Follow up ranged from 4 days to 6 months. Meta-analyses were done using a fixed effects model.

QUESTION: Do unfractionated heparin (UH), low molecular weight heparin (LMWH), or physical methods (compression stockings and calf or foot pumps) prevent deep venous thrombosis (DVT) and pulmonary embolism (PE) after surgery for hip fracture in elderly patients?

Data sources
Studies were identified by searching Medline (1966 to March 2002), CINAHL (1982 to February 2002), EMBASE/Excerpta Medica (1980 to March 2002), Current Contents (1993 Week 26 to 2002 Week 12), and the Cochrane Musculoskeletal Injuries Group specialised register (to March 2002); reviewing reference lists of identified trials and review articles; and contacting colleagues, trialists, and manufacturers. Randomised controlled trials (RCTs) in languages other than English were also included.

Study selection
Randomised or quasi-randomised clinical trials were included if they evaluated interventions to reduce DVT and PE in patients having surgery for proximal femoral fracture. Interventions included injectable anticoagulants (UH or LMWH) and physical agents (e.g., compression stockings and arteriovenous foot pumps), which were compared with placebo, no treatment, or each other. Trials that focused exclusively on children or high energy fracture in young adults were excluded. Main outcomes included DVT, PE, and death.

Data extraction
2 reviewers independently extracted data on study methods, participants, interventions, and outcomes. Methodological quality of individual studies was assessed for 11 aspects of internal and external validity.

Main results
31 trials involving 2958 patients (predominantly elderly women) met the selection criteria. Mean score for methodological quality was 14 out of 33 (range 3–29). Heparin (UH or LMWH) reduced the incidence of any DVT, proximal DVT, and distal DVT compared with placebo or control (table). The heparin and control or placebo groups did not differ for PE or mortality. No trials evaluated compression stockings. Mechanical pumping devices reduced the incidence of DVT and PE compared with control (table), but not mortality. LMWH reduced any DVT compared with UH; however, analysis of the 3 studies with methodological scores ≥ 16 showed no such difference. UH and LMWH did not differ for PE or mortality. 2 studies each found no difference between heparin and mechanical methods for any outcome.

Conclusions
Unfractionated and low molecular weight heparins reduce deep venous thrombosis, but not pulmonary embolism or death, after surgery for hip fracture. Mechanical pumping devices such as arteriovenous foot pumps reduce deep venous thrombosis and pulmonary embolism.
Review: heparin and mechanical pumping devices reduce deep venous thrombosis after surgery for hip fracture

Evid Based Nurs 2003 6: 82
doi: 10.1136/ebn.6.3.82

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