Original Article

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Uptake of Pharmacological Prophylaxis for Venous Thromboembolism in Postpartum Women After Introduction of Formal Risk Assessment Tool – A Quasi-experimental study.

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Abstract

Risk estimation and prophylactic treatment of maternal morbidity and mortality due to thromboembolism through a standard formal VTE risk assessment tool with numerical scoring is more effective in clinical decision making and management than not using a scoring system. This study was designed to assess the risk factors and prospectively measure the uptake of pharmacological prophylaxis for postpartum VTE before and after introducing a standard risk assessment scoring tool.

Methods

The study was conducted in 200 postpartum women aged 18–39 without randomization. They were prospectively followed before and after introduction of a standard formal venous thromboembolism risk assessment tool with numerical scoring. Individual risk scoring and the uptake of pharmacological prophylaxis for venous thromboembolism were analysed descriptively. Data was collected from the postpartum mothers' case notes in the postnatal ward without interfering the clinical practice of the ward.

Results

Of the 100 postpartum mothers 43 were entitled for postpartum pharmacological prophylaxis for venous thromboembolism and of them 19% (8/43) were treated with enoxaparin when a risk assessment tool with numerical scoring was not used. This uptake rate was 74% (29/39) among the subsequent 100 postpartum mothers after a risk assessment tool with numerical scoring was introduced which was statistically significant. This significant improvement of the uptake of pharmacological prophylaxis was mainly observed in the group which scored 2 points than who scored ≥3 during the risk scoring. Among the 82 postpartum women who were entitled for pharmacological prophylaxis for postpartum VTE parity of ≥3 was the single most common risk factor being 40% and the elective and emergency caesarean section being 32% and 26%.

Conclusion

Uptake rate of pharmacological prophylaxis for postpartum VTE in mothers can be significantly improved by using a standard risk assessment tool rather than using clinical judgement alone.

Key Words

Postpartum ,Thromboembolism,Prophylaxis

Introduction

Pulmonary embolism (PE) and venous thromboembolism (VTE) during pregnancy and postpartum is a serious condition that increases the maternal morbidity and mortality worldwide.(1,2) PE which is a sequalae of VTE remains a leading direct cause of maternal death in the UK.(3) In Sri Lanka it accounted for 2.36% of maternal death in 2017. (4)

Pregnancy itself increases the risk of VTE as it increases the coagulation factors and decreases

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the natural anticoagulants.(5) The relative risk of VTE and pulmonary embolism increases four to six times during the antepartum period and the relative risk postpartum is five-fold higher compared to antepartum period.(6,7) In addition to pregnancy, independent factors such as obesity, advance maternal age and a positive family history also increases the risk of VTE and pulmonary embolism.(8) As the relative risk in postpartum period is higher, the threshold for recommending pharmacological prophylaxis for postpartum VTE is lower during this period.(9)

Prescription of pharmacological prophylaxis postpartum VTE namely low molecular weight heparin (LMWH) significantly reduces the risk of maternal morbidity and mortality associated with VTE and pulmonary embolism.(10,11) To achieve this risk reduction, it is recommended that a risk assessment should be performed on each woman at least once following delivery and before discharge and arrangements made for LMWH prescription and administration.(10) Risk estimation through a Standard formal VTE Risk assessment Tool (SVRT) with numerical scoring is more effective in clinical decision making and management than not using a scoring system.(12)

Teaching hospital Jaffna consists of three obstetric units and the total number of deliveries in 2018 was 6192. Though pharmacological prophylaxis for postpartum VTE (PPPVT) is practiced in the hospital a SVRT is not used for this purpose. It has been customary to estimate risks by specialists and middle grade doctors during ward assessments of patients and to prescribe pharmacological prophylaxis for postpartum VTE without a SVRT. As a standard risk assessment tool has been shown to increase the uptake of pharmacological prophylaxis for postpartum VTE for eligible patients and it was decided to in cooperate a SVRT to all mothers admitted to the university obstetric unit at teaching hospital for confinement.

Our study was designed to assess the risk factors and prospectively measure the uptake of pharmacological prophylaxis for postpartum VTE before and after manipulation of an independent variable namely introduction of SVRT, without random assignment of participants to conditions or orders of conditions.

Methods

The study was conducted at the University Obstetric Unit, Teaching Hospital, Jaffna. All procedures performed were in accordance with good clinical practice.

The study cohort comprised 200 postnatal women aged 18–39 without randomization. Of this cohort 100 were before introducing a standard formal VTE risk assessment tool with numerical scoring.

The study was continued prospectively in further 100 postpartum women after manipulation of an independent variable namely introduction of SVRT, without random assignment of participants to conditions or orders of conditions. Data was collected from mother's case notes in the postnatal ward. This data collection was carried out by the researchers independently without interference to the clinical practice of the ward.

Standard formal VTE risk assessment tool with numerical scoring for pharmacological post-partum DVT prophylaxis published by the Royal College of Obstetricians and Gynaecologists' guidelines available online was used in the study to identify the mothers who are entitled for pharmacological post-partum DVT prophylaxis. Table 1 shows the standard formal VTE risk assessment tool with numerical scoring which was used and Box1 shows the VTE risk guide.(10)

Table **1:** Standard formal VTE risk assessment tool with numerical scoring

Pre-existing risk factors	**Score**
Family history of unprovoked or estrogen-related VTE in first-degree relative	1
Known low-risk thrombophilia (no VTE)	1
Age (> 35 years)	1
Obesity BMI ≥ 30 = 1 BMI ≥ 40 = 2	1 2
Parity ≥ 3	1
Smoker	1
Gross varicose veins	1
Pre-eclampsia in current pregnancy	1
ART/IVF (antenatal only)	1

Multiple pregnancy	1
Caesarean section in labour	2
Elective caesarean section	1
Mid-cavity or rotational operative delivery	1
Prolonged labour (> 24 hours)	1
PPH (> 1 litre or transfusion)	1
Preterm birth < 37^{+0} weeks in current pregnancy	1
Stillbirth in current pregnancy	1
Any surgical procedure in pregnancy or puerperium except immediate repair of the perineum, e.g. appendicectomy, post-partum sterilisation	3
Current systemic infection	1
Immobility, dehydration	1
Total	

Box 1: VTE risk guide.

- If total score ≥ 2 postnatally, consider thromboprophylaxis for at least 10 days.
- If admitted to hospital antenatally consider thromboprophylaxis.
- If prolonged admission (≥ 3 days) or readmission to hospital within the puerperium consider thromboprophylaxis.

For patients with an identified bleeding risk, the balance of risks of bleeding and thrombosis should be discussed in consultation with a haematologist with expertise in thrombosis and bleeding in pregnancy.

Enoxaparin was the low molecular weight heparin (LMWH) used for pharmacological prophylaxis and the suggested subcutaneous doses during postpartum varies with the weight of the woman. Table 2 summarises the recommended dosage LMWH for pharmacological prophylaxis for postpartum VTE.10

Table 2: Suggested thromboprophylaxis doses of enoxaparin for postpartum VTE.

Weight	Enoxaparin
< 50 kg	20 mg daily
50–90 kg	40 mg daily
91–130 kg	60 mg daily*
131–170 kg	80 mg daily*
> 170 kg	0.6 mg/kg/day*

**may be given in 2 divided doses*

Women who were on antepartum VTE prophylaxis were excluded from this study. Descriptive statistics were calculated using SPSS Statistics version - 23.

Results

Of the 100 postpartum mothers before introducing the SVRT, 43 were entitled for PPPVT due to their risk factors and 8 were treated with enoxaparin. Of the 100 postpartum mothers after introducing the SVRT, 39 were entitled for PPPVT and 29 were treated with enoxaparin. Table 3 summarises the above results showing a significant improvement of the uptake of PPPVT after introduction of the SVRT ($X2= 25.67$, p-value < 0.0001).

Table 3: Uptake of PPPVT before and after introduction of the SVRT

	Treated with LMWH	Not treated with LMWH	Total
Before introduction of SVRT	8	35	43
After introduction of SVRT	29	10	39
Total	37	45	82

($X^2= 25.6738$, p-value < 0.00001)

Of the cohort of 200 postpartum women a total of 82 were entitled for PPPVT with a risk score of 2 or above. Table 4 summarises the risk factor frequency of them.

Table 4: Risk factors identified

Parity≥3	40 (48.7%)
EL LSCS	32 (39%)
EM Caesarean section	26 (31.7%)
Preterm birth	24 (29.2%)
Advanced Maternal Age	16 (19.5%)
BMI≥30kg/m^2	20(24.4%)
Major PPH	07(0.9%)

Table 5 summarises the number of women who received PPPVE against their risk score 2 and ≥ 3points before and after the introduction of the risk assessment tool.

Table 5: Pharmacological prophylaxis and risk score before and after the introduction of the risk assessment tool.

	2 points		**≥ 3points**	
	Re-ceived LMWH	Did not receive LMWH	Re-ceived LMWH	Did not receive LMWH
Before introduc-tion of SVRT	1 (3%)	33 (97%)	7 (77.7%)	2 (22.3%)
After introduc-tion of SVRT	18 (64.3%)	10 (35.7%)	11 (100%)	0

When the risk score was ≥3 the uptake of pharmacological prophylaxis for postpartum VTE improved from 77.7% to 100% with the introduction of the SVRT. When the score was 2 the uptake of pharmacological prophylaxis for postpartum VTE improved from 03% to 64.3% after the introduction of the SVRT. Improvements observed in both categories were statistically significant (p-value < 0.0001)

Even after the introduction of the SVRT 35.7% (10 women) of the entitled women on the 2-point category did not receive LMWH and in all 10 cases the specialist obstetrician was involved in the decision not to treat them with LMWH. Further all the postpartum mothers who were treated received the appropriate dose enoxaparin throughout the study.

Discussion

Parity of ≥3 was the single most common risk factor (40%) among the 82 postpartum women who were entitled for pharmacological prophylaxis for postpartum VTE, and a combination of elective and emergency caesarean section accounted for 58%.

Introduction of the SVRT improved the overall pickup rate of mothers who needed pharmacological prophylaxis for postpartum VTE from 19% to 74% which was statistically significant.

When the results were analysed after subcatogarising the risk score namely to 2 and ≥3, the observed improvement was mainly contributed by the higher uptake rate amongst the women who scored 2 points during the risk assessment.

Yet we observed 35.7% (10 women) of the entitled women on the 2-point category did not receive LMWH even after the introduction of the SVRT. In all ten women the reason for not prescribing LMWH being the specialist obstetrician overruling the score-based treatment policy.

Given the promising improvement in the uptake rate we recommend the use of a standard risk assessment tool in all obstetric wards with the aim of reducing the maternal morbidity and mortality resulting from postpartum venous thromboembolism and pulmonary embolism.

Referrance

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