J.22 Fragility fractures of the pelvis, hip and proximal femur

Study	[National Clinical Guideline Centre 2010[666]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design**: Decision analytic model **Approach to analysis:** A decision tree model was developed based on the results of a systematic literature review and a network meta-analysis. **Perspective:** UK NHS and PSS **Time horizon:** VTEs and major bleeding events modelled for the acute period (10 days). QALYs and health service costs arising from these events are modelled over	**Population:** Adults admitted for hip fracture surgery in England. **Cohort settings: (HES data)** Start age: 82 years Male: 23% **Interventions:** 1. Fondaparinux sodium (2.5 mg subcutaneously) 2.Warfarin variable dose (adjusted to INR range 2 to 3, average dose 4mg/day) 3. LMWH (average of dalteparin 5000 units subcutaneous daily) and enoxaparin (4000 units subcutaneous daily) 4. UFH (5000 units three times daily)	**Total costs (mean per patient):** NR Incremental (2–1): NR (95% CI: NR; p=NR) **Currency & cost year:** 2009 UK pounds **Cost components incorporated:** Pharmacological prophylaxis costs, prophylaxis testing, nurse time, VTE diagnosis and treatment costs, other events treatment costs (i.e. stroke, PTS, CTEPH, major bleeding, reoperation)	**QALYs (mean per patient):** NR Incremental (2–1): NR (95% CI: NR; p=NR)	**Incremental net monetary benefit (INMB)** (pa) Intervention 1: £2148 (rank 1) Intervention 2: £1830 (rank 2) Intervention 3: £1711 (rank 3) Intervention 4: £1465 (rank 4) Intervention 5: £999 (rank 5) Intervention 6: £558 (rank 6) Intervention 7: £0 (rank 7) Probability cost-effective (£20K threshold): Intervention 1: 85% Intervention 2: 4.2% Intervention 3: 4.5% Intervention 4: 0.6% Intervention 5: 5.7% Intervention 6: 0.0% Intervention 7: 0.0%

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the patient's lifetime **Treatment effect duration:**[a] 10 days **Discounting:** Costs: 3.5% ; Outcomes: 3.5%	5. IPCD-FID 6.Aspirin (High dose) 7. No prophylaxis			**Analysis of uncertainty:** Deterministic and probabilistic sensitivity analyses were performed. The deterministic SAs explored the impact of changing the incidence of CTEPH and PTS and their costs, including HIT, changing its incidence, lower costs for LMWH, changing fatality rate after PE and MB and change the cost effectiveness threshold. In all analyses, fondaparinux remained as the most cost-effective strategy. A two-way threshold analysis exploring the impact of baseline risk for both major bleeding and PE was also undertaken. It showed that as the risk of bleeding increases and the risk of PE decreases, LMWH becomes the most cost-effective option.

Data sources

Health outcomes: baseline events were obtained from the no prophylaxis arm of the RCTs included in the systematic review and NMA that informed the model. Relative treatment effects for DVT (symptomatic and asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** utilities based on the EQ-5D UK tariff were sourced from the published literature and previous guidelines. **Cost sources:** standard sources on unit costs in the UK were used including the drug tariff, the NHS reference costs and the BNF.

Comments

Source of funding: National Institute for Health and Care Excellence (NICE). **Limitations:** Some uncertainty regarding the applicability of unit costs from 2009 to current NHS context. Some of the interventions are not included in the current clinical review, for example aspirin (high dose), warfarin (variable dose) and UFH. The relative treatment effect applied to all VTE events in the model is the relative treatment effect obtained from the DVT NMA.

Overall applicability:[b] Partially applicable   **Overall quality**[c] Minor limitations

Abbreviations: BNF: British National Formulary; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; da: deterministic analysis; da: deterministic analysis; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); FID: foot impulse devices; HES: Hospital Episode statistics; HIT: Heparin induced thromboembolism; ICER: incremental cost-effectiveness ratio; INMB: incremental net monetary benefit; IPCD: intermittent pneumatic compression

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devices; LMWH: low molecular weight heparin; NR: not reported; NMA: network meta-analysis; pa: probabilistic analysis; PE: pulmonary embolism; QALYs: quality-adjusted life years; SA: sensitivity analysis; UFH: unfractionated heparin.

(a) For studies where the time horizon is longer than the treatment duration, an assumption needs to be made about the continuation of the study effect. For example, does a difference in utility between groups during treatment continue beyond the end of treatment and if so for how long.

(b) Directly applicable / Partially applicable / Not applicable

(c) Minor limitations / Potentially serious limitations / Very serious limitations

Study	[National Clinical Guideline Centre 2010[666]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design**: Decision analytic model **Approach to analysis:** A decision tree model was developed based on the results of a systematic literature review and a direct meta-analysis of the trials that randomised patients at the point of discharge. **Perspective:** UK NHS and PSS **Time horizon:** VTEs and major bleeding events modelled for the acute period 28 days). QALYs and health service costs arising from these events are modelled over the patient's lifetime **Treatment effect**	**Population:** Adults admitted for hip fracture surgery in England. **Cohort settings: (HES data)** Start age: 82 years Male: 23% **Interventions 1:** No post discharge prophylaxis (it is not clear whether prophylaxis was given during the initial hospital stay) **Intervention 2:** Post-discharge prophylaxis with fondaparinux 2.5 mg given subcutaneously once daily.	**Total costs (mean per patient):** NR Incremental (2–1): NR (95% CI: NR; p=NR) **Currency & cost year:** 2009 UK pounds **Cost components incorporated:** Pharmacological prophylaxis costs, prophylaxis testing, nurse time, VTE diagnosis and treatment costs, other events treatment costs (i.e. stroke, PTS, CTEPH, major bleeding, reoperation)	**QALYs (mean per patient):** NR Incremental (2–1): NR (95% CI: NR; p=NR)	**Incremental net benefit (INB)** (pa) Intervention 1: £0 Intervention 2: £239 Probability cost-effective (£20K threshold): Intervention 1: 8.0% Intervention 2: 92.0% **Analysis of uncertainty:** Deterministic and probabilistic sensitivity analyses were performed. The deterministic SAs explored the impact of changing the incidence of CTEPH and PTS and their costs, including HIT, changing its incidence, lower costs for LMWH, changing fatality rate after PE and MB and change the cost effectiveness threshold. In all SAs, the most cost effective strategy remained the same (fondaparinux). A two-way threshold analysis exploring the impact of baseline risk for both major bleeding and PE was also

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Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
duration:[a] 28 days **Discounting:** Costs: 3.5% ; Outcomes: 3.5%				undertaken. It showed that as the risk of bleeding increases and the risk of PE decreases, no prophylaxis becomes the most cost-effective option.

Data sources

Health outcomes: baseline events were obtained from the no prophylaxis arm of the RCTs included in the systematic review and direct meta-analysis that informed the model. Relative treatment effects for DVT (symptomatic and asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** utilities based on the EQ-5D UK tariff were sourced from the published literature and previous guidelines. **Cost sources:** standard sources on unit costs in the UK were used including the drug tariff, the NHS reference costs and the BNF.

Comments

Source of funding: National Institute for Health and Care Excellence (NICE). **Limitations:** Some uncertainty regarding the applicability of unit costs from 2009 to current NHS context. The relative treatment effect applied to all VTE events in the model is the relative treatment effect obtained from the DVT MA.

Overall applicability:[b] Partially applicable   **Overall quality**[c] potentially serious limitations

Abbreviations: BNF: British National Formulary; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; da: deterministic analysis; da: deterministic analysis; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); HES: Hospital Episode statistics; HIT: Heparin induced thromboembolism; ICER: incremental cost-effectiveness ratio; NR: not reported; NMA: network meta-analysis; pa: probabilistic analysis; PE: pulmonary embolism; QALYs: quality-adjusted life years; SA: sensitivity analysis.

(a) *For studies where the time horizon is longer than the treatment duration, an assumption needs to be made about the continuation of the study effect. For example, does a difference in utility between groups during treatment continue beyond the end of treatment and if so for how long.*

(b) *Directly applicable / Partially applicable / Not applicable*

(c) *Minor limitations / Potentially serious limitations / Very serious limitations*