Authors' objectives
To review the effectiveness and associated risks of anticoagulation in patients with heart failure.

Searching
MEDLINE and EMBASE were searched from 1966 to September 1993 using the search terms given. References from identified articles, textbooks and review articles were also examined.

Study selection
Study designs of evaluations included in the review
Observational studies comparing treated and non-treated patients.

Specific interventions included in the review
Anticoagulation mainly involving the use of coumarin-based drugs.

Participants included in the review
Patients with chronic heart failure due to left ventricular systolic dysfunction not receiving anticoagulants.

Outcomes assessed in the review
Incidence of arterial embolism, and risk of major bleeding in treated patients.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
The validity of the studies was not explicitly assessed, though studies were reviewed according to a range of inclusion criteria.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Methods of synthesis
How were the studies combined?
The studies were combined by a narrative review.

How were differences between studies investigated?
Differences between the studies are reported, but are not investigated further.

Results of the review
Nine studies examining the effectiveness of anticoagulation and 5 studies examining the risk of major bleeding associated with anticoagulation.
No clinical trials were located. There is conflicting evidence regarding the effectiveness of anticoagulation: 7 small studies indicated the effectiveness of anticoagulants in preventing arterial embolism, whereas the results from 2 larger studies indicated that patients who had received anticoagulants had the same or higher incidence of stroke, arterial embolism and pulmonary embolism, as those who had not.

The risk of major bleeding in patients who are fully anticoagulated was found to be significant: estimated rates of major bleeding were between 1.5 and 4.4 per 100 patient years for higher doses of anticoagulant. Low-dose anticoagulation appeared to result in fewer bleeding complications.

No studies were found that used multivariate techniques to estimate the independent effect of ventricular dysfunction on the risk of arterial thromboembolism.

**Authors' conclusions**
Anticoagulation and antiplatelet therapy should be discouraged for patients in sinus rhythm and with no history of left ventricular thrombus, stroke or arterial embolism. Patients with atrial fibrillation should receive low-dose anticoagulation to achieve the target ranges used in large clinical trials (international normalised ratio, 1.5 to 3.5; prothrombin-time ratio, 1.2 to 1.8). Patients with cardiac thrombus on echocardiogram or documented arterial embolism should be maintained at the upper end of these ranges.

**CRD commentary**
The authors note that the studies of effectiveness included in the review do not represent strong evidence either for or against the use of anticoagulation: the smaller studies showing a positive effect do not appear to control for level of anticoagulation, while the larger studies indicating lack of effectiveness included patients more likely to be at risk of embolism. The studies also differ in regard to the initial clinical status of the participants, making generalisation about the overall effect of anticoagulation difficult.

The authors recommendations on the associated risks of anticoagulation in patients with atrial fibrillation are based on larger trials where the level of anticoagulation was controlled.

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