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Article:

Decision-analysis modelling of the effects of thromboprophylaxis for people with lower limb immobilisation for injury

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Aims/objectives/background

Pharmacological thromboprophylaxis reduces the risk of symptomatic venous thromboembolism (VTE) in people with lower limb immobilisation due to injury but can increase the risk of bleeding. We used decision-analytic modelling to compare the risks and benefits of thromboprophylaxis and determine the overall benefit of treatment.

Methods/design

A decision-analytic model was developed to simulate the management of a cohort of people with lower limb immobilisation due to injury according to different thromboprophylaxis strategies, including thromboprophylaxis for all and thromboprophylaxis for none. Costs were estimated from the perspective of the UK National Health Service and Personal Social Services. A six-month decision tree was used to model rates of prophylaxis, VTE events (pulmonary embolism [PE], deep vein thrombosis [DVT]) and major bleeds). A Markov model with a lifetime horizon was used to extrapolate costs and QALY losses associated with chronic complications following VTE or bleeding events. The health states included within the Markov model captured the risk of post-thrombotic syndrome (PTS) following VTE and the risk of chronic thromboembolic pulmonary hypertension (CTEPH) following PE. QALYs were estimated by applying estimates of health utility to life expectancy after each of the events in the model.

Results/conclusions

The results suggest that the combined rate of serious acute adverse outcomes (intracranial haemorrhage [ICH], death from VTE or bleeding) would be around 1 in 4000 regardless of thromboprophylaxis use. As shown in Table 1, the short-term benefits of thromboprophylaxis lie in reducing the rates of non-fatal PE, symptomatic DVT and asymptomatic DVT, with associated longer-term benefits of reduced risks of PTS and CTEPH. Overall, thromboprophylaxis is estimated to result in 0.015 additional QALYs per patient. Our findings suggest that the benefits of thromboprophylaxis lie in reducing long-term consequences of VTE rather than reducing the risk of acute serious adverse events.

Table 1: Predicted clinical outcomes per 100,000 patients with lower limb immobilisation due to injury

		No prophylaxis	Prophylaxis
Outcomes at 6 months per 100,000 patients	Fatal PE	12	7
	Fatal bleed	9	12
	Non-fatal ICH	5	8
	Other major bleed	26	35
	Non-fatal PE	415	225
	Symptomatic DVT	907	492
	Asymptomatic DVT	7052	3820
Outcomes at 5 years per 100,000 patients	PTS	1859	1007
	PE survivor with CTEPH	11	6
	PE survivor without CTEPH	397	215
	ICH survivor	5	7
	Dead (any cause)	1133	1129