Cost-effectiveness of prophylactic anticoagulation prolonged after hospital discharge following general surgery

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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
Prolonged self-administered prophylactic low-dose low-molecular-weight heparin (LMWH) during 4 weeks after hospital discharge versus anticoagulant therapy with heparin started immediately after the first clinically overt venous thromboembolism (VTE).

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Patients discharged from hospital after general surgery (gastrointestinal, gynecologic, urologic or vascular surgery).

Setting
Primary and secondary care settings. The study was carried out in Geneva, Switzerland.

Dates to which data relate
The studies from which the effectiveness data were obtained were published between 1983 and 1995. The resource use and cost data relate to 1994.

Source of effectiveness data
The evidence of final outcomes was based on a review of previously published studies.

Modelling
A decision tree was used to estimate final costs and benefits.

Outcomes assessed in the review
The main outcome measures were the number of venous thromboembolisms prevented and the number of major bleeding events induced.

Study designs and other criteria for inclusion in the review
The design of the studies reviewed was not stated but it was stated that no randomised controlled trials (the gold standard design) have been undertaken in this intervention area. No inclusion or exclusion criteria were reported.
Sources searched to identify primary studies
Not reported.

Criteria used to ensure the validity of primary studies
Not reported.

Methods used to judge relevance and validity, and for extracting data
No judgement criteria on which to assess the validity of the studies included was provided. Summary statistics were extracted from the studies.

Number of primary studies included
Five main studies and a number of other studies were included in the review. The study types were not specified.

Methods of combining primary studies
Individual primary studies were not combined. The authors assumed different values based on individual results.

Investigation of differences between primary studies
Not reported.

Results of the review
The baseline assumptions were as follows: the incidence of VTE was assumed to be constant at 0.15% after general surgery (comparator) (or 0.0125 per week); for the prophylactic LMWH group the risk of major bleeding events was 0.1% during the 4 weeks after hospital discharge which was 0.025% per week; the effectiveness of prophylactic regimens of LMWH in preventing symptomatic VTE was 80%.

Measure of benefits used in the economic analysis
The measures of benefit were the number of symptomatic VTEs prevented or the number of major bleeding events induced. A decision tree was used to deal with uncertainty regarding cost and outcomes.

Direct costs
Given the time frame, discounting was not required. Costs but few quantities were provided. The costs measured were pharmaceutical costs, diagnosis of VTE tests, the cost of the hospital room and the cost of complications. Quantities, including the average duration of hospital stay for patients with VTE (5 days) and the average duration of hospital stay for patients with major bleeds (8 days), were reported, but the source was not. Unit costs were based on actual data. The cost data were obtained from the clinical cost manager of the institution. Fiscal year 1994 price data were used. The perspective of the study was stated as the health care system.

Statistical analysis of costs
Not included.

Indirect Costs
Not reported.
Currency
US dollars ($).

Sensitivity analysis
One way sensitivity analysis was performed on the bleeding risk and the efficacy of anti-coagulation. Threshold analysis was performed to calculate the net benefits of the prophylactic anticoagulation by varying the probability of VTE (simple sensitivity analysis) and the rate of bleeding risk and the rate of VTE (two-way simple sensitivity analysis). Also, simple sensitivity analyses were performed on the costs of each outcome modelled and the effectiveness rate of the intervention.

Estimated benefits used in the economic analysis
Taking a 0.16 weekly rate of VTE and the rest of the values based on the baseline assumptions, the number of thromboembolic cases avoided (for a hypothetical cohort of 10,000 patients) with the intervention, relative to the no-intervention option, was estimated to be 51.

Cost results
For a hypothetical cohort of 10,000 patients, the marginal cost varied from $2,589,068 to $2,630,489 for a rate of VTE % per week of 0.06 and 0.18 respectively.

Synthesis of costs and benefits
The incremental cost-effectiveness ratio, using a 0.16 rate of VTE incidence and baseline values, was $51,442 for using the intervention relative to the comparator. This estimate varied notably with respect to the assumed rate of incidence of VTE, ranging from $135,903 for an 0.06% weekly rate of VTE to $45,353 for an 0.18% weekly rate of VTE. The threshold values for the net benefit results (value above which the intervention is expected to produce more benefit than harm) from the bleeding complications induced approach were as follows: rate of VTE 0.04% (4 times less that the baseline value); if the bleeding risk rate was reduced by half from the baseline value (to 0.05%) the threshold probability value of VTE became 0.02% (8 times less than baseline value). The sensitivity analysis showed no important changes from simple sensitivity analysis using costs and effectiveness rate of intervention.

Authors' conclusions
The authors argued that, whilst prolonged prophylactic anticoagulation following hospital discharge for general surgery was effective for the prevention of VTE, the marginal (incremental) costs of pursuing prophylactic anticoagulation with low-dose LMWH were high, and hence prolongation of preventive therapy should not be used indiscriminately. They suggested that subgroups of patients at higher risk of having a VTE after hospital discharge, in whom prophylactic anticoagulation would presumably be more cost-effective, should be identified.

CRD Commentary
The search strategy was not provided and therefore it is not clear what quality of data was used. Potential biases and differences between studies were not explored and these aspects may compromise the internal validity of the study. The sensitivity analysis conducted was quite thorough. Cost estimations would have been more explicit if more detail on resources had been provided. It appears that the cost of hospital staff was omitted.

Source of funding
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