Implementation of Thromboprophylaxis Guidelines

Abstract:
A Cregan, JR Higgins, S O'Shea
Anu Research Centre, UCC Department of Obstetrics and Gynaecology, Cork University Maternity Hospital, Wilton, Cork

Abstract
Venous thromboembolism (VTE) remains one of the leading direct causes of maternal death.4-6 Risk factors for VTE and prophylaxis guidelines have been highlighted by the Royal College of Obstetricians and Gynaecologists (RCOG). A cross-sectional study was completed in Cork University Maternity Hospital (CUMH) to determine pattern of VTE risk and compliance with 2004 RCOG guidelines. 364 women's charts were reviewed. Forty percent (n=145) were at risk for VTE, 6% (n=100) of these received thromboprophylaxis but only 54% (n=54) received the correct weight adjusted dose. Three of four morbidly obese women in this study received recommended thromboprophylaxis but none at the appropriate dose. Only 67% (n = 245) had a recorded body mass index (BMI). Increased BMI is a significant risk factor for VTE and should be measured and recorded at the booking visit. Awareness of the risks for VTE and the need for appropriate dosing should be improved.

Introduction
VTE is one of the leading direct causes of maternal mortality in the developed world. In the latest Centre for Maternal and Child Enquiries (CMACE) report the maternal mortality rate in the UK was 0.79 per 100,000 deliveries, a fall from the previous 1.56 per 100,000. This was the first triennial data after the publication of the RCOG guideline for thromboprophylaxis in 2004 and recorded that 18 mothers died as a result of VTE, 16 of whom had known risk factors for VTE. It was emphasised that there is still a need for improvement in risk profiling of women throughout pregnancy and implementation of appropriate thromboprophylaxis antenatal and in the puerperium. The RCOG guidelines were further updated in 2009. The ongoing need for maternity services to audit their standards to ensure compliance with expert guidelines and to use standardised assessment tools throughout pregnancy to identify women at risk who are widely accepted. Evidence from large non pregnant studies demonstrates high levels of non-compliance with relevant thromboprophylaxis guidelines. We hypothesised that levels of non-compliance with guidelines would be similar in an obstetric in-patient population. To test this hypothesis and to add data specific to an obstetric in-patient population, we undertook this study.

Methods
Our cross-sectional study was completed on four separate sampling days between April and July 2009 in CUMH, a large tertiary referral centre. All women who were obstetric in-patients on each day of sampling were included and this study was performed by ward based chart review. The RCOG green top guidelines 2004 were used as the benchmark for assessment. In this guideline, all women post vaginal delivery with two or more risk factors, all emergency lower segment caesarean section (LSCS) cases, all elective LSCS cases with at least one additional risk factor and all antenatal cases with three or more risk factors were considered at risk and therefore eligible to receive thromboprophylaxis. Information on type and dosing regimen of low molecular weight heparin (LMWH) was recorded and compared with RCOG recommendations to assess if provision was in accordance with the regimen in the 2004 guidelines.4

Results
A total of 364 charts were reviewed. Of these, 102 (28%) were antenatal and 262 (72%) were postpartum. 109 (42%) women were postpartum and were post LSCS. Of these 38 (35%) had an emergency LSCS and 71 (65%) had an elective LSCS.

Identification of women meeting criteria for thromboprophylaxis
145 (40%) women were at risk for VTE according to the criteria in the 2004 RCOG guidelines as demonstrated in Table 1. Of the 145 women at risk for VTE, 100 (69%) received thromboprophylaxis. The 45 women that did not receive the recommended thromboprophylaxis can be categorised into three groups; post vaginal delivery, antenatal and post elective LSCS. The vast majority (n = 34) were women post vaginal delivery with two or more risk factors, followed by 10 women who were antenatal with three or more risk factors. One woman was post elective LSCS with one additional risk factor (see Table 2). 34 women were receiving thromboprophylaxis when it would not be recommended by the guidelines. 20 were women post elective LSCS with no other risk factors, 13 were antenatal women with two or more existing risk factors, 13 were morbidly obese and the remaining six (6%) had no weight recorded. In all cases the LMWH used in CUMH was tinzaparin and the 2004 RCOG dosing regimen was applied.

At risk for VTE, % of all 364 women
- Adequacy of thromboprophylaxis dosage
Of the 100 women who appropriately received thromboprophylaxis, 54 (54%) received the correct weight adjusted dose, 39 (39%) received too small a dose, one (1%) received too high a dose and the remaining six (6%) had no weight recorded. In all cases the LMWH used in CUMH was tinzaparin and the 2004 RCOG dosing regimen was applied.

Compliance with 2009 guidelines
For the completion of this study the RCOG released updated thromboprophylaxis guidelines.4 The results of this study were also compared to these guidelines (see table 3). A further 19 women would have been eligible to receive thromboprophylaxis (n=64) but didn't. This is due to the addition of smoking and of reducing parity from 4 to 3 as risk factors. A total of these women were post vaginal delivery with one existing risk factor and scored an additional risk factor by the new guidelines because they were either smokers or had a parity of 3 or over. Three of these women were antenatal smokers with two other existing risk factors. All six women that were morbidly obese would be automatically eligible for thromboprophylaxis based on BMI alone. The number of women receiving the appropriate weight adjusted dose would be the same if the 2009 dosing regimen was applied. Only 28 women would have received thromboprophylaxis inappropriately according to these guidelines. The reduction in this figure is because six of the 20 women post elective LSCS who received thromboprophylaxis inappropriately by the 2004 guidelines were also smokers or had a parity of 3 or more and therefore would be eligible under the 2009 guidelines.

Discussion
The results of this study demonstrate that 69% (n=100) of obstetric in-patients at risk for VTE were managed appropriately according to the 2004 RCOG guidelines in CUMH. This demonstrates better compliance with guidelines compared with studies performed in non pregnant medical and surgical populations. The 2004 guidelines were the benchmark for this study although the results were also compared with the 2009 guidelines that were published as a result of recommendations of this study. Women not managed according to both the 2004 and 2009 guidelines were more likely not to receive recommended thromboprophylaxis than to be prescribed it unnecessarily. Women post vaginal delivery with two or more risk factors and antenatal women with three or more risk factors were the groups most likely not to receive recommended thromboprophylaxis. This is in keeping with findings of other studies that have identified inconsistencies in provision of thromboprophylaxis to at risk antenatal women and a lack of adequate risk profiling for women post normal vaginal delivery. In this study provision of antenatal thromboprophylaxis was either lacking or given without the support of the
guidelines. It is recognised that this is a difficult patient group to risk stratify as there is a deficiency of robust randomized controlled trials in this group due to the ethical constraints of research in the pregnant population. Therefore, reliance on expert guidelines may be the best recourse for clinicians to ensure that at risk women in this group are protected from VTE. The vast majority of women in this study who failed to receive indicated prophylaxis were women post vaginal delivery (n = 34). Application of the 2009 guidelines highlights an additional 16 women post vaginal delivery who would have been eligible to receive thromboprophylaxis which demonstrates potential continued inadequacies in risk profiling for VTE in the peripartum for this group. The poor provision of prophylaxis to women at risk of VTE post vaginal delivery has been highlighted in the literature and the comparison has been made to the management of women post LSCS where thromboprophylaxis provision is more consistent, possibly due to more longstanding recognition of the risks of VTE in this patient group. In fact it may be given to this group when not recommended by the guidelines as was the case in this study. Only one patient in the cohort that delivered by LSCS did not receive thromboprophylaxis. It is practice in CMUH to provide all women post elective or emergency LSCS with pharmacological thromboprophylaxis.

The number of women who had undergone LSCS in this study (n=109, 42%) was not reflective of practice in CMUH where the LSCS rate at the time was 28%. This discrepancy may reflect sampling error or it may be partially due to the prolonged in-patient stay post LSCS compared with vaginal delivery so that at any one time, there are proportionately more women post LSCS in hospital. Provision of an appropriate weight adjusted dose was inconsistent with both the RCOG 2004 and 2009 dosing regimen. Of the women who appropriately received thromboprophylaxis (n=100) only 54% (n=54) were receiving the correct dose according to both guidelines. In all but one case this meant that the women were provided with an insufficient prophylactic dose. The 2009 guidelines have a more graduated dosing schedule for women over 90kg, clinical application of this schedule may improve both awareness of the need to record body weight and to provide thromboprophylaxis for women in this weight category. 22 (6%) women had no body weight recorded, six of whom were receiving thromboprophylaxis which therefore could not be appropriately weight adjusted.

Insufficient dosing has been highlighted in other studies looking at both prophylaxis and treatment of VTE. In those obese in the obese requires further study as these women are at increased risk for VTE. The pharmacokinetics of anti-thrombotic agents are not fully understood in the obese as they are frequently excluded from clinical trials and so it is not understood how best to dose these patients to ensure adequate protection from VTE. This will remain clinically important as rates of obesity continue to rise. In the latest CMAE report 11 of 18 women who died as a result of VTE had a BMI over 35 kg/m². CMAE, in collaboration with the RCOG, have launched a guideline for the management of obesity in pregnancy stressing the importance of adequate risk profiling for these women according to RCOG guidelines for thromboprophylaxis. The report suggests that all women should have height and weight measured and BMI calculated and recorded at booking visit. The issue of obesity in pregnancy among Irish women has led to the development of Health Service Executive (HSE) guidelines which support the recommendations of the RCOG and CMAE with respect to measuring and recording of BMI at booking visit and the use of thromboprophylaxis for any woman with a BMI over 30. This is in keeping with the recent updated RCOG 2009 guidance on the treatment of VTE.

There is a need for increased clinical vigilance to identify women at risk of VTE to prevent this potentially fatal complication in pregnancy and the puerperium. This is particularly required for women antenatally and post vaginal delivery who may not clinically assessed for VTE. It is not known how best to dose these patients to ensure adequate protection from VTE. This will remain clinically important as rates of obesity continue to rise. In the latest CMAE report 11 of 18 women who died as a result of VTE had a BMI over 35 kg/m². CMAE, in collaboration with the RCOG, have launched a guideline for the management of obesity in pregnancy stressing the importance of adequate risk profiling for these women according to RCOG guidelines for thromboprophylaxis. The report suggests that all women should have height and weight measured and BMI calculated and recorded at booking visit. The issue of obesity in pregnancy among Irish women has led to the development of Health Service Executive (HSE) guidelines which support the recommendations of the RCOG and CMAE with respect to measuring and recording of BMI at booking visit and the use of thromboprophylaxis for any woman with a BMI over 30. This is in keeping with the recent updated RCOG 2009 guidance on the treatment of VTE.

Acknowledgements

Everyone at the ANU research centre and the haematology department in Cork University Hospital.

References


Implementation of Thromboprophylaxis Guidelines