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Dubious Benefit of Inferior Vena Cava Filters

I have concerns about the article by Stein et al[1] demonstrating an association between inferior vena cava (IVC) filter placement and improved survival in stable patients with pulmonary embolism who received thrombolytic therapy. This study seems to be a case–control study, as summarized by the 2 × 2 table in the **Figure**.

Unfortunately, the authors make few attempts to adhere to best practices in reporting such observational research,[2] such as acknowledging potential confounders and bias, thereby jeopardizing internal validity.

Survivor treatment selection bias likely accounts for the apparent mortality benefit of IVC filter placement in patients having received thrombolysis.[3] In clinical practice, thrombolysis is a more timely intervention and thus generally performed before IVC filter placement; patients who survive the initial course of acute pulmonary embolism are more likely to undergo IVC filter placement. Other confounders could include access to timely interventional radiology services and payer mix, which may be markers of hospital quality or the socioeconomic status of its patients. In addition, the authors do not provide details on how unstable patients were excluded from this study; defining these variables would strengthen their approach.[2] Finally, odds ratios are typically used to report differential outcomes in case–control studies.[2] In their Table 3, the authors misstate the risk ratio as a "relative risk"[1,2]; and their decision to report absolute risk reduction and numbers needed to treat—which are generally reserved for prospective randomized trials—are misleading.

The authors also have not recognized threats to external validity, namely other robust population-level data suggesting IVC filters confer no survival benefit in patients who can receive anticoagulation.[4] Moreover, well-designed prospective randomized trials on both thrombolysis[5] and IVC filters[6] have failed to demonstrate a mortality benefit in stable patients with acute pulmonary embolism. Why would combining these therapies be expected to protect against mortality in stable patients?

The conclusion that "an inferior vena cava filter *results* in a lower in-hospital all-cause mortality" in this population[1] would be overstated for any retrospective case–control study; we can only infer an association. Taken in the context of potential confounders and the broader literature on the treatment of acute pulmonary embolism, the authors should temper their enthusiasm.

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Population: Stable PE patients who received thrombolysis

	Condition	
Exposure	In-hospital death	In-hospital survival
IVC filter placement	139	2521
No IVC filter placement	697	3635

Figure Putative 2 × 2 table design for Stein et al.[1]

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