Cost-effective method for bedside insertion of vena caval filters in trauma patients

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Bedside insertion of inferior vena cava (IVC) filters in trauma patients versus radiology suite or operating room.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Male and female trauma patients requiring IVC filter placement.

Setting
Hospital. The economic study was carried out in Nashville, Tennessee, US.

Dates to which data relate
The main effectiveness data were obtained from a single study conducted between 1995 and 1996. Resource and cost data were obtained from 1995-96 sources. The price year was not stated.

Source of effectiveness data
The estimates of the number of successful IVC filters placed under ultrasound guidance, and complications were obtained from a single study.

Link between effectiveness and cost data
The costing was undertaken retrospectively on the same patient sample as that used in the effectiveness study.

Study sample
Of all 3,172 trauma admission, 55 (1.7%) patients were included in the analysis; only 49 (89.1%) of these patients had successful, ultrasound-guided, bedside PGF placement. The mean age was 31 years (range: 14 - 76 years) and the mean Injury Severity Score was 30.3 (range: 16 - 54). The indications for placement in this group included 92% with spinal trauma, 21 (43%) had paraplegia, 16 (33%) quadriplegia, two hemiplegia and five nonparalysing spinal injuries. Of the four patients without spinal trauma, three had pelvic or long bone fractures and two had severe closed head injuries. One patient sustained a combined injury. Power calculations to determine the sample size were not undertaken.

Study design
Case series. The duration of the follow-up was not stated. The loss to follow-up was six patients (10.9%) when ultrasound guided filter placement failed.

Analysis of effectiveness
The analysis of the clinical study was based on successful treatment only. The primary health outcomes used in the analysis were the number of successful IVC filters placed under ultrasound guidance, and complications.

Effectiveness results
The number of successful IVC filters placed under ultrasound guidance was 49 and failure occurred in 10.9% cases. There were four complications in four patients (8.2%).

Clinical conclusions
Ultrasound guided, bedside placement of IVC filters is a safe method of pulmonary embolism prophylaxis in select trauma patients.

Measure of benefits used in the economic analysis
The authors made the implicit assumption that the effectiveness of the intervention and the two comparators was equivalent. Therefore the main benefits were measured in terms of cost/charge reduction (cost-minimisation).

Direct costs
Hospital, radiology, operative and equipment charges were analysed for total charges for each of the three methods of PGF placement. Additional charges for failed placement attempts and the use of additional filters using ultrasound at the bedside were included in the analysis. For the purposes of the financial analysis, a zero percent complication and failure rate was assumed for both the operatively and radiologically placed filters. Quantities were reported separately from the prices. Discounting was not undertaken due to the short study period. The quantity/cost boundary adopted was the hospital. The price year was not stated.

Statistical analysis of costs
Not undertaken.

Indirect Costs
Not included.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
Charges for the bedside placement technique were less ($3,508) than charges for placement in the operation room
($5,940) or the radiology suite ($4,989). Over 13 months, bedside placement reduced charges when compared with radiology placement ($69,800) and operating room ($118,300).

**Synthesis of costs and benefits**
Bedside placement reduced charges when compared with radiology placement ($1,481/patient) and operating room placement ($2,432/patient).

**Authors’ conclusions**
Ultrasound guided, bedside placement of IVC filters is a safe, cost-effective method of pulmonary embolism prophylaxis in select trauma patients.

**CRD COMMENTARY - Selection of comparators**
The reason for the choice of the comparator is clear. The use of the PGF in the general trauma population has become an established means of pulmonary embolism prophylaxis. The chosen comparators are traditional alternatives. As most of the trauma patients are critically ill, it is necessary to identify a means of bedside PGF placement which would obviate the need for transport to the radiology suite or operating room without compromising the safety or efficacy of the filter placement. You, as a user of this database, should consider whether these are widely used health technologies in your own setting.

**Validity of estimate of measure of benefit**
No summary benefit measure was used and the authors restricted themselves to an analysis of costs/charges, implicitly assuming the effectiveness to be similar for the alternatives addressed. It is not clear whether this is a valid assumption as health outcomes were not examined for the comparators. In this sense, a limited cost-minimisation analysis was performed.

**Validity of estimate of costs**
Resource quantities were reported separately from the prices and adequate details of methods of quantity/charges estimation were given. The use of charges rather than costs limits the generalisability of the results to other settings. The costing methodology lacked some details, without the price year being stated. No statistical analysis was conducted. As the study was retrospective, the charges need to be treated with a degree of caution. Furthermore, as the authors acknowledged, a true cost analysis was not conducted as it was not possible to obtain meaningful cost estimates for suite usage, patient transportation and physician involvement. An assumption of 0% complication rate for costing purposes clearly introduces potential biases.

**Other issues**
The issue of generalisability to other settings or countries was not addressed, although comparisons with other studies, supporting the clinical results from this investigation, were reported in the study.

**Implications of the study**
A true cost analysis is required. Moreover, a prospective, randomized trial may yield more information regarding the impact of contrast reactions, radiation exposure, and complications related to patient transport and time away from the surgical intensive care unit in select groups of trauma patients.

**Source of funding**
None stated.

**Bibliographic details**

**PubMedID**
Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
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