Moxibustion for Stroke Rehabilitation
Systematic Review

Myeong Soo Lee, PhD; Byung-Cheul Shin, OMD, PhD; Jong-In Kim, OMD, PhD;
Chang-ho Han, OMD, PhD; Edzard Ernst, MD, PhD, FMedSci, FRCP, FRCPEd

Background and Purpose—Positive effects of moxibustion for stroke rehabilitation may be seen in real clinical practice. Currently, no systematic reviews are available. The aim of this systematic review was to analyze the trial data on the effectiveness of moxibustion for stroke rehabilitation.

Methods—Fourteen databases were searched without language restriction. Randomized clinical trials were included if moxibustion was tested as the sole treatment or as an adjunct to other treatments for stroke rehabilitation.

Results—Nine randomized clinical trials met our inclusion criteria. Three randomized clinical trials reported favorable effects of moxibustion plus standard care on motor function versus standard care alone (N=142; standardized mean difference = 0.72; 95% confidence interval, 0.37 to 1.08; P<0.0001). Three randomized clinical trials compared the effects of moxibustion on activities of daily living alone but failed to show favorable effects of moxibustion.

Conclusion—This systematic review found limited effectiveness of moxibustion as an adjunct to standard care in stroke rehabilitation. (Stroke. 2010;41:00-00.)

Key Words: moxibustion ■ stroke ■ rehabilitation ■ systematic review ■ meta-analysis

One recent survey indicated that 46% of stroke patients used some form of complementary alternative medicine, such as herbal medicine, acupuncture, or chiropractic care.1 Another complementary alternative medicine option is moxibustion, a traditional Chinese method that uses the heat generated by burning herbal preparations containing Artemisia vulgaris to stimulate acupuncture points. In East Asian countries, moxibustion is popular for stroke rehabilitation. However, to date, no systematic review of this topic is available. It was therefore the aim of this systematic review to summarize and critically evaluate the evidence for or against the effectiveness of moxibustion during stroke rehabilitation.

Methods
The following databases were searched from their inception through November 2009: MEDLINE, AMED, EMBASE, CINAHL, Psyclnfo, The Cochrane Library, 6 Korean medical databases (KSI, DBPIA, KISTEP, KRISS, KoreaMed, and the Korean National Assembly Library), Chinese medical database (CNKI), and the Japanese medical database (J-Stage). The search terms used were as follows: (moxibustion OR Moxa) AND (stroke OR apoplexy OR cva OR cerebrovascular attack OR cerebrovascular accident OR cerebrovascular* OR cerebral infarction OR cerebral hemorrhage OR cerebral*). In addition, our own files, Focus on Alternative and Complementary Therapies, Forschende Komplementarmedizin, and 12 major Korean traditional medicine journals were manually searched.

Randomized controlled trials (RCTs) were included if moxibustion was tested as the sole treatment or as an adjunct to other treatments during stroke rehabilitation. Trials with designs that did not allow an evaluation of the effectiveness of moxibustion were excluded. No restrictions on language and publication forms were imposed. All articles were read by 2 independent reviewers (M.S.L. and B.C.S.), who extracted data from the articles (the Table). Risk of bias was assessed with the Cochrane classification.2 The statistical analysis was performed with Review Manager (The Nordic Cochrane Centre).

Results
We found 203 potentially relevant articles (Figure 1), of which 9 RCTs3–11 met our inclusion criteria (the Table). Three RCTs4–6 showed superior effects of moxibustion on motor function in patients with hemiplegia compared with standard care, according to assessment by the Fugl-Myer Assessment or Motor Index tool (N=142; standard mean difference = 0.72; 95% confidence interval, 0.37 to 1.08; P<0.0001; Figure 2A). Three RCTs3,4,10 with a high level of heterogeneity failed to demonstrate favorable effects of moxibustion on activities of daily living, as assessed by the Functional Independence Measure, Barthel Index, or Modified Barthel Index (N=122; standard mean difference = 0.51; 95% confidence interval, −0.08 to 1.10; P=0.09; Figure 2B). Two RCTs9,10 showed favorable effects of moxibustion on...
urinary function, whereas 1 RCT8 failed to do so. Two RCTs reported favorable effects of moxibustion on hand edema5 and cerebrovascular function.11 One10 reported that there were no adverse events,11 but the other 3 reported 2 cases of skin burns and blisters9 or skin redness and blisters.4,5

Discussion

Few rigorous RCTs of moxibustion during stroke rehabilitation are currently available. Three RCTs4–6 showed favorable effects on motor function. Two9,10 of 3 RCTs8–10 reported significant beneficial effects of moxibustion on urinary function. The number of trials, their total sample size, and their methodological qualities, however, were too low to draw firm conclusions. Overall, our findings show only limited evidence of a beneficial effect of moxibustion as an adjunct to standard care for stroke rehabilitation.

Five4,7–9,11 of 9 included trials had a high risk of bias. Three RCTs4,5,10 were assessor-blinded. All RCTs tested outcome measures, and this may have led to exclusion and attrition biases. None of the studies used allocation con-

Table. Summary of RCTs of Moxibustion for Stroke Rehabilitation

<table>
<thead>
<tr>
<th>First Author (Year)</th>
<th>Country</th>
<th>Sample Size, Duration After Stroke</th>
<th>Intervention Group (Regimen), Style of Moxibustion†</th>
<th>Control Group (Regimen)</th>
<th>Main Outcomes</th>
<th>Intergroup Differences*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee5 (2006)</td>
<td>Korea</td>
<td>47, Hemiplegia after stroke (infarction only), NR</td>
<td>(A) Moxibustion (3 times daily, 5 times weekly for 4 weeks, n=21), plus (B) indirect</td>
<td>(B) Standard therapy (drug, AT, and physiotherapy, once daily for 6 weeks, n=21)</td>
<td>FIM</td>
<td>5.63 (2.53, 8.78), P=0.001</td>
</tr>
<tr>
<td>Choi6 (2003)</td>
<td>Korea</td>
<td>46, Hemiplegia after stroke</td>
<td>(A) Moxibustion (5 times once, once daily for 2 weeks, n=20), plus (B) direct</td>
<td>(B) Standard therapy (drug, AT, and standard physiotherapy, once daily for 2 weeks, n=20)</td>
<td>(1) FMA (2) MI (3) MBI</td>
<td>(1) 2.5 (1.37, 9.03), P=0.038 (2) 7.00 (1.32, 12.68), P=0.002 (3) 1.30 (0.47, 3.07), P=0.35</td>
</tr>
<tr>
<td>Choe6 (2003)</td>
<td>Korea</td>
<td>48, (Hand edema) hemiplegic stroke</td>
<td>(A) Moxibustion (5 times once, once daily for 2 weeks, n=20), plus (B) direct</td>
<td>(B) Standard therapy (drug, AT, and standard physiotherapy, once daily for 2 weeks, n=22)</td>
<td>(1) FMA (2) Hand volume</td>
<td>(1) 8.50 (3.63, 13.37), P=0.002 (2) 9.20 (1.23, 17.17), P=0.032</td>
</tr>
<tr>
<td>Chen6 (2006)</td>
<td>China</td>
<td>65, Early stage after stroke, &lt;2 weeks</td>
<td>(A) Moxibustion (each point 3 times once daily, 5 sessions weekly for 4 weeks, n=32), plus (B) direct</td>
<td>(B) Standard therapy (Bobath therapy, drug, 45 minutes once daily, 5 sessions weekly for 4 weeks, n=30)</td>
<td>(1) FMA (2) Response rate</td>
<td>(1) 5.00 (0.17, 9.83), P&lt;0.05 (2) RR=1.19 (0.93, 1.54), NS</td>
</tr>
<tr>
<td>Moon7 (2003)</td>
<td>Korea</td>
<td>35, Spasticity after stroke</td>
<td>(A) Moxibustion (3 times once, every 2 days for 15 days, n=10), plus (B) direct</td>
<td>(B) Standard therapy (ROM, exercise once daily, AT 30 minutes, total 10 points, once daily, n=10); (C) EA (n=19), plus (B)</td>
<td>MAS</td>
<td>0.90 (0.23, 1.57), P&lt;0.01</td>
</tr>
<tr>
<td>Xiao8 (2008)</td>
<td>China</td>
<td>46, Bladder dysfunction after stroke, 6 months</td>
<td>(A) Moxibustion (once daily, n=23), plus (B) direct</td>
<td>(B) Usual catheter removal (n=23)</td>
<td>Response rate</td>
<td>RR=1.05 (0.90, 1.22), NS</td>
</tr>
<tr>
<td>Liu9 (2006)</td>
<td>China</td>
<td>82, Urination disorders after stroke, 2.4/2.6 months</td>
<td>(A) Moxibustion (2 times once, once daily, 5 times weekly for 3 weeks, n=39), plus (B) indirect</td>
<td>(B) AT (NR, 5 times per week for 3 weeks, n=36)</td>
<td>Frequency of (1) Mean urination times/day (2) Increasing degree of UI (3) IPSS Score (4) Bl</td>
<td>(1) 6.00 (2) P&lt;0.01 (3) P&lt;0.05 in favor of moxibustion</td>
</tr>
<tr>
<td>Yun10 (2007)</td>
<td>Korea</td>
<td>41, Poststroke urinary symptoms 18.6/20.1 days</td>
<td>(A) Moxibustion (5 times daily for 10 days, n=20), plus (B) direct</td>
<td>(B) Routine care (herbal medicine and AT not related to the target symptoms, n=19)</td>
<td>(1) Total IPSS Score (2) BI</td>
<td>(1) 3.29 (1.90, 4.68), P&lt;0.001 (2) 0.08 (15.50, 17.10), NS</td>
</tr>
<tr>
<td>Chen11 (2006)</td>
<td>China</td>
<td>28, Cerebrovascular function in ischemic apoplexy 0.8/0.7 months</td>
<td>(A) Moxibustion (3 times once, once daily for 20 days, n=14), plus (B) direct</td>
<td>(B) Usual basic care (daily for 20 days, n=14)</td>
<td>(1) Cerebral vasomotor response in MCA by TCD (2) Recovery of nervous function</td>
<td>(1) P&lt;0.05 in favor of moxibustion (2) P&lt;0.05 in favor of moxibustion</td>
</tr>
</tbody>
</table>

AT indicates Acupuncture; BI, Barthel Index; FIM, Functional Independence Measure scale; FMA, Fugl-Meyer Assessment; IPSS, International Prostate Symptom Score; MAS, modified Ashworth scale; MBI, modified Barthel Index; MCA, middle cerebral artery; MI, motor index; NR, not reported; NS, not significant; ROM, range of motion; RR, risk ratio; TCD, transcranial Doppler ultrasound; and UI, urinary incontinence.

*Expressed as mean difference (95% confidence intervals), except for RR.
†Direct moxibustion is applied directly to the skin surface at an area around an acupuncture point, whereas indirect moxibustion is performed with some insulating materials (eg, ginger, salts) placed between the moxibustion cone and the skin.

---

AT indicates Acupuncture; BI, Barthel Index; FIM, Functional Independence Measure scale; FMA, Fugl-Meyer Assessment; IPSS, International Prostate Symptom Score; MAS, modified Ashworth scale; MBI, modified Barthel Index; MCA, middle cerebral artery; MI, motor index; NR, not reported; NS, not significant; ROM, range of motion; RR, risk ratio; TCD, transcranial Doppler ultrasound; and UI, urinary incontinence.

*Expressed as mean difference (95% confidence intervals), except for RR.
†Direct moxibustion is applied directly to the skin surface at an area around an acupuncture point, whereas indirect moxibustion is performed with some insulating materials (eg, ginger, salts) placed between the moxibustion cone and the skin.
cealment. Thus, the reliability of the evidence presented here is clearly limited.

Limitations of our systematic review pertain to its potential incompleteness and to the possibility of selective publishing and reporting. Further limitations include the paucity and the often suboptimal methodological quality of the primary data.

In conclusion, the results of our systematic review and meta-analyses provide only limited evidence for the effectiveness of moxibustion as an adjunct to standard care during stroke rehabilitation. The number and methodological quality of the primary data are too low to draw firm conclusions.

**Figure 1.** Flow chart of the trial selection process.

**Figure 2.** Meta-analysis of moxibustion for stroke. A, Motor function. B, Activities of daily living.
Source of Funding

M.S. Lee and J.I. Kim were supported by Korea Institute of Oriental Medicine.

Disclosures

None.

References

Moxibustion for Stroke Rehabilitation. Systematic Review
Myeong Soo Lee, Byung-Cheul Shin, Jong-In Kim, Chang-ho Han and Edzard Ernst

Stroke. published online February 11, 2010;
Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2010 American Heart Association, Inc. All rights reserved.
Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://stroke.ahajournals.org/content/early/2010/02/11/STROKEAHA.109.566851.citation

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Stroke can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Stroke is online at:
http://stroke.ahajournals.org//subscriptions/