paik M, Stern Y. Risk factors for cerebrovascular disease as correlates of cognitive function in a stroke-free cohort. *Archives of Neurology* 1993;**50**:162-6.

Egger 1997

Egger M, Zellweger-Zähner T, Schneider M, Junker C, Lengeler C, Antes G. Language bias in randomised controlled trials published in English and German. *Lancet* 1997;**350**:326-29.

Erkinjuntii 1996

Erkinjuntii T, Benavente O, Eliasziw M. Diffuse vacuolization (spongiosis) and arteriosclerosis in the frontal white matter occurs in vascular dementia. *Archives of Neurology* 1996;**53**:325-32.

Gfeller 1991

Gfeller JD, Rankin EJ. The WAIS-R profile as a cognitive marker of Alzheimer's disease: A misguided venture?. *Journal of Clinical and Experimental Neuropsychology* 1991;**13**:629-36.

Gorelick 1993

Gorelick PB, Brody JA, Cohen DC. Risk factors for dementia associated with multiple cerebral infarcrs: A case-control analysis in predominantly African American hospital-based patients. *Archives of Neurology* 1993;**50**:714-20.

Gorelick 1994

Gorelick PB, Roman G, Mangoe CA. Vascular dementia. In: Gorelick PB, Alter MA editor(s). Handbook of Neuroepidemiology. New York: Marcel Dekker, 1994:197-214.

Gorelick 1997

Gorelick PB. Status of risk factors for dementia associated with stroke. *Stroke* 1997;**28**:459-63.

Hebert 1995

Hebert R, Brayne C. Epidemiologiy of vascular dementia. *Neuroepidemiology* 1995;**14**(5):240-57.

Helene 2001

Helene M, David L. Mechanical signaling through connective tissue: a mechanism for the therapeutic effect of acupuncture. *The FASEB Journal* 2001;**15**:2275-82.

Huang 1998

Hongli Huang, Baojian Chen, Hao Zhou. Vascular Dementia. *Base Medicine and Clinic* 1998;**18**(5):26-30.

Jorm 1987

Jorm AF, Koerten AE, Henderson AS. The Prevalence of dementia: a quantitative integration of the literature. *Acta Psychiatrica Scandinavica* 1987;**76**(5):465-79.

Juni 2001

Juni P, Altman DG, Egger M. Assessing the quality of controlled clinical trials. *BMJ* 2001;**323**:42-6.

Lindsay 1997

Lindsay J, Hebert R, Rockwood K. The Canadian Study of Health and Aging: Risk factors for vascular dementia. *Stroke* 1997;**28**:526-30.

Lo 2003

Lo YL, Cui SL. Acupuncture and the modulation of cortical excitability. *Neuroreport.* 2003;**14**(9):1229-31. [MEDLINE: 12824765]

Loeb 1996

Loeb C, Meyer JS. Vascular dementia: still a debatable entity?. *Journal of Neurological Sciences* 1996;**143**(1-2):31-40. [MEDLINE: 8981295]

Lu 2000

Lu JP, Cui YL, Shi RH. Chinese Acupuncture and Moxibustion. In: Zhang EQ editor(s). A Practical English-Chinese Library of Traditional Chinese Medicine. 8. ShangHai: Unknown, 2000:21-39, 428-31.

Metter 1993

Metter EJ, Wilson RS. Vascular dementia. In: Parks RW, Zec RF, Wilson RS editor(s). Neuropsychology of Alzheimer's Disease and Other Dementias. New York: Oxford University Press, 1993:416-37.

Meyer 1994

Meyer JS, Takashima S, Obara K. 'Silent cerebrovascular lesions occur among elderly normal volunteers besides patients with previous symptomatic strokes. *Journal of Stroke and Cerebrovascular Disease* 1994;**4**:229-34.

Nyenhuis 1998

Nyenhuis DL, Gorelick PB. Vascular dementia: a contemporary review of epidemiology, diagnosis, prevention, and treatment. *American Geriatrics Society* 1998;**46**:1437-48.

Pantoni 1997

Pantoni L, Garcia JH. Pathogenesis of leukoaraiosis: A review. *Stroke* 1997;**28**:652-9.

Roman 2003

Roman GC. Vascular dementia: distinguishing characteristics, treatment, and prevention. *Journal of the American Geriatrics Society* 2003;**51 Suppl 2**(5):296-304.

Skoog 1998

Skoog I. Status of risk factors for vascular dementia. *Neuroepidemiology* 1998;**17**:2-9.

Slooter 1997

Slooter AJC, Tang M-X, van Duijn CM. Apolipoprotein E ¦Å4 and the risk of dementia with stroke. *A population-based investigation* 1997;**277**:818-21.

Starkstein 1996

Starkstein SE, Sabe L, Vazquez S. Neuropsychological, psychiatric, and cerebral blood flow findings in vascular dementia and Alzheimer's disease. *Stroke* 1996;**27**:408-14.

Sultzer 1993

Sultzer DL, Levin HS, Mahler. A comparison of psychiatric symptoms in vascular dementia and Alzheimer's disease. *American Journal of Psychiatry* 1993;**150**:1806-12.

Taixiang 2005

Taixiang W, Qingpu L. Yizhi capsule for vascular dementia. *Cochrane Database of Systematic Reviews* 2005, Issue 3. Art. No.: CD005382.. [DOI: 10.1002/14651858.CD005382]

Tatemichi 1992

Tatemichi TK, Desmond DW, Mayeux R. Dementia after stroke: Baseline frequency, risks, and clinical features in a hospitalized cohort. *Neurology* 1992;**42**:1185-93.

Tatemichi 1993

Tatemichi TK, Desmond DW, Paik M. Clinical determinants of dementia related to stroke. *Annals of Neurology* 1993;**33**:568-75.

Tian 1997

Tian J, Wang Y, Haworth J, Wilcock G. Investgation of vascular dementia. *Journal of Beijing University of TCM* 1997;**20**(4):2-7.

Udea 1992

Udea K, Hasuo Y, Fujishima M. Prevalence and etiology of dementia in a Japanese community. *Stroke* 1992;**23**:798-803.

Ulett 1998

Ulett GA, Han S, Han JS. Electroacupuncture: mechanisms and clinical application. *Biological Psychiatry* 1998;**44**(2):129-38. [MEDLINE: 9646895]

Villardita 1993

Villardita C. Alzheimer's disease compared with cerebrovascular dementia: Neuropsychological similarities and differences. *Acta Neurologica Scandinavica* 1993;**87**:299-308.

Williams 2003

Rands G, Orrel M, Spector A. Aspirin for vascular dementia. *Cochrane Database of Systematic Reviews* 2000, Issue 4. Art. No.: CD001296.. [DOI: 10.1002/14651858.CD001296]

Yoshitake 1995

Yoshitake T, Kiyohara Y, Yato I. Incidence and risk factors of vascular dementia and Alzheimer's disease in a defined elderly Japanese population: The Hisayama Study. *Neurology* 1995;**45**:1161-8.

References to other published versions of this review

Libin 2011

Libin Hou. Observation of self-made decoction for vascular dementia. *Chinese Journal of Integrative Medicine on Cardio-/Cerebrovascular Disease* 2011;**9**(2).

Peng 2007

Peng WN, Zhao H, Liu ZS, Wang S. Acupuncture for vascular dementia. *Cochrane Database of Systematic Reviews* 2007, Issue 2. [DOI: 10.1002/14651858.CD004987.pub2]

Shihao 2010

Shihao Shen. Yiqi Huoxue Xingnao Decoction for vascular dementia: a randomized controlled trial. *Journal of Traditional Chinese Medicine* 2010;**S2**.

CHARACTERISTICS OF STUDIES

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Cao 2007	Acupuncture but versus a huperzine A tablets control.
Chen 2000	Electroacupuncture but versus a nimodipine control.
Chu 2008	Intervention is scalp acupuncture plus duxil versus a control using duxil.
Gao 2001	Inadequately randomized and control uses piracetam.
Huang 2007	Intervention is acupuncture at certain acupoints versus acupuncture at different acupoints.
Jiang 1998	Intervention is electroacupuncture but versus a control using hydergine.
Lai 1997	Intervention is electroacupuncture but versus a control using aniracetam.
Lai 1998	Intervention is electroacupuncture versus a control using acupuncture but participants were randomized inadequately according to entry sequence.
Li 2001a	Intervention is electroacupuncture versus a control using dihydroergotoxine (DHET).
Li 2008	Intervention is tongue acupuncture plus duxil versus a control using duxil.
Liu 1997	It is inadequately randomized since participants are chosen according to entry sequence. Intervention is acupuncture at certain acupoints versus acupuncture at different acupoints.
Liu 2004	Intervention is acupuncture but versus a control using low molecular weight dextran.
Liu 2007	Inadequately randomized and control uses duxil.
Liu 2008	Intervention is scalp acupuncture but versus a control using nimodipine.
Liu 2008a	Intervention is Xiusanzhen acupuncture but versus a control using duxil.
Lun 2003	This was inadequately randomized and without allocation concealment. The control group used a Chinese herbal medicine which was also present in the intervention.
Niu 2007	Inadequately randomized and control uses duxil.
Peng 2008	Participants were randomly divided into 3 groups, namely the use of acupuncture, acupuncture plus Xingnaojing drip as well as Xingnaojing drip.
Wang 2007	Intervention is electroacupuncture but versus a control using abu nidal plus hydergine.

Study	Reason for exclusion
Wang 2007a	Intervention is scalp acupuncture but versus a control using hydergine.
Wang 2007b	Intervention is acupuncture plus cerebrolysin via intravenous drip versus a control using the same west medicine only but participants were randomized inadequately according to entry sequence.
Wang 2007c	Intervention is acupuncture plus Chinese medicine versus a control using the same Chinese medicine only.
Wang 2008	Intervention is scalp acupuncture but versus a control using huperzine A tablets.
Yu 2006	Intervention is acupuncture at certain acupoints versus acupuncture at different acupoints.
Yu 2007	Acupuncture but versus a hydergine control.
Zhang 2008	Participants were randomly divided into 3 groups, namely the use of electroacupuncture, electroacupuncture plus nimodipine as well as nimodipine.
Zhao 2000	Intervention was electroacupuncture but versus a control using hydergine.
Zhou 2008	Acupuncture but versus an aniracetam control.

ADDITIONAL TABLES

Table 1. Excluded studies: further trial information

Study name	Participants and Methods	Interventions	Outcomes	Reported results
Cao 2007	120 participants with VD were randomly allocated by a computer to equal size groups	Acupuncture (N=60) versus a control group treated with huperzine A tablets (N=60)	MMSE, ADL	MMSE (treatment effect = 3.90, 95% CI 2.25 to 5.55, P<0.00001); ADL (treatment effect = -4.40, 95% CI -6.99 to -1.81, P = 0.0009)
Chen 2000	46 participants with VD were randomly allocated by a computer	Electroacupuncture (N=23) versus a control group treated with nimodipine (N=23)	HDS	A reported improvement from baseline on the HDS. Change from baseline scores: treatment effect = 3.76, 95% CI 1.04 to 13.65, P=0.04
Chu 2008	65 participants with VD were randomly allocated using a random number table	Scalp acupuncture plus duxil (N=33) versus a control group treated with duxil (N=32)	MMSE, HDS, ADL	MMSE (treatment effect =2.14 95% CI 0.19 to 4.09, P = 0.03); HDS (treatment effect =1.83 95% CI -0.25 to 3.91, P = 0.09); ADL (treatment effect = -7.18, 95% CI -12.75 to -1.61, P = 0.01)
Gao 2001	63 participants with VD were pseudo-randomized using entry sequence	Acupuncture (N=31) versus a control using piracetam	HDS, SOD, LPO	HDS (treatment effect = 3.22, 95% CI 0.17 to 6.27, P = 0.04); SOD (treatment effect = 5.01, 95% CI 2.01 to 8.01, p = 0.001); LPO (treatment effect = -0.70, 95% CI -1.5 to 0.10, P = 0.09)
Huang 2007	50 participants with VD were randomly allocated using a	Routine acupuncture plus Baihui (N=10) versus routine acupuncture plus	MMSE, ADL, FAQ	$MMSE_1$(treatment effect =-5.48 95% CI -9.36 to -1.60, P=0.006); ADL_1(treat-

Table 1. Excluded studies: further trial information *(Continued)*

	random number table	Shuigou (N=10) versus routine acupuncture plus Shenmen (N=10) versus routine acupuncture plus Baihui plus Shuigou plus Shuigou (N=10) versus routine acupuncture (N=10) Note: Labelled from 1 to 4 are the results from the previous four groups compared with routine acupuncture respectively.		ment effect =0.05 95% CI -4.19 to 4.29, P=0.98); FAQ_1(treatment effect =3.28 95% CI -1.51 to 8.07, P=0.18); $MMSE_2$(treatment effect =-1.51 95% CI -4.83 to 1.81, P=0.37); ADL_2(treatment effect =-0.18 95% CI -3.84 to 3.48, P=0.92); FAQ_2(treatment effect =0.32 95% CI -4.48 to 5.12, P=0.90); $MMSE_3$(treatment effect =-1.99 95% CI -6.15 to 2.17, P=0.35); ADL_3(treatment effect =0.40 95% CI -3.32 to 4.12, P=0.83); FAQ_3(treatment effect =2.66 95% CI -1.94 to 7.26, P=0.26); $MMSE_4$(treatment effect =-2.28 95% CI -5.41 to 0.85, P=0.15); ADL_4(treatment effect =0.03 95% CI -3.70 to 3.76, P=0.99); FAQ_4(treatment effect =2.05 95% CI-3.12 to 7.22, P=0.44)
Jiang 1998	66 participants with VD were randomly allocated by a computer	Electroacupuncture (N=33) versus a control using hydergine (N=33)	HDS, FAQ, LPO, SOD, NO	HDS (treatment effect = 5.10, 95% CI 1.47 to 8.73, P = 0.006); FAQ (treatment effect = -2.12, 95% CI -5.11 to 0.87, P = 0.16); LPO (treatment effect = -1.19, 95% CI -2.04 to -0.34, P = 0.006); SOD (treatment effect = 9.02, 95% CI 1.20 to 16.84, p = 0.02); NO (treatment effect = -0.23, 95% CI -0.36 to -0.10, P = 0.0004)
Lai 1997	60 participants with VD were randomly allocated by a computer	Electroacupuncture (N=30) versus a control using aniracetam (N=30)	HDS	A reported improvement from baseline on the HDS. Change from baseline scores: treatment effect = 3.76, 95% CI 1.04 to 13.65, P=0.04
Lai 1998	46 participants with VD were pseudo-randomized using entry sequence	Electroacupuncture (N=23) versus a control using acupuncture (N=23)	HDS, FAQ, SOD, LPO, NO	HDS (treatment effect = 5.82, 95% CI 1.15 to 10.49, P = 0.01); FAQ (treatment effect = -2.13, 95% CI -5.62 to 1.36, P = 0.23); SOD (treatment effect = 189.20, 95% CI 26.30 to 352.10, P = 0.02); LPO (treatment effect = -1.27, 95% CI -2.24 to -0.30, P = 0.01); NO (treatment effect = -0.20, 95% CI -0.36 to -0.04, P = 0.01)
Li 2001a	68 participants with VD were randomly allocated using block randomization	Electroacupuncture (N=34) versus a control using dihydroergotoxine (DHET) (N=34)	HDS, FAQ, ADL	HDS (treatment effect = 6.73, 95% CI 3.74 to 9.72, P < 0.001); FAQ (treatment effect = -0.55, 95% CI -3.18 to 2.08, P = 0.68); ADL (treatment effect = 5.45, 95% CI -7.00 to 17.90, P = 0.39)
Li 2008	78 participants with VD were randomly allocated using a random number table	Tongue acupuncture plus duxil (N=40) versus a control using duxil (N=38)	HDS, MMSE	HDS (treatment effect = 1.97, 95% CI 0.20 to 3.74, P = 0.03); MMSE (treatment effect = 0.57, 95% CI -1.62 to 2.76, P = 0.61)
Liu 1997	100 participants with VD were pseu-	Acupuncture at designated acupoints (N=50)	HDS, FAQ	HDS (treatment effect = 2.56, 95% CI 0.13 to 4.99, P = 0.04); FAQ (treatment

Table 1. Excluded studies: further trial information *(Continued)*

	do-randomized using entry sequence	versus control using acupuncture at designated different acupoints (N=50)		effect = -2.24, 95% CI -4.42 to 0.06, P = 0.04)
Liu 2004	76 participants with VD were randomly allocated using a random number table	Acupuncture (N=38) versus a control using low molecular weight dextran (N=38)	HDS, FAQ	HDS (treatment effect = 5.26, 95% CI 3.43 to 7.09, P < 0.00001); FAQ (treatment effect = -7.05, 95% CI -10.55 to -3.55, P < 0.0001)
Liu 2007	120 participants with VD were randomised using a random number table but allocation concealment was not applied	Acupuncture (N=60) versus a control using duxil (N=60)	HDS, MMSE, FAQ, NFD	HDS (treatment effect = 1.04, 95% CI -0.38 to 2.46, P = 0.15); MMSE (treatment effect = 0.68, 95% CI -1.25 to 2.61, P = 0.49); FAQ (treatment effect = -1.03, 95% CI -2.79 to 0.73, P = 0.25); NFD (treatment effect = -1.78, 95% CI -4.28 to 0.72, P = 0.16)
Liu 2008	108 participants with VD were randomly allocated using a random number table	Scalp acupuncture (N=47) The reason of 7 dropout in this group is noncompliance with acupuncture. A control using nimodipine (N=45) The reason of 9 dropout in this group is noncompliance with medicine.	MMSE, BDS, HDS, ADL	MMSE (treatment effect = -0.29, 95% CI -1.96 to 1.38, P = 0.73); BDS (treatment effect = -0.09, 95% CI -1.94 to 1.76, P = 0.92); HDS (treatment effect = -0.11, 95% CI -2.48 to 2.26, p = 0.93); ADL (treatment effect = -1.23, 95% CI -10.24 to 7.78, P = 0.79)
Liu 2008a	60 participants with VD were randomly allocated using a random number table	Acupuncture (N=30) versus a control using duxil (N=30)	HDS, MMSE, FAQ	HDS (treatment effect = 1.04, 95% CI -0.97 to 3.05, p = 0.31); MMSE (treatment effect = 0.68, 95% CI -2.05 to 3.41, p = 0.63); FAQ (treatment effect = -1.03, 95% CI -3.51 to 1.45, p = 0.42)
Lun 2003	89 participants with VD were randomized using the drawing of lots but allocation concealment was not applied	Scalp acupuncture using electricity plus a Chinese herbal medicine (N=57) versus a control using the same Chinese herbal medicine only (N=32)	HDS	HDS (treatment effect =2.04, 95% CI -0.91 to 4.99, P = 0.17)
Niu 2007	60 participants with VD were randomized using a random number table but allocation concealment was not applied	Scalp acupuncture (N=30) versus a control using duxil (N=30)	HDS, NFD	HDS (treatment effect =0.89 95% CI -1.12 to 2.90, P = 0.38); NFD (treatment effect =-1.78 95% CI -5.32 to 1.76, P = 0.32)
Peng 2008	122 participants with VD were randomly allocated us-	Acupuncture (N=40) versus acupuncture plus XingNaoJing drip (N=34)	MMSE, ADL	$MMSE_1$ (treatment effect = 1.92, 95% CI 1.05 to 2.79, P < 0.0001); ADL_1 (treatment effect = 20.68, 95% CI 14.96 to 26.40, P < 0.00001);

Table 1. Excluded studies: further trial information *(Continued)*

	ing a random number table	versus a control using XingnNaoJing drip(N=48) Note: Labelled 1 and 2 are the results from the previous two groups compared with the last group respectively.		$MMSE_2$ (treatment effect = 0.53, 95% CI -0.58 to 1.64, P = 0.35); ADL_2 (treatment effect = 27.44, 95% CI 20.83 to 34.05, P < 0.00001)
Wang 2007	64 participants with VD were randomly allocated using a random number table	Electroacupuncture (N=32) versus a control using abu nidal plus hydergine (N=32)	ADL, MMSE	ADL (treatment effect = 3.75, 95% CI -0.10 to 7.60, P = 0.06); MMSE(treatment effect = 1.33, 95% CI 0.19 to 2.47, P = 0.02)
Wang 2007a	60 participants with VD were randomly allocated by a random number table	Scalpa cupuncture (N=30) versus a control using hydergine (N=30)	MMSE, ADL	MMSE (treatment effect = 5.00, 95% CI 3.19 to 6.81, P < 0.00001); ADL (treatment effect = -4.43, 95% CI -11.28 to 2.42, P = 0.20)
Wang 2007b	60 participants with VD were pseudo-randomized using entry sequence	Acupuncture plus cerebrolysin via intravenous drip (N=30) versus a control using cerebrolysin via intravenous drip (N=30)	HDS, ADL	HDS (treatment effect = 2.24, 95% CI -0.12 to 4.60, P = 0.06); ADL (treatment effect = 10.72, 95% CI 3.82 to 17.62, P = 0.002)
Wang 2007c	60 participants with VD were randomly allocated using a random number table	Acupuncture plus Xinkang capsule (N=30) versus Xinkang capsule (N=30)	MMSE, ADL	MMSE (treatment effect = 1.63, 95% CI 0.84 to 2.42, P < 0.0001); ADL (treatment effect = -0.12, 95% CI -5.17 to 4.93, P = 0.96)
Wang 2008	60 participants with VD were randomly allocated using a random number table	Acupuncture (N=30) versus a control using huperzine A tablets (N=30)	HDS, ADL, MMSE	HDS (treatment effect = 3.84, 95% CI 1.94 to 5.74, P < 0.0001); ADL (treatment effect = 10.58, 95% CI 7.97 to 13.19, P < 0.00001); MMSE (treatment effect = 5.31, 95% CI 2.33 to 8.29, P = 0.0005)
Yu 2006	60 participants with VD were randomly allocated by a computer	Special acupuncture plus routine acupuncture (N=30) versus routine acupuncture (N=30)	MMSE, HDS, ADL	MMSE (treatment effect = 1.56, 95% CI -2.15 to 5.27, P = 0.41); HDS (treatment effect = 2.25, 95% CI -0.59 to 5.09, P = 0.12); ADL (treatment effect = -1.50, 95% CI 9.80 to 6.80, P = 0.72)
Yu 2007	63 participants with VD were randomly allocated using block randomization	Acupuncture (N=32) The reason for 2 dropouts in this group is non-compliance with acupuncture. A control using hydergine (N=30) The reason for 1 dropout in this group is non-compliance with medicine.	MMSE, BBS	MMSE (treatment effect = 2.20, 95% CI 0.75 to 3.65, P = 0.003); BBS (treatment effect = -1.67, 95% CI -2.27 to -0.57, P = 0.003)

Table 1. Excluded studies: further trial information *(Continued)*

Zhang 2008	270 participants with VD were randomly allocated by a computer	29 are eliminated and 241 are analysed. Electroacupuncture (N=78) versus electroacupuncture plus nimodipine (N=82) versus a control using nimodipine (N=81) 13 dropout without reason or group. Note: Labelled 1 and 2 are the results from the previous two groups compared with the last group respectively.	MMSE	$MMSE_1$(treatment effect =3.41 95% CI 1.84 to 4.98, P < 0.0001); $MMSE_2$(treatment effect =3.85 95% CI 2.26 to 5.44, P < 0.00001)
Zhao 2000	68 participants with VD were randomly allocated using a random number table	Electroacupuncture (N=36) versus a control using hydergine (N=32)	MMSE, BDS	MMSE (treatment effect = 2.43, 95% CI 0.15 to 4.71, P = 0.04); BDS (treatment effect =-3.08, 95% CI -5.96 to -0.20, P = 0.04)
Zhou 2008	60 participants with VD were randomly allocated using block randomization	Acupuncture (N=30) versus a control using aniracetam (N=30)	HDS, FAQ, ADL	HDS (treatment effect = 2.10, 95% CI -0.15 to 4.35, P = 0.07); FAQ (treatment effect =0.16, 95% CI -2.31 to 2.63, P = 0.90); ADL (treatment effect =5.45, 95% CI -7.80 to 18.70, P = 0.42)

VD (vascular dementia), HDS (Hasegawa's Dementia Score), SOD (blood superoxide dismutase), LPO (lipid peroxides), MMSE (Mini Mental State Examination), ADL (Activities of Daily Living), FAQ (Functional Activity Questionnaire); NO (nitric oxide); GSH-PX (glutathione peroxidase); BDS (Blessed-Dementia-Scale)

APPENDICES

Appendix 1. Update search: January 2011

Source	Search strategy	Hits retrieved
1. ALOIS (www.medicine.ox.ac.uk/alois)	Keyword search: acupuncture OR ACU [no date restriction]	17
2. MEDLINE In-process and other non-indexed citations, and MEDLINE 1950 to present (Ovid SP)	1. exp Dementia/ 2. Delirium/ 3. Wernicke Encephalopathy/ 4. Delirium, Dementia, Amnestic, Cognitive Disorders/ 5. dement*.mp. 6. alzheimer*.mp.	29

(Continued)

	7. (lewy* adj2 bod*).mp. 8. deliri*.mp. 9. (chronic adj2 cerebrovascular).mp. 10. ("organic brain disease" or "organic brain syndrome").mp. 11. ("normal pressure hydrocephalus" and "shunt*").mp. 12. "benign senescent forgetfulness".mp. 13. (cerebr* adj2 deteriorat*).mp. 14. (cerebral* adj2 insufficient*).mp. 15. (pick* adj2 disease).mp. 16. (creutzfeldt or jcd or cjd).mp. 17. huntington*.mp. 18. binswanger*.mp. 19. korsako*.mp. 20. or/1-19 21. Acupuncture Therapy/ or Acupuncture/ or Acupuncture Points/ 22. acupunct*.ti,ab. 23. 21 or 22 24. 20 and 23 25. (2009* or 2010* or 2011*).ed. 26. 24 and 25	
3. EMBASE 1980 to 2011 week 3 (Ovid SP)	1. exp dementia/ 2. Lewy body/ 3. delirium/ 4. Wernicke encephalopathy/ 5. cognitive defect/ 6. dement*.mp. 7. alzheimer*.mp. 8. (lewy* adj2 bod*).mp. 9. deliri*.mp. 10. (chronic adj2 cerebrovascular).mp. 11. ("organic brain disease" or "organic brain syndrome").mp. 12. "supranuclear palsy".mp. 13. ("normal pressure hydrocephalus" and "shunt*").mp. 14. "benign senescent forgetfulness".mp.	89

(Continued)

	15. (cerebr* adj2 deteriorat*).mp.	
	16. (cerebral* adj2 insufficient*).mp.	
	17. (pick* adj2 disease).mp.	
	18. (creutzfeldt or jcd or cjd).mp.	
	19. huntington*.mp.	
	20. binswanger*.mp.	
	21. korsako*.mp.	
	22. CADASIL.mp.	
	23. or/1-22	
	24. ACUPUNCTURE/	
	25. (acupunct* or acupress*).ti,ab.	
	26. electroacupunct*.ti,ab.	
	27. or/24-26	
	28. 23 and 27	
	29. (2009* or 2010* or 2011*).em.	
	30. 28 and 29	
4. PsycINFO 1806 to February week 3 2011 (Ovid SP)	1. exp Dementia/ 2. exp Delirium/ 3. exp Huntingtons Disease/ 4. exp Kluver Bucy Syndrome/ 5. exp Wernickes Syndrome/ 6. exp Cognitive Impairment/ 7. dement*.mp. 8. alzheimer*.mp. 9. (lewy* adj2 bod*).mp. 10. deliri*.mp. 11. (chronic adj2 cerebrovascular).mp. 12. ("organic brain disease" or "organic brain syndrome").mp. 13. "supranuclear palsy".mp. 14. ("normal pressure hydrocephalus" and "shunt*").mp. 15. "benign senescent forgetfulness".mp. 16. (cerebr* adj2 deteriorat*).mp. 17. (cerebral* adj2 insufficient*).mp.	14

(Continued)

	18. (pick* adj2 disease).mp. 19. (creutzfeldt or jcd or cjd).mp. 20. huntington*.mp. 21. binswanger*.mp. 22. korsako*.mp. 23. ("parkinson* disease dementia" or PDD or "parkinson* dementia").mp. 24. or/1-23 25. exp Acupuncture/ 26. acupunct*.ti,ab. 27. acupress*.ti,ab. 28. electroacup*.ti,ab. 29. or/25-28 30. 24 and 29	
5. CINAHL (EBSCOhost)	S1 (MH "Dementia+") S2 (MH "Delirium") or (MH "Delirium, Dementia, Amnestic, Cognitive Disorders") S3 (MH "Wernicke's Encephalopathy") S4 TX dement* S5 TX alzheimer* S6 TX lewy* N2 bod* S7 TX deliri* S8 TX chronic N2 cerebrovascular S9 TX "organic brain disease" or "organic brain syndrome" S10 TX "normal pressure hydrocephalus" and "shunt*" S11 TX "benign senescent forgetfulness" S12 TX cerebr* N2 deteriorat* S13 TX cerebral* N2 insufficient* S14 TX pick* N2 disease S15 TX creutzfeldt or jcd or cjd S16 TX huntington* S17 TX binswanger* S18 TX korsako* S19 S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17 or S18	27

(Continued)

	S20 (MH "Acupuncture") OR (MH "Acupuncture, Ear") S21 TX Acupunct* S22 (MH "Electroacupuncture") S23 TX Electroacupunctur* S24 TX acupress* S25 S20 or S21 or S22 or S23 or S24 S26 S19 and S25 S27 EM 2008 S28 EM 2009 S29 EM 2010 S30 EM 2011 S31 S27 or S28 or S29 or S30 S32 S26 and S31	
6. ISI Web of Knowledge – all databases [includes: Web of Science (1945 to present); BIOSIS Previews (1926 to present); MEDLINE (1950 to present); Journal Citation Reports]	Topic=(dement* OR alzheimer* OR VAD OR ADD OR lewy OR DLB OR LBD OR "vascular cognitive impairment" OR VCI) AND Topic=(acupunct* OR acupress* OR "electro-acupunct*" OR electroacupuncture) AND Topic=(random* OR placebo* OR trial OR "double-blind*" OR "single-blind*") AND Year Published=(2009-2011)	22
7. LILACS (BIREME)	acupuncture OR acupressure OR electroacupuncture	47
8. CENTRAL (*The Cochrane Library*) (Issue 4 of 4, Oct 2010)	#1 MeSH descriptor Dementia explode all trees #2 MeSH descriptor Delirium, this term only #3 MeSH descriptor Wernicke Encephalopathy, this term only #4 MeSH descriptor Delirium, Dementia, Amnestic, Cognitive Disorders, this term only #5 dement* #6 alzheimer* #7 "lewy* bod*" #8 deliri* #9 "chronic cerebrovascular" #10 "organic brain disease" or "organic brain syndrome" #11 "normal pressure hydrocephalus" and "shunt*" #12 "benign senescent forgetfulness" #13 "cerebr* deteriorat*" #14 "cerebral* insufficient*"	19

(Continued)

#15 "pick* disease"

#16 creutzfeldt or jcd or cjd

#17 huntington*

#18 binswanger*

#19 korsako*

#20 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19)

#21 MeSH descriptor Acupuncture, this term only

#22 acupunct*

#23 acupress*

#24 electroacupunct*

#25 (#22 OR #23 OR #24)

#26 (#25 OR #21)

#27 (#26 AND #20)

#28 (#27), from 2008 to 2011

9. Clinicaltrials.gov (www.clinicaltrials.gov)	dementia OR VAD OR VCI OR vascular OR alzheimer OR alzheimer's | acupuncture OR acupressure OR electroacupuncture OR electro-acupuncture	6
10. ICTRP Search Portal (http://apps.who.int/trialsearch) [includes: Australian New Zealand Clinical Trials Registry; ClinicalTrilas.gov; ISRCTN; Chinese Clinical Trial Registry; Clinical Trials Registry – India; Clinical Research Information Service – Republic of Korea; German Clinical Trials Register; Iranian Registry of Clinical Trials; Japan Primary Registries Network; Pan African Clinical Trial Registry; Sri Lanka Clinical Trials Registry; The Netherlands National Trial Register]	Intervention: acupunture OR acupressure OR electroacupuncture OR electro-acupuncture AND condition: dementia OR vascular dementia AND recruitment status: ALL [no date restriction]	4
TOTAL before de-duplication		274
TOTAL after de-duplication and first assessment		39

WHAT'S NEW

Date	Event	Description
12 April 2012	Amended	Additional table linked to text.

HISTORY

Protocol first published: Issue 4, 2004
Review first published: Issue 2, 2007

Date	Event	Description
24 January 2011	New search has been performed	An update search was performed for this review on 24 January 2011
10 November 2010	Amended	spelling of author's name and address changed
10 November 2008	Amended	Sequence of authors changed
20 June 2008	Amended	Converted to new review format.
2 February 2007	New search has been performed	Update search run 2 February 2007; no new studies were found

CONTRIBUTIONS OF AUTHORS

- Weina Peng initiated and designed the study, drafted and updated the review. She unified differences of opinion, conducted quality assessment and statistical analyses.

- Yang Wang provided methodological perspectives, quality assessment, data extraction and updated the review.

- Yan Zhang provided methodological perspectives, quality assessment and data extraction.
- Cuimei Liang searched for trials, extracted and analysed data .

Co-ordinating editor: Rupert McShane.
Consumer editor: Zhilong Sun.

DECLARATIONS OF INTEREST

None known

SOURCES OF SUPPORT

Internal sources

- Department of Acupuncture and Moxibustion, Guang An Men Hospital, Chinese Academy of TCM, China.

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

*Acupuncture Therapy; Dementia, Vascular [*therapy]

MeSH check words

Humans