The need for anticoagulation following inferior vena cava filter placement: systematic review

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CRD summary
This review concluded that an inferior vena cava filter can be placed in patients who cannot receive concomitant anticoagulation without placing them at significantly higher risk of venous thromboembolism. Potentially high risks of bias in the included studies and the variability between studies mean that the review findings may not be robust; therefore, the conclusions should be treated with caution.

Authors' objectives
To determine the effect of anticoagulant therapy on the rates of venous thromboembolism following placement of an inferior vena cava (IVC) filter.

Searching
MEDLINE, The Cochrane Library and ACP Journal Club were searched without language restrictions for articles published between 1967 and 2007. Reference lists of relevant articles were scanned. The PubMed related links tool was used. A separate search was undertaken using the first and last author name from relevant articles. Search terms were reported.

Study selection
Studies that reported short-term (immediate periprocedure period) or long-term venous thromboembolism outcomes following IVC filter replacement (with and without concomitant anticoagulation therapy) were eligible for inclusion. Studies were included regardless of whether there were sufficient data to calculate the rate of venous thromboembolism. Randomised controlled trials (RCTs), prospective cohort studies, retrospective cohort studies and case-control studies were eligible.

The included studies used Gunther, Greenfield, Vena Tech-LGM, Simon nitinol or Bird's Nest filters. Mean follow-up ranged from 12 days to nine years (where reported). In most studies, whether or not patients received anticoagulation therapy appeared to be based on physician judgement. Methods used to assess presence of venous thromboembolism varied within and between studies. More than half of the studies used at least one of routine abdominal radiograph, duplex ultrasound, contrast venography and ventilation-perfusion scan. Some studies performed imaging only on clinical suspicion, clinical follow-up only or the method of outcome assessment was not reported; there was some form of radiologic follow-up of 33% of patients, clinical follow-up only of 42% and unspecified method of follow-up for 25%.

Study selection appeared to be undertaken independently by two reviewers.

Assessment of study quality
The intention was to grade RCTs using CONSORT criteria, but no studies of this design were found. Other study designs were not quality assessed.

Data extraction
The number of episodes of venous thromboembolism and total number of patients were extracted for IVC filter placement with concomitant anticoagulation and filter replacement without concomitant anticoagulation to calculate the odds ratio (OR).

Data were independently extracted by two reviewers.

Methods of synthesis
A random-effects meta-analysis was used to calculate the summary odds ratios and 95% confidence intervals (CI). Heterogeneity was assessed using the Q statistic.

**Results of the review**

Fourteen studies were included: nine retrospective cohort studies and five prospective cohort studies. Nine studies were pooled in the meta-analysis (n=1,369, range 32 to 465); these studies were undertaken between 1989 and 2006.

There were 83 venous thromboembolisms (12.3%) in the group that received anticoagulation and 110 (15.8%) in the group that did not receive anticoagulant following placement of an IVC filter. There was no statistically significant difference in the odds of venous thromboembolism in patients who received an anticoagulant compared to those who did not; the odds were lower for the anticoagulant group and the confidence interval included reduced and increased rates of thromboembolism (OR 0.639, 95% CI 0.351 to 1.159).

There was significant heterogeneity between the studies (p=0.04); this was no longer statistically significant (and the results were broadly similar) when two studies with higher odds ratios than the other studies were removed from the analysis; it was unclear how these studies were clinically different.

**Authors' conclusions**

Inferior vena cava filters can be placed in patients who cannot receive concomitant anticoagulation without placing them at significantly higher risk of development of venous thromboembolism.

**CRD commentary**

There was a clearly stated review question. A number of relevant sources were searched without language restrictions. Some relevant studies may have been missed as only published studies were included. Relevant details from the primary studies were reported (where available). Appropriate methods were used to reduce error and bias in study selection and data extraction. Study quality was not formally assessed. From the details provided about the included studies, it appeared they had a number of important limitations and potentially a high risk of bias.

Given the lack of RCTs and the clinical and statistical heterogeneity among the studies included in the meta-analysis, the summary treatment effect estimate may not have been robust. Therefore, the authors' conclusions may be over-confident and should be treated with caution. The recommendations for practice extended beyond the data presented in the review.

**Implications of the review for practice and research**

**Practice:** The authors recommended that: IVC filter placement should be reserved for patients with firm indications for placement that included contra-indication to, complication or failure of anticoagulation; placement should be reserved for when pulmonary embolism was the major clinical concern; consideration should be given to placement of a retrievable filter in the presence of pulmonary embolism and absence of other indications for anticoagulation; concomitant anticoagulation should be considered following IVC filter placement where there was a separate indication for anticoagulation, such as deep vein thrombosis; and long-term anticoagulation should be considered following filter placement for patients with known hypercoagulable states or recurrent venous thromboembolism.

**Research:** The authors did not state any implications for research.

**Funding**

Not stated.

**Bibliographic details**

Ray CE, Prochazka A. The need for anticoagulation following inferior vena cava filter placement: systematic review. CardioVascular and Interventional Radiology 2008; 31(2): 316-324

**DOI**
10.1007/s00270-007-9244-x

Original Paper URL
http://www.springerlink.com/content/b42855j17244l4u6/

Indexing Status
Subject indexing assigned by NLM

MeSH
Anticoagulants /adverse effects /therapeutic use; Humans; Pulmonary Embolism /prevention & control;
Thromboembolism /etiology; Vena Cava Filters /adverse effects

Accession Number
12008103695

Date bibliographic record published
03/02/2009

Date abstract record published
02/02/2011

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract
contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on
the reliability of the review and the conclusions drawn.