Thromboembolic prophylaxis in moderate-risk patients undergoing elective abdominal surgery: decision and cost-effectiveness analyses

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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
Thromboembolic prophylaxis in moderate-risk patients undergoing elective abdominal surgery.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Patients over 40 years of age, undergoing major elective abdominal surgery under general anaesthesia which was expected to be greater than 30 min in duration, and requiring at least 5 days of hospitalization.

Setting
Hospital. The economic study was conducted in Detroit, USA.

Dates to which data relate
Effectiveness data were extracted from studies published in the period 1971-1995. The resources were estimated using data for 1995. 1996 prices were used.

Source of effectiveness data
Effectiveness data were derived from a review of previously completed studies.

Modelling
A decision tree of the possible outcomes of interest for the utilisation of low-dose heparin, dalteparin, or IPC as methods of thromboembolic prophylaxis and no prophylaxis was constructed using a computer software program (DATA, TreeAge Software, Inc., Boston). Five possible immediate outcomes thought to have significant clinical or economic impact on the analysis, as assessed from previous economic analyses, were considered for each method of prophylaxis: no complications;
suspicion of DVT and diagnosis by echo Doppler sonography and venography;
suspicion of PE and diagnosis by chest radiograph, electrocardiography (ECG), blood gases, and ventilation/perfusion (V/Q) lung scan;
sudden death due to PE;

and major bleeding episodes.

Relevant outcomes and probabilities for the respective methods of prophylaxis were then assigned.

Outcomes assessed in the review
Five possible immediate outcomes thought to have significant clinical or economic impact on the analysis, as assessed from previous economic analyses, were considered for each method of prophylaxis: no complications; suspicion of DVT and diagnosis by echo Doppler sonography and venography; suspicion of PE and diagnosis by chest radiograph, electrocardiography (ECG), blood gases, and ventilation/perfusion (V/Q) lung scan; sudden death due to PE; and major bleeding episodes. Relevant outcomes and probabilities pertaining to the respective methods of prophylaxis were then assigned.

Study designs and other criteria for inclusion in the review
The assistance of a drug information specialist was used to obtain the relevant data and select the relevant studies.

Sources searched to identify primary studies
A search of MEDLINE and HSTAR (Health Sciences and Technology Assessment Research) was conducted. Clinical and economic studies were reviewed and the bibliographies were searched for additional references. Further information was also requested from Pharmacia, Inc. (Columbus, OH) regarding dalteparin and HNE Healthcare (Manalapan, NJ) regarding IPC.

Criteria used to ensure the validity of primary studies
The study primarily analysed clinical trials.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
25 studies were included in the review.

Methods of combining primary studies
Narrative method.

Investigation of differences between primary studies
Validity testing in the form of sensitivity analyses was conducted to manage the uncertainty involved in assigning data values and to strengthen the confidence in the data used in the model. One and two-way sensitivity analyses were conducted.

Results of the review
Mortality and complications avoided were the main outcome measures on which the cost-effectiveness analysis was based.

Measure of benefits used in the economic analysis
Mortality and complications avoided were the main outcome measures on which the cost-effectiveness analysis was based.

**Direct costs**
Only health services costs were considered. Average hospital cost data from the Detroit Medical centre (DMC) and Medicare diagnosis-related groups (DRGH) cost data from 1995 were used to conduct the economic evaluation.

**Statistical analysis of costs**
Not performed.

**Indirect Costs**
Not considered.

**Currency**
US dollars ($).

**Sensitivity analysis**
Validity testing in the form of sensitivity analyses was conducted to manage the uncertainty involved in assigning data values and to strengthen the confidence in the data used in the model. One and two-way sensitivity analyses were conducted.

**Estimated benefits used in the economic analysis**
Mortality and complications avoided were the main outcome measures on which the cost-effectiveness analysis was based.

**Cost results**
The overall costs in the primary analysis in which labour costs were included were:

- conventional low-dose heparin: $84
- dalteparin: $122
- intermittent pneumatic compression: $102
- no prophylaxis: $112

Compared with no prophylaxis, incremental cost-effectiveness analysis in terms of cost/mortality avoided involved savings of $6,087 and $3,125 with conventional low-dose heparin and IPC, respectively, and expenses of $2,857 with dalteparin. A secondary analysis, excluding costs of labour, showed similar results.

**Synthesis of costs and benefits**
Compared with no prophylaxis, incremental cost-effectiveness analysis in terms of cost/mortality avoided involved savings of $6,087 and $3,125 with conventional low-dose heparin and IPC, respectively, and expenses of $2,857 with dalteparin.

**Authors’ conclusions**
The results of the study consistently showed that, of the methods considered, conventional low-dose heparin provided the most cost-effective thromboembolic prophylaxis in terms of reducing both morbidity and mortality in the patient population studied.

CRD COMMENTARY - Selection of comparators
The selection of comparators is justified as conventional low-dose heparin, dalteparin, and intermittent pneumatic compression (IPC) are all widely used as thromboembolic prophylaxis.

Validity of estimate of measure of benefit
Data do not appear to have been used selectively to prove a particular point and the choice of health outcomes is justified.

Validity of estimate of costs
Adequate details of methods of quantity/cost estimation were given and no important cost items were omitted.

Other issues
Cost data may not be generalisable to other settings or countries.

Source of funding
None stated.

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