The cost-effectiveness of mechanical forms of DVT prophylaxis in 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
Deep venous thrombosis (DVT) prophylaxis including physical methods such as graduated elastic compression (GEC) and intermittent pneumatic compression (IPC) and pharmacological modalities including low dose subcutaneous heparin (LDH) and low molecular weight heparin (LMWH) in general surgery.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
General surgical patients with DVT and pulmonary embolism (PE).

Setting
Secondary care setting. The study was carried out in London, UK.

Dates to which data relate
The dates were not stated, however, the studies reviewed were published between 1971 and 1990.

Source of effectiveness data
The effectiveness data were based on a review of previously completed studies.

Outcomes assessed in the review
The outcome assessed in the review was the reduction in the incidence rates of DVT in general surgery.

Study designs and other criteria for inclusion in the review
A large number of the studies identified were randomised controlled trials. No criteria were stated for inclusion or exclusion of studies.

Sources searched to identify primary studies
Not stated.

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

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

**Number of primary studies included**
In the studies reviewed for prophylactic regimens used in general surgery, 50 studies had no prophylaxis, 10 studies used graduated elastic compression (GEC), 11 studies included intermittent pneumatic compression (IPC), 59 studies used low dose subcutaneous heparin (LDH), and 18 studies used low molecular weight heparin (LMWH). The type of study was not stated.

**Methods of combining primary studies**
Narrative method.

**Investigation of differences between primary studies**
The authors did not investigate differences between primary studies.

**Results of the review**
The review of the literature suggested that GEC decreases the incidence of DVT by 64% in general surgery. In 6 studies, DVT occurred in 22.5% of 525 patients not receiving prophylaxis, whilst it occurred in only 8.2% of 541 patients in the treatment groups. In eleven studies, IPC was shown to produce a 74% reduction in the incidence of postoperative DVT. DVT occurred in 26% of 665 control patients as compared to 6.8% of treated patients. IPC is also effective in patients having hip replacement, reducing DVT by 61%, in 4 studies. In 32 general surgery studies, LDH decreases the incidence of DVT by approximately 57% (from 19.9% in the control groups to 8.5% in the treatment groups). In addition, it lowers the incidence of proximal DVT from 6% to 0.6%. The addition of GEC to LDH has decreased the incidence of DVT by 74%, from 17% in the LDH group to 4% in the group receiving LDH and GEC.

**Measure of benefits used in the economic analysis**
The measure of benefit used in the economic analysis was the reduction in the incidence rates of DVT in general surgery achieved through different modes of prophylaxis.

**Direct costs**
It is unclear whether costs were discounted. Quantities and costs were analysed separately. The costs and cost savings incurred through the various methods of prophylaxis were stated. For IPC, costing for the machine was conducted assuming an initial cost of 1,000 which depreciated over a five year period. The cost of leggings for IPC was calculated assuming that they were recycled for use for three patients, with 7 days per patient. The cost for treating DVT included the cost of diagnosis by duplex scans and the cost of treatment, which included a 7-day hospital stay (cost of hospital surgical bed, consumables, intravenous heparin, etc.). The total cost per 1000 patients was calculated on the basis of efficacy data and the cost of treating clinically manifest DVT. The hospital cost/quantity boundary was adopted. Quantity and cost data estimations were based on published information. Prices were not stated.

**Statistical analysis of costs**
Not conducted.

**Indirect Costs**
Not given.
Currency
UK pounds Sterling ()

Sensitivity analysis
Sensitivity analysis was not carried out.

Estimated benefits used in the economic analysis
GEC decreases the incidence of DVT by 64%. In eleven studies, IPC had been shown to produce a 74% reduction in the incidence of postoperative DVT. Also IPC was effective in reducing DVT by 61%, in 4 studies. Other studies revealed that IPC works better than LDH or LDH combined with dihydroergotamine. In 32 general surgery studies, LDH decreases the incidence of DVT by approximately 57%. The addition of GEC to LDH has decreased the incidence of DVT by 74%. A review of the literature suggests that LMWH produces a decrease in the incidence of DVT. The side effects associated with the pharmacological modalities were mentioned.

Cost results
For 100 patients, the cost of no prophylaxis was 23,300. The cost of GEC was close to 10,000 with savings near to 15,000. The cost of IPC was higher than GEC, just over 10,000 and produced less savings than GEC, (about 12,500). The costs of LDH and LMWH were almost the same at over 20,000 and the savings from both were around 2,500.

Synthesis of costs and benefits
Costs and benefits were reported separately. Whilst the immediate cost of no prophylaxis was zero, as compared to positive costs incurred in the prophylaxis group, the lowered incidence rate of DVT in the prophylaxis group resulted in cost savings.

Authors' conclusions
The cost of various methods of prophylaxis, including pharmacological as well as mechanical modalities, plus the cost of treating the few DVT that become clinically manifest despite prophylaxis, is less expensive than that of using no prophylaxis at all. GEC stockings are cost-effective in low-risk surgical patients and can be used in combination with other methods of prevention in moderate and high risk surgical patients. IPC is also a cost-effective modality of prophylaxis in general surgery. Mechanical prophylaxis provides the most cost-effective method for preventing DVT in patients undergoing low and moderate risk surgery.

CRD COMMENTARY - Selection of comparators
The comparator used was no prophylaxis. You should decide if this is a valid comparator in your own setting.

Validity of estimate of measure of benefit
The measure of benefit used was reduction in the incidence of DVT. Because there is no evidence of a systematic search of the literature for trials of effectiveness, it is not clear to what extent all relevant studies were included.

Validity of estimate of costs
Although the costing methodology was presented, it lacked detail. No prices were stated.

Other issues
The authors could have provided more information about the selection criteria as no judgement criterion were applied for assessing the validity of primary studies.
Source of funding
None stated.

Bibliographic details

Indexing Status
Subject indexing assigned by CRD

MeSH
Anticoagulants /administration & dosage /therapeutic use; Bandages /economics; Cost-Benefit Analysis; Costs and Cost Analysis; Heparin /therapeutic use /economics; Heparin, Low-Molecular-Weight /therapeutic use /economics; Injections, Subcutaneous; Postoperative Complications /prevention & control; Thrombophlebitis /prevention & control /therapy /drug therapy

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