CRD summary
The review concluded that there was a paucity of evidence to guide clinicians when planning long-term management of patients with intracranial haemorrhage and cogent indications for anti-thrombotic therapy. The authors’ conclusion reflected the limited evidence presented, but given potential for missing studies and a number of possible biases in the review process, the reliability of this conclusion is uncertain.

Authors’ objectives
To review observational studies that described long-term follow-up of patients who received antithrombotic therapy following intracerebral haemorrhage.

Searching
EMBASE and MEDLINE were searched from 1984 to November 2008 for articles published in English. The search was based on previously developed strategies (referenced in the paper). Reference lists of identified articles were searched.

Study selection
Observational studies of any dose of antiplatelet or anticoagulant medicines with follow-up that extended beyond discharge in adult patients with radiologically confirmed intracranial haemorrhage were eligible for inclusion. The primary outcome was recurrent intracranial haemorrhage. Secondary endpoints were serious thrombo-occlusive events. Case studies were excluded.

The included cohort and case series evaluated antiplatelet therapy and oral anticoagulants in patients with prosthetic heart valve, atrial fibrillation, ischaemic stroke, transient ischaemic stroke, myocardial infarction, peripheral vascular disease and ischaemic heart disease. The control groups in cohort studies were non-users. The mean age of patients ranged from 11 to 82 years.

The authors did not state how many reviewers performed study selection.

Assessment of study quality
The validity of cohort studies was assessed with the Newcastle-Ottawa Scale for selection, outcomes/follow-up and comparability/confounders to give a score out of eight.

Case series were assessed on the basis of ascertainment of exposure, outcome and duration of follow-up.

The authors did not state how many reviewers carried out the validity assessment.

Data extraction
Data were extracted on recurrent intracranial haemorrhage and serious thrombo-occlusive events and used to calculate risk ratios and hazard ratios, together with 95% confidence intervals (CIs).

The authors did not state how many reviewers were involved in data extraction.

Methods of synthesis
A narrative synthesis that grouped the studies by study type and drug type.

Results of the review
Eight studies were included in the review (n=326 patients): two cohort studies (n=255 patients) and six case series (n=71 patients). Study sample size ranged from two to 207 patients. Follow-up ranged from six to 49.8 months. The quality of the cohort studies was variable (one scored 7 and one scored 3). Case series did not control for confounding, but cases were well defined and the studies had adequate follow-up.

**Antiplaettelet use:** One high-quality cohort study indicated a non-significant difference in risks for recurrent lobar intracerebral haemorrhage, deep intracerebral haemorrhage and risk of subsequent ischaemic events.

**Oral anticoagulants:** One poor-quality cohort study showed no difference in risk for the combined endpoint of thromboembolic events and recurrent intracerebral haemorrhage. Six case series reported two intracerebral haemorrhages and three major thrombo-occlusive events in patients who received oral anticoagulants.

**Authors’ conclusions**
There was a paucity of evidence to guide clinicians when planning long-term management of patients with intracranial haemorrhage and cogent indications for anti-thrombotic therapy.

**CRD commentary**
Inclusion criteria for the review were broadly defined. Two relevant data sources were searched. There was potential for language bias, as only studies in English were included. Publication bias was not assessed and could not be ruled out. The authors did not report how many reviewers were involved in study selection, data extraction and quality assessment, which may have introduced reviewer error and bias into the review. Quality assessment indicated the variable quality of included studies. Most studies were case series and so were prone to bias. Several studies had a sample size smaller than 10 patients. One case series appeared to include children, which contradicted the inclusion criteria for the review. A very limited narrative synthesis was presented.

The authors’ conclusion reflected the limited evidence presented, but given potential for missing studies and a number of possible biases in the review process, the reliability of this conclusion is uncertain.

**Implications of the review for practice and research**
**Practice:** The authors stated that published guidance that addressed this area of treatment was not evidence-based.

**Research:** The authors stated a need for more high-quality observational studies. If such studies showed no harm, a high-quality trial may be viable.

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