Cost-effectiveness of rivaroxaban versus enoxaparin for thromboprophylaxis after total hip replacement in the UK

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Introduction

- **Venous thromboembolism (VTE: the composite of deep vein thrombosis [DVT] and pulmonary embolism [PE]) is the outcome of a clot, which forms within a vein and then travels through the blood vessels to a different site**
- **Total hip replacement (THR) surgery is an important risk factor for VTE[1]**
- **With more than 65,000 THRs being performed in the UK annually, the potential public health risk is sizeable[2]**
- **Rivaroxaban is a novel, once-daily, direct inhibitor of Factor Xa that received marketing approval in the EU and in Canada for the prevention of VTE after elective THR and total knee replacement. Unlike existing low molecular weight heparins such as enoxaparin, rivaroxaban is administered orally**
- **In two pivotal randomized controlled trials in patients undergoing THR, rivaroxaban reduced total VTE (composite of any DVT, non-fatal PE and all-cause mortality) by 70% versus enoxaparin (both 35 days)[3], whereas 35 days' rivaroxaban reduced total VTE by 79% and symptomatic VTE by 80% versus 12 days' enoxaparin followed by placebo.[4] There was a similar level of major bleeding in both arms**

Objective

- The aim of this study was to assess the cost-effectiveness of rivaroxaban versus enoxaparin for the prevention of VTE after THR in the UK

Methods

- An economic model assessed the cost-effectiveness of rivaroxaban versus enoxaparin from the UK National Health Service and personal and social services perspective. The analysis initially models the period from surgery to up to 90 days after surgery (Figure 1), followed by long-term complications such as recurrent VTE and post-thrombotic syndrome (PTS) from 90 days to 5 years after surgery (Figure 2)

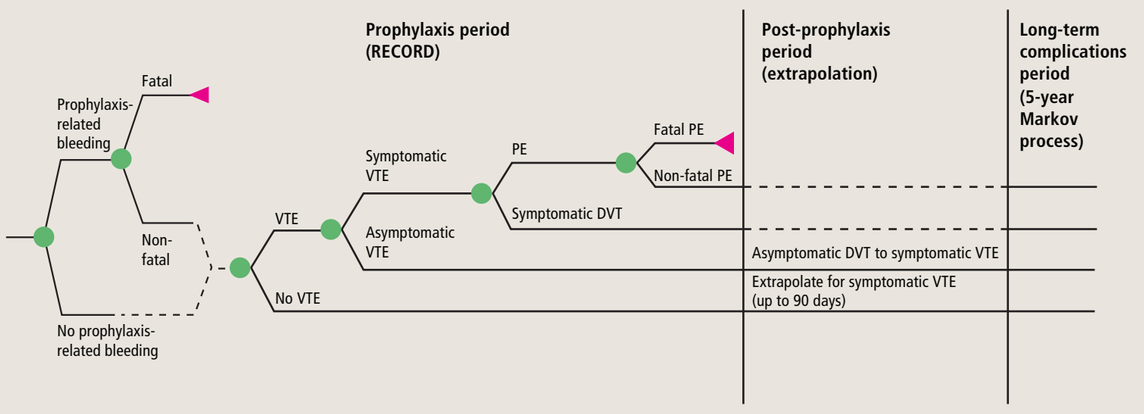

Figure 1. Prophylaxis and post-prophylaxis phases of the model. DVT, deep vein thrombosis; PE, pulmonary embolism. VTE, venous thromboembolism.

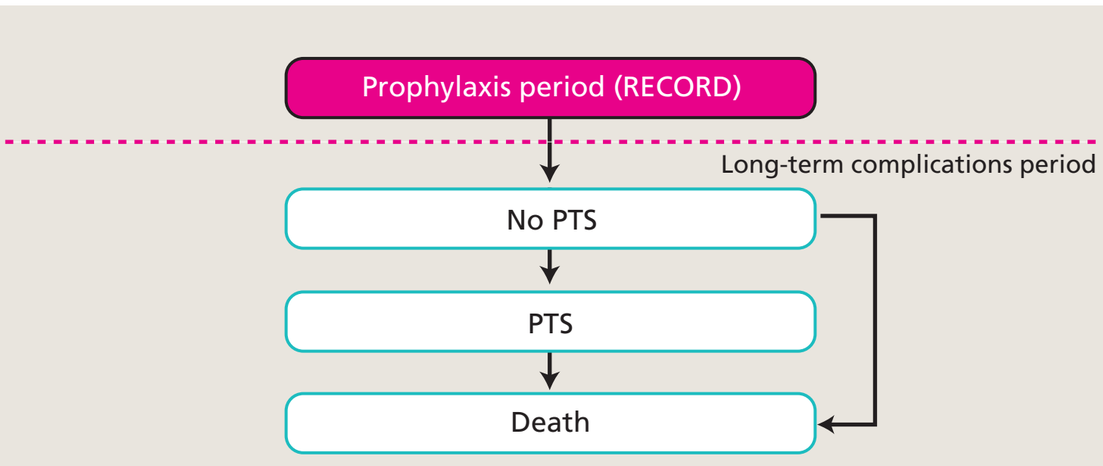

Figure 2. Long-term complications phase of the model. Note: recurrent venous thromboembolism is modelled as a transitory event. PTS, post-thrombotic syndrome.

- Event probabilities during prophylaxis were derived from RECORD1 and 2 data. The probability of asymptomatic events developing into symptomatic events after prophylaxis was based on published clinical data.[5] The estimated risks of VTE and PTS beyond the initial 90 days after surgery were based on epidemiological data[6,7]
- Resource consumption and associated costs of symptomatic events (2008 pounds [£]) were derived from published sources.[1,8–10] The fact that rivaroxaban is an oral drug, with no monitoring requirements, resulted in the following savings
  - 8% of patients require daily nurse visits to inject subcutaneous enoxaparin (the remainder self-inject), at £24 per visit[1,8]
  - While in hospital, enoxaparin patients require a full blood count at baseline and then every 2–4 days until 14 days, at £2.35 per test[1,8]
- Utilities associated with DVT and PE[11] and long-term complications[12] were taken from a systematic literature review. Utilities were adjusted for the fact that patients had undergone THR[13]
- Costs and outcomes beyond the first year were discounted at 3.5% per annum. Probabilistic sensitivity analyses were conducted. Event probabilities and utilities used a beta distribution, whereas costs used either a normal or gamma distribution

Results

- When comparing 35 days' rivaroxaban with 35 days' enoxaparin based on RECORD1, rivaroxaban yielded a gain of 0.004 quality-adjusted life years (QALYs) and saved £68.35 per patient. Savings were driven mainly by reduced outpatient administration costs and in savings associated with long-term complications (Table 1)

Table 1. Cost-effectiveness of rivaroxaban versus enoxaparin after total hip replacement in the UK

	Rivaroxaban	Enoxaparin	Incremental
35 days' rivaroxaban versus 35 days' enoxaparin (RECORD1)			
Prophylaxis-related costs	£182.50	£224.22	–£41.72
Cost of events: 0–90 days	£21.63	£25.93	–£4.30
Cost of long-term complications	£13.28	£35.61	–£22.32
Total costs	**£217.41**	**£285.76**	**–£68.35**
QALYs	3.5928	3.5887	0.0041
Rivaroxaban saves £68.35 per patient and produces a gain of 0.0041 QALYs per patient			
35 days' rivaroxaban versus 12 days' enoxaparin followed by placebo (RECORD2)			
Prophylaxis-related costs	£182.50	£89.58	£92.92
Cost of events: 0–90 days	£18.08	£32.76	–£14.68
Cost of long-term complications	£23.40	£126.48	–£103.50
Total costs	**£223.98**	**£248.82**	**–£24.83**
QALYs	3.5906	3.5712	0.0194
Rivaroxaban saves £24.83 per patient and produces a gain of 0.0194 QALYs per patient			

QALY, quality-adjusted life year.

- Probabilistic sensitivity analyses showed dominance in 98% of cases versus 35 days' enoxaparin (Figure 3)
- When compared to 12 days' enoxaparin followed by placebo, based on RECORD2, 35 days' rivaroxaban resulted in a QALY gain of 0.0194 and savings of £24.83 per patient. This result was primarily driven by improved efficacy for the extended rivaroxaban regimen and in substantial savings in long-term complications (Table 1)
- Probabilistic sensitivity analyses showed dominance in 57% of cases versus 12 days' enoxaparin (Figure 4)
- In addition, the cost-effectiveness acceptability curve (Figure 4) shows that rivaroxaban is 100% cost-effective at a threshold of less than £15,000 per QALY
- These results demonstrate that baseline results are reliable and withstand changes to the value of key variables

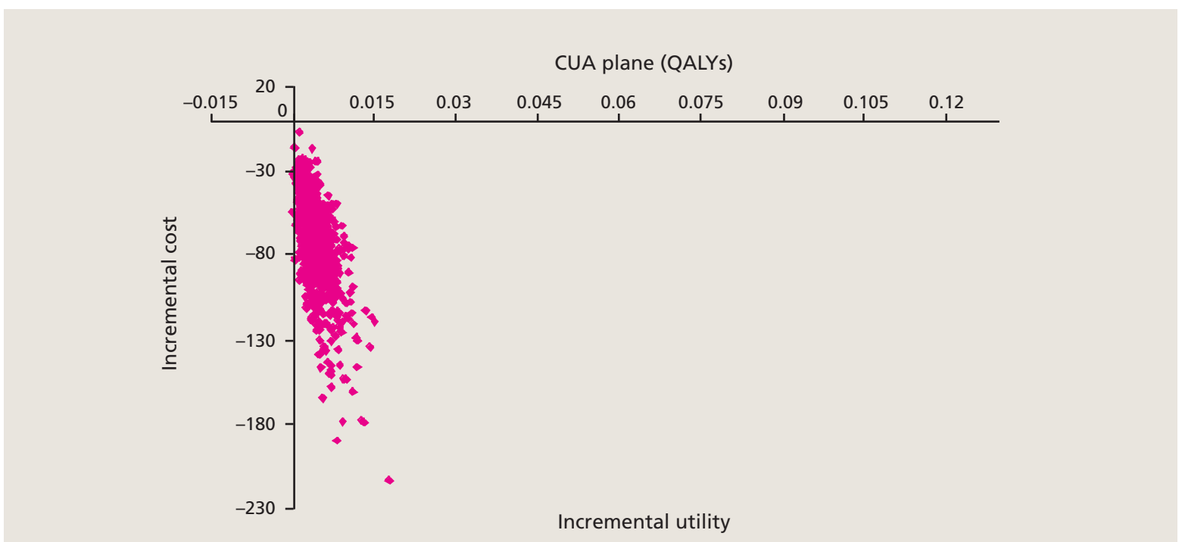

Figure 3. Plot of incremental cost versus incremental quality-adjusted life years: 35 days' rivaroxaban versus 35 days' enoxaparin (RECORD1). The figure shows that rivaroxaban produces cost savings and QALY gains, and is thus the dominant strategy, in more than 98% of simulations versus 35 days' enoxaparin. CUA, cost-utility analysis; QALY, quality-adjusted life year.

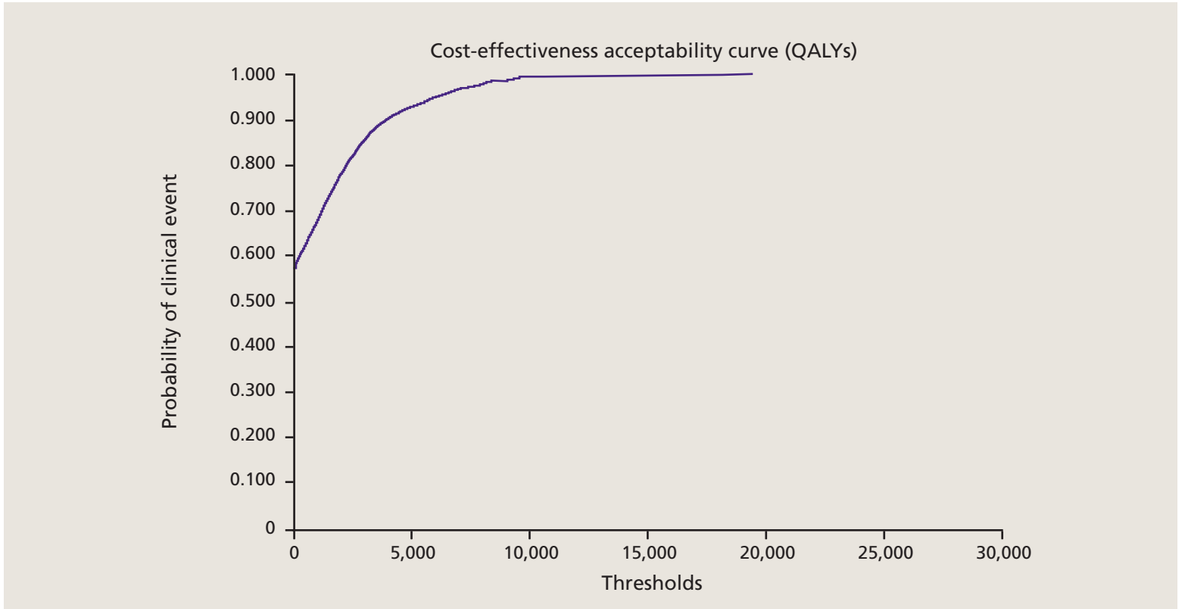

Figure 4. Cost-effectiveness acceptability curve: 35 days' rivaroxaban versus 12 days' enoxaparin (RECORD2). Thresholds are shown in UK pounds (£). QALY, quality-adjusted life year.

Conclusions

- **Rivaroxaban produced gains in QALYs and is cost-saving against both 12-day and 35-day regimens of enoxaparin after THR**
- **Disaggregated results show that the savings associated with long-term complications are key drivers of these overall cost savings**
- **Probabilistic sensitivity analyses show that these results are robust**

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Disclosures

This study was supported by Bayer HealthCare AG and J&JPRD. Xarelto® (rivaroxaban) is licensed in the EU and in Canada for the prevention of venous thromboembolism after elective total hip or knee replacement. The data contained within this poster do not support or recommend the use of Xarelto in any other indication or countries in which it is not licensed.

Abstract PHC9 presented at the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) 11th Annual European Congress, Hilton Athens, Athens, Greece; 8–11 November 2008