The question of whether vena cava filters have a role in trauma patients remains unanswered

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Summary

Whether to temporarily place retrievable inferior vena cava filters for prophylaxis against pulmonary embolism in high-risk trauma patients has been a difficult question to answer. Guidelines regarding the management of these patients are mixed in their recommendations. The question merits further attention.

The question of whether there is a role for the temporary placement of retrievable inferior vena cava (IVC) filters for prophylaxis against pulmonary embolism (PE) in high-risk trauma patients has been a difficult one to answer. We applaud the recent efforts of Ho and colleagues for conducting the most rigorous trial in this area to date.[1]

Trauma patients are known to be at high risk for thromboembolic events,[2] particularly in the first 72 hours of admission.[3] Most trauma patients are able to be started safely on pharmacologic prophylaxis within 24–72 hours, although substantial practice variation may exist with respect to the timing of prophylaxis initiation. Trauma patients with worsening intracranial hemorrhages or those with perispinal hematomas are at extremely high risk for thromboembolic events, but also for hemorrhagic complications from inappropriate early administration of pharmacologic prophylaxis. Guidelines regarding the management of these patients are mixed in their recommendations. The Eastern Association for the Surgery of Trauma recommends the placement of retrievable IVC filters in high-risk patients,[4] whereas the American College of Chest Physicians recommends against the use of IVC filters.[5] A 2014 systematic review published in *JAMA Surgery*[6] concluded "the strength of evidence is low," but stated that there is an "association between IVC filter placement and a lower rate of PE and fatal PE in trauma patients." The review also called for further well-designed research to better answer the question.

In a large, multicentre randomized controlled trial (RCT) of 240 severely injured trauma patients recently published in the *New Englang Journal of Medicine*,[1] Kwok and colleagues attempted to address the role of prophylactic IVC filters. Their composite primary outcome of PE or all-cause mortality at 90 days occurred in 17 patients in the IVC filter group and 17 in the control group. The authors concluded that "early placement of a vena cava filter after major trauma did not result in a lower incidence of symptomatic PE or death at 90 days than no placement of a filter." Results for the composite outcome were driven predominantly by death (16 of 17 in the IVC filter group and 11 of 17 in the control group). Further review of these deaths (Appendix 1, Table 6, available at canjsurg.ca/016619-a1) showed that only 1 was related to PE (control group) and none was attributed to complications of the IVC filter. Most of the deaths were due to head injuries, as expected in this patient population.

While all-cause mortality is a tremendously important outcome in trauma research, its inclusion (and dominance) in the primary outcome of the trial by

Ho and colleagues does not definitively help us to answer whether a vena cava filter results in a lower incidence of PE. In fact, the data in this paper showed a PE incidence of 1 in 122 (0.8%) in the IVC filter group and 6 in 118 (5.1%) in the control group. In relation to the question of the role of IVC filter placement to prevent PE, this is the finding that merits the most attention. A sample size calculation based on this actual difference in proportions (and using the same assumptions as published) suggests a total of 490 patients would be required to have confidence in this result.

Current literature espouses that most thromboembolic events occur in the first 72 hours post-trauma. A single-centre RCT by our group was designed around this notion.[7] The trial by Ho and colleagues suggests that patients remain at risk for PEs for the duration of their hospital stays, even after receiving pharmacologic prophylaxis against thromboembolic events.

We are pleased to see rekindled interest into the important clinical question of whether to use IVC filters in high-risk trauma patients. The largest trial to date has advanced our understanding, helping us to better design future trials powered to demonstrate a reduction in PEs for the duration of hospital stay.

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