

# Readmission after hysterectomy and prophylactic low molecular weight heparin: retrospective case-control study

Gary Cook, John Depares, Maneesh Singh, Patrick McElduff

## Abstract

**Objective** To determine whether use of tinzaparin, a low molecular weight heparin introduced for prophylactic management of deep vein thrombosis, increases the risk of serious postoperative bleeding leading to a higher than expected 28 day readmission rate after discharge for hysterectomy.

**Design** Retrospective case-control study using computerised hospital inpatient data and review of case notes.

**Setting** District general hospital.

**Subjects** 2108 patients undergoing hysterectomy between August 1997 and March 2003

**Main outcome measures** Readmission and reoperation associated with bleeding.

**Results** 54 cases of serious postoperative bleeding were identified, 46 of which were readmissions. These 54 cases were compared with 179 controls. Regression analysis indicated a positive relation between prophylaxis with tinzaparin and serious postoperative bleeding. There was a significant twofold increase in odds (odds ratio 2.02, 95% confidence interval 1.02 to 4.05) after adjustment for type of operation, age, and type of pain relief.

**Conclusions** In the prophylactic treatment of thromboembolic disease after hysterectomy, compared with calci-heparin, tinzaparin is associated with a twofold increase in risk of serious postoperative bleeding.

## Introduction

Clinical indicators, such as emergency readmissions to hospital within 28 days of discharge, are increasingly used to assess the quality of hospital care.<sup>1 2</sup> From 2000 to 2003, such indicators showed a 20-30% excess of such readmissions after elective hysterectomy at Stockport NHS Foundation Trust. An initial audit project suggested two potential contributory factors: either readmissions for post-procedural care (first noted in the year 1998-9 and peaking in 2001-2) or readmissions because of post-procedural complications in particular bleeding.

Gynaecologists at the hospital suggested that the rise and fall in rates may have been associated with the introduction and withdrawal of tinzaparin for deep vein thrombosis prophylaxis. We therefore carried out a retrospective case-control study to quantify the excess risk associated with the use of tinzaparin (a low molecular weight heparin).

## Methods

We assessed all patients who were readmitted within 28 days after discharge after hysterectomy or who returned to theatre within 28 days from August 1997 to March 2003 inclusive. Case notes were reviewed and the reasons for readmission/reoperation were classi-

fied as post-procedural care (for example, removal of stitch); serious postoperative bleeding (vault or wound haematoma, and postoperative bleeding); other postoperative complications; and development of a new acute medical or surgical problem (unrelated to the initial admission).

To act as a control group we selected a random sample from all other women who had a hysterectomy during the same time period. We recorded basic demographic data and details of preoperative heparin. The standard treatment for prevention of thromboembolic disease was either calci-heparin 5000 units twice a day or tinzaparin 3500 units once a day. Tinzaparin was introduced during June 1999 and withdrawn from April 2001 after a perceived increase in the number of cases of postoperative bleeding. The practice returned to the use of unfractionated heparin (calci-heparin), which was the prophylaxis of choice before the introduction of the tinzaparin.

We used  $\chi^2$  tests to test for differences between cases and controls and logistic regression to examine the association between case-control status and prophylaxis with either calci-heparin or tinzaparin, with adjustment for potential confounders (age, operation type (vaginal or abdominal), and type of postoperative pain relief).

## Results

From the 2108 hysterectomies (71% abdominal, mean age 50.7 years (range 23.0-92.5)), we identified 54 cases of serious postoperative bleeding, 46 of which were readmissions. The table shows the numbers of readmissions in each category.

The rise and fall in re-admissions because of serious postoperative bleeding peaked in the period 1999-2001, coinciding with the changes in prophylaxis. During the period when tinzaparin was used, 28 of 40 (70%) readmissions for any postoperative complication were related to bleeding compared with 18 of 41 (44%) for the years when calci-heparin was used ( $\chi^2$  5.62, 1 df;  $P=0.018$ ).

Of the 54 cases and 179 controls selected for the study, seven cases and 21 controls received no prophylaxis. Twenty three of the remaining 47 cases and 52 of the 158 controls were given tinzaparin. Regression analysis indicated a positive relation between tinzaparin prophylaxis and serious postoperative bleeding. There was a significant twofold increase in odds (odds ratio 2.02, 95% confidence interval 1.02 to 4.05) after adjustment for type of operation, age, and type of pain relief.

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Hysterectomies and 28 day readmissions to a district general hospital, 1997-2003. Figures are numbers (percentages)

	1997-8*	1998-9	1999-2000	2000-1	2001-2	2002-3	All years
No of hysterectomies	275	409	376	341	357	350	2108
Reason for readmission:							
Serious postoperative bleeding	3 (1.1)	2 (0.5)	14 (3.7)	14 (4.1)	6 (1.7)	7 (2.0)	46 (2.2)
Other postoperative complications	4 (1.5)	8 (2.0)	7 (1.9)	5 (1.5)	3 (0.8)	8 (2.3)	38 (1.8)
New acute medical or surgical problem	3 (1.1)	8 (2.0)	8 (2.1)	4 (1.2)	8 (2.2)	7 (2.0)	35 (1.7)
Postprocedural care	0 (0.0)	3 (0.7)	3 (0.8)	3 (0.9)	9 (2.5)	3 (0.9)	21 (1.0)
Total readmissions	10 (3.6)	21 (5.1)	32 (8.5)	26 (7.6)	26 (7.3)	25 (7.1)	140 (6.6)

\*1997-8 is a part year of eight months.

**What is already known on this topic**

Deep vein thrombosis and pulmonary embolism are risks after hysterectomy

Prophylaxis with anticoagulants is effective

**What this study adds**

Tinzaparin, a low molecular weight heparin, may result in a doubling of postoperative bleeding and an increased risk of readmission

**Discussion**

From 1997-8 to 1999-2000 there was a twofold increase in the risk readmission in the 28 days after hysterectomy and a twofold increase in the risk of serious postoperative bleeding in women given tinzaparin compared with those given calci-heparin. While previous studies have shown conflicting results,<sup>3-5</sup> our results indicate that tinzaparin is associated with an increased risk of bleeding after hysterectomy. This may be the case in other trusts with high readmission rates.

Our study shows that clinical performance indicators are useful in the monitoring of quality of care and outcomes. Early warning of adverse trends would be enhanced through reporting complications

such as these within a clinical incident reporting process and better clinical information systems.

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Ethical approval: The study was approved by the local research ethics committee.

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**Does amblyopia affect educational, health, and social outcomes? Findings from 1958 British birth cohort**

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**Abstract**

**Objective** To determine the association of amblyopia with diverse educational, health, and social outcomes in order to inform current debate about population screening for this condition.

**Design, setting, and participants** Comparison of 8432 people with normal vision in each eye with 429 (4.8%) people with amblyopia (childhood unilateral reduced acuity when tested with correction and unaccounted for by eye disease) from the 1958 British birth cohort, with respect to subsequent health and social functioning.

**Results** No functionally or clinically significant differences existed between people with and without amblyopia in educational outcomes, behavioural

difficulties or social maladjustment, participation in social activities, unintended injuries (school, workplace, or road traffic accidents as driver), general or mental health and mortality, paid employment, or occupation based social class trajectories.

**Conclusions** It may be difficult to distinguish, at population level, between the lives of people with amblyopia and those without, in terms of several important outcomes. A pressing need exists for

 Tables A-D are on [bmj.com](http://bmj.com).

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