Stroke is a major cause of morbidity and mortality worldwide. One of the major complications in the acute phase of stroke is infection; especially pneumonia and urinary tract infection occur often. Poststroke infections are strongly associated with poor outcome. Preventive antibiotic therapy in the acute phase of stroke may reduce infections and improve functional outcome.

**Methods**

**Study Objective**

The objective of this study was to assess whether preventive antibiotic therapy in patients with acute stroke reduces infection rate, the risk of dependency, and the risk of death at follow-up.\(^1\)

**Selection Criteria**

Randomized controlled trials of preventive antibiotic therapy vs control (placebo or open control) in patients with acute ischemic or hemorrhagic stroke were used.

**Data Collection and Analysis**

Two authors independently selected articles and performed data extraction; methodologic quality was assessed by an independent observer. We calculated relative risks for dichotomous outcomes, assessed heterogeneity among included studies, performed subgroup analyses on study quality, and calculated a weighted overall effect estimate based on the risk ratio.

**Results**

A total of 5 studies involving 506 patients were included. Studies showed heterogeneity in study design, type of antibiotic, duration of treatment, and definition of infection. Also, functional outcome was not evaluated in all included studies. Preventive antibiotic therapy reduced infection rate from 36% to 22% overall (relative risk, 0.58; 95% confidence interval, 0.43–0.79; Figure), whereas effects on mortality and functional outcome were not significant: 13% died in the preventive antibiotic group vs 15% in the control group (relative risk, 0.85; 95% confidence interval, 0.47–1.51) and 47% of patients in the preventive antibiotic group were dependent vs 61% in the control group (relative risk, 0.67; 95% confidence interval, 0.32–1.43). No major side effects of preventive antibiotic therapy were reported.

**Discussion**

This meta-analysis does not allow a robust conclusion on the use of preventive antibiotic therapy in acute stroke. This is
attributable to different factors. First, the total number of studies and participants is limited: 5 studies were included with a total number of 506 participants. Second, several biases may have influenced the results of the included studies, and only 1 study was scored overall as having low risk of bias.

**Implications for Practice**
Currently, the use of preventive antibiotic therapy is not included in standard care for patients with acute stroke. Results of this meta-analysis do not provide evidence that current practice has to be changed but do warrant further research.

**Implications for Research**
The observed effect in this meta-analysis warrants evaluation of preventive antibiotics in new stroke trials with functional outcome measurements. Currently, 2 large, phase III, randomized, controlled trials are underway in the United Kingdom and in the Netherlands. In the Stroke-INF study, the effect of preventive treatment with amoxicillin on infection rate in stroke patients with dysphagia is being investigated (ISRCTN 37118456). In the Preventive Antibiotics in Stroke Study (PASS; ISRCTN 66140176), the effect of ceftriaxone on functional outcome is being investigated and 3200 stroke patients are included; it is expected to be completed in 2014.

**Conclusions**
In this Cochrane meta-analysis, preventive antibiotic therapy seemed to reduce the risk of infection but did not reduce the number of dependent or deceased patients; however, included studies were small and heterogeneous. A valid estimate of the effect of preventive antibiotics on functional outcome is not possible yet. Results of 2 large, phase III, randomized, controlled trials will be available soon.

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**Disclosures**
Dr van de Beek and Dr Nederkoorn are the principal investigators of the Preventive Antibiotics in Stroke Study (PASS), ISRCTN 66140176, www.passamc.nl. All authors of this review and meta-analysis are members of the study group of this trial.

**References**

**Key Words:** antibiotics ◼ functional recovery ◼ infectious disease ◼ prevention ◼ stroke care
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