

## **Costing statement: rivaroxaban for the prevention of venous thromboembolism after total hip or total knee replacement in adults**

The guidance on rivaroxaban for the prevention of venous thromboembolism after total hip or total knee replacement in adults (NICE technology appraisal guidance TA170) is unlikely to result in a significant change in NHS resource above levels already identified in previous NICE costing work. It may though have the potential to produce savings.

The guidance states that rivaroxaban, within its marketing authorisation, is recommended as an option for the prevention of venous thromboembolism in adults having elective total hip replacement surgery or elective total knee replacement surgery.

### **Patient numbers affected**

Each year in England the NHS carries out about 51,800 elective total hip replacements and about 59,200 elective total knee replacements<sup>1</sup>.

### **Current thromboprophylaxis practice**

For both total hip replacement and total knee replacement the most frequently prescribed treatment is low molecular weight heparin (LMWH)<sup>2</sup>.

**Table 1 Current thromboprophylaxis regimes for primary hip and knee replacement patients prescribed in 2007**

Drug	Primary hip replacement	Primary knee replacement
Aspirin	23%	24%
Low dose heparin	1%	1%
LMWH	64%	62%
Pentasaccharide	1%	1%
Warfarin	1%	1%
Other chemical	2%	1%

NICE guidance on venous thromboembolism (NICE clinical guideline 46)<sup>3</sup> recommends that people who have orthopaedic surgery should be offered LMWH or fondaparinux. The cost of this was included in the costing report for the guideline.

In NICE technology appraisal 157, dabigatran etexilate is recommended as an option for the primary prevention of venous thromboembolic events in adults who have undergone elective total hip replacement surgery or elective total knee replacement surgery<sup>4</sup>.

We have assessed the cost of using rivaroxaban in place of LMWH, fondaparinux or dabigatran etexilate for people having total hip replacement or total knee replacement.

Table 2 gives the typical average duration of treatment and drug cost for LMWH, fondaparinux, dabigatran and rivaroxaban. Actual treatment durations and doses may vary.

**Table 2 Estimated drug costs for total hip replacement and total knee replacement**

Drug	Daily dose	Daily drug cost	Total hip replacement treatment duration (days)	Total knee replacement treatment duration (days)	Cost of course (total hip replacement)	Cost of course (total knee replacement)
LMWH*	4000 units	£4.20	30	8	£126.00	£33.60
Fondaparinux	2.5 mg	£6.66	30	8	£199.80	£53.28
Dabigatran	210 mg	£4.20	32	10	£134.50	£42.00
Rivaroxaban	10 mg	£4.50	33	15	£148.50	£68.00

\* The daily cost of LMWH is estimated as £4.20. Prescription cost analysis data suggest the most commonly prescribed LMWH is enoxaparin (£4.20 a day). Dalteparin (£2.82 a day) and tinzaparin (£3.83 a day) are also prescribed.

### Savings and benefits

The external reference group<sup>5</sup> (ERG) reported that rivaroxaban was estimated to be associated with an average cost saving of around £67 per patient, when compared to LMWH. Assuming that currently 63% of the total elective hip and knee replacement patients receive LMWH (69,930 patients). The potential savings will depend on how many switch from prescribing LMWH to rivaroxaban, as rivaroxaban is recommended as an option.

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Table 3 investigates the potential savings that may be achieved with a switch from LMWH to rivaroxaban..

**Table 3 Potential savings through a change in prescribing**

Target population	Switch to rivaroxaban %	Number switching	Potential saving per patient	Potential total saving £000s
69,930	5	3497	67	234
69,930	10	6993	67	469
69,930	15	10,490	67	703
69,930	20	13,986	67	937

### **Resource impact**

It is believed that implementation of this technology appraisal will not result in a significant increase in NHS prescribing costs above levels identified in the costing for NICE clinical guideline 46.

It may, however, result in savings as discussed above.

### **References**

1. Hospital episodes statistics (HES) data (2007/08): total hip replacement (W37,W38 & W30), total knee replacement (W40, W41).
2. National Joint Registry for England and Wales (2008) 5th Annual Report)
3. National Institute for Health and Clinical Excellence (2007) Venous thromboembolism: reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in inpatients undergoing surgery. NICE clinical guideline 46. London: National Institute for Health and Clinical Excellence. Available from: [www.nice.org.uk/CG046](http://www.nice.org.uk/CG046)
4. National Institute for Health and Clinical Excellence (2008) Dabigatran etexilate for the prevention of venous thromboembolism after hip or knee replacement surgery in adults. NICE technology appraisal 159. London: National Institute for Health and Clinical Excellence. Available from: [www.nice.org.uk/TA159](http://www.nice.org.uk/TA159)
5. School for Health & Related Research [Commissioned by National Institute for Health & Clinical Excellence]. Rivaroxaban for the prevention of venous thromboembolism. National Institute for Health and Clinical Effectiveness (2009)