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Research Article

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Comparative study to assess the knowledge regarding low molecular heparin comparable to intermediate dosage of heparin among thromboembolism mother at SMVMCH, Puducherry.

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ABSTRACT

Background: Pregnancy and the puerperium are associated with a markedly increased risk of venous thromboembolism (VTE) due to physiological hypercoagulability, venous stasis, and endothelial changes. Low molecular weight heparin (LMWH) is widely recommended for thromboprophylaxis in women at moderate to high risk of VTE because of its proven efficacy and favorable safety profile. **Aim:** To assess and compare the effectiveness of low-dose LMWH and intermediate-dose LMWH among peripartum mothers at risk of thromboembolism. **Methods:** A quantitative, comparative observational study was conducted among 100 peripartum mothers from 36 weeks of gestation to seven days postpartum. Participants were selected using convenient sampling and allocated into two groups: low-dose LMWH (n = 50) and intermediate-dose LMWH (n = 50). Data were collected using a structured tool comprising demographic and clinical variables, the Caprini Risk Assessment Model, and a clinical scoring system to evaluate efficacy and safety outcomes. Data were analyzed using descriptive and inferential statistics. **Results:** Demographic and clinical characteristics were comparable between the two groups. Most mothers were categorized as low to moderate risk for VTE. The mean efficacy score was higher in the intermediate-dose LMWH group (1.54 ± 0.639) compared to the low-dose group (1.40 ± 0.692), with a mean difference of 0.14, indicating better effectiveness with intermediate dosing. **Conclusion:** Intermediate-dose LMWH demonstrated superior efficacy compared to low-dose LMWH in preventing thromboembolic complications among peripartum mothers, supporting its use in women with elevated VTE risk.

Keywords: Pregnancy, thromboembolism, low molecular weight heparin.

INTRODUCTION

Pregnancy is associated with a substantially increased risk of venous thromboembolism (VTE), highlighting the importance of effective prophylaxis such as low molecular weight heparin (LMWH) to prevent potentially fatal thrombotic events. Physiological adaptations during pregnancy create a hypercoagulable state, characterized by elevated clotting factors, including fibrinogen and factor VII, along with reduced natural anticoagulants such as protein S. While these changes reduce the risk of hemorrhage during childbirth, they simultaneously increase susceptibility to thrombosis. This risk is further amplified by venous stasis caused by uterine compression of pelvic veins and increased estrogen levels that promote coagulation.

Several maternal factors increase the likelihood of VTE, including advanced age, obesity, smoking, multiple gestations, inherited or acquired thrombophilia, immobility, and prior VTE. Obstetric factors such as cesarean delivery, pre-eclampsia, and gestational diabetes further elevate the risk. In women with these risk factors, thromboprophylaxis is strongly recommended.

LMWH is the anticoagulant of choice during pregnancy because it does not cross the placenta, thereby minimizing fetal risk. Unlike warfarin, which is teratogenic, LMWH has a favorable safety profile and is preferred over unfractionated heparin due to its lower risk of heparin-induced thrombocytopenia and more predictable anticoagulant effect. Major professional bodies, including ACOG, ACCP, and RCOG, recommend LMWH for women at moderate to high risk of VTE during pregnancy and for up to six weeks postpartum.

LMWH acts by enhancing antithrombin III activity, leading to inhibition of factor Xa and thrombin, thereby preventing fibrin clot formation. Although generally safe, potential complications include bleeding, thrombocytopenia, and osteoporosis with prolonged use. Careful monitoring, including platelet counts and, in selected cases, anti-factor Xa levels, is essential, particularly in women with renal impairment or obesity.

NEED FOR THE STUDY

Venous thromboembolism (VTE) is a major cause of maternal morbidity and mortality worldwide, accounting for approximately 10–12% of maternal deaths, with a disproportionate burden in low- and middle-income countries. Globally, the incidence of VTE in pregnancy is estimated at 1–2 per 1,000 pregnancies, with the highest risk occurring during the postpartum period, particularly within the first six weeks after delivery. High-income countries such as the United States, the United Kingdom, and several European nations report lower incidence rates ranging from 0.5 to 1.7 per 1,000 pregnancies, largely due to effective maternal healthcare systems and routine use of thromboprophylaxis.

In India, the prevalence of pregnancy-related VTE is also estimated at 1–2 per 1,000 pregnancies, although underreporting and regional disparities in healthcare access may underestimate the true burden. Risk factors such as obesity and rising cesarean section rates contribute significantly. In states like Tamil Nadu, although precise prevalence data are limited, better healthcare infrastructure may reduce VTE-related complications; however, increasing maternal obesity and operative deliveries remain concerns. Evidence from a tertiary care centre in Puducherry demonstrates a substantial gap between guideline-based eligibility for thromboprophylaxis and its actual implementation, underscoring the need for improved adherence to preventive strategies.

AIM OF THE STUDY:

The aim of the study to assess the knowledge regarding low molecular heparin comparable to intermediate dosage of heparin among thromboembolism mother at SMVMCH, Pondicherry.

MATERIALS AND METHODS

Study Design and Participants

A quantitative, comparative observational study was conducted among peripartum mothers in labour at Sri Manakula Vinayagar Medical College and Hospital (SMVMCH). The study population consisted of peripartum mothers admitted to SMVMCH during the study period. A total of 100 participants were enrolled using a convenient sampling technique and were equally allocated into two groups: low-dose LMWH (n = 50) and intermediate-dose LMWH (n = 50).

Inclusion and Exclusion Criteria

Peripartum mothers from 36 weeks of gestation up to seven days postpartum who were willing to provide written informed consent were included in the study. Mothers with known hypersensitivity to heparin or LMWH and those already receiving therapeutic anticoagulation for other medical conditions were excluded.

Tools

Data were collected using three sections. Section A included demographic and clinical variables such as age, religion, parity, gravidity, area of residence, health history, pregnancy-related factors, mode of delivery, and body mass index. Section B comprised the Caprini Risk Assessment Model to stratify the risk of venous thromboembolism based on cumulative risk scores. Section C was a structured clinical scoring tool designed to compare the efficacy and safety of low-dose and intermediate-dose LMWH, assessing outcomes such as thromboembolic events, bleeding complications, coagulation parameters, heparin-induced thrombocytopenia, and mortality.

Data Collection Procedure

Ethical approval was obtained from the Institutional Ethics Committee of SMVMCH prior to data collection. The purpose of the study was explained to eligible participants, and written informed consent was obtained. Clinical and laboratory data related to efficacy and safety outcomes were collected from patient records and direct observation using a structured checklist, ensuring confidentiality and privacy throughout the study.

Data Analysis

Collected data were coded and analyzed using descriptive and inferential statistics. Demographic variables were summarized using frequency and percentage. Associations between variables were tested using the chi-square test, and results were considered statistically significant at $p < 0.05$.

RESULTS

Demographic characteristics

The demographic characteristics of the low-dose and intermediate-dose LMWH groups were comparable. Mothers aged ≥40 years formed the largest age group (28% vs. 36%). Hindus predominated in the low-dose group (44%), while Christians were more common in the intermediate-dose group (38%), with Muslims represented in both. Parity was evenly distributed, with 50% primiparous and 50% multiparous in each group, and gravidity was identical (20% nulligravida, 40% primigravida, 40% multigravida). Urban residence was reported by 54% of the low-dose group and 50% of the intermediate-dose group. More than half had no pre-existing medical conditions (58% vs. 54%). Full-term pregnancies accounted for 30% in both groups. Mode of delivery was the same, with 40% vaginal, 50% cesarean, and 10% assisted deliveries. Most mothers had a normal BMI (40% in both groups), followed by overweight and obese categories, with slightly more obesity in the intermediate-dose group.

Level of risk of venous thromboembolism

The distribution of venous thromboembolism risk varied slightly between the two groups. In the low-dose LMWH group, 52.0% of mothers were classified as low risk, 36.0% as moderate risk, and 12.0% as high risk, with none falling into the highest risk category. In the intermediate-dose group, a larger proportion of mothers were in the low-risk category (62.0%), while 30.0% had moderate risk and 8.0% had high risk; no mothers were classified as highest risk.

Comparison of the efficacy of low dose versus intermediate dose on venous thromboembolism The Low Dose group had a mean score of 1.40 ± 0.692, whereas the Intermediate Dose group showed a higher mean score of 1.54 ± 0.639. The mean difference of 0.14 indicates superior outcomes in the Intermediate Dose group. Overall, the intermediate-dose LMWH demonstrated greater effectiveness with more consistent results compared to the low-dose regimen.

Table 1: Demographic variables of peripartum mother. (N= 100)

Demographic Variable		Low dose (n=50)		Intermediate dose (n=50)	
		Frequency	%	Frequency	%
Age	<20 years	13	26.0	12	24.0
	20-29 years	12	24.0	12	24.0
	30-39 years	11	22.0	8	16.0
	40+ years	14	28.0	18	36.0
Religion	Hindu	22	44.0	17	34.0
	Christian	15	30.0	19	38.0
	Muslim	13	26.0	14	28.0
Parity	Primiparous	25	50.0	25	50.0
	Multiparous	25	50.0	25	50.0
Gravidity	Nulligravida	10	20.0	10	20.0
	Primigravida	20	40.0	20	40.0
	Multigravida	20	40.0	20	40.0
Area of living	Urban	27	54.0	25	50.0
	Rural	23	46.0	25	50.0
Health History	Pre-existing medical conditions	21	42.0	23	46.0
	No known pre-existing medical conditions	29	58.0	27	54.0
Pregnancy- Related Factors	Full term pregnancy	15	30.0	15	30.0
	Preterm pregnancy	12	24.0	13	26.0
	Post-term pregnancy	10	20.0	10	20.0
	Pregnancy complications	13	26.0	12	24.0
Mode of Delivery	Vaginal delivery	20	40.0	20	40.0
	Caesarean section	25	50.0	25	50.0
	Assisted delivery (forceps, vacuum)	5	10.0	5	10.0
BMI	Underweight	7	14.0	8	16.0
	Normal weight	20	40.0	20	40.0
	Overweight	15	30.0	10	20.0
	Obese	8	16.0	12	24.0

Table 2: Level of risk of venous thromboembolism among peripartum mother. (N = 100)

S.NO	Level of Risk	Low dose		Intermediate dose	
		n	%	n	%
1.	Low Risk (<1%)	26	52.0	31	62.0
2.	Moderate Risk (1-3%)	18	36.0	15	30.0
3.	High Risk (3-6%)	6	12.0	4	8.0
4.	Highest Risk (>6%)	0	0	0	0

Table 3: Comparison of the efficacy of low dose versus intermediate dose on venous thromboembolism in peripartum mother.

S.NO	Group	Mean	SD	Mean Difference
1.	**Low dose**	1.40	0.692	0.140
2.	**Intermediate dose**	1.54	0.639	

Table 4: Association of the level of risk of venous thromboembolism in low dose among peripartum mother with selected demographic variables.

S.No	Demographic Variables	Low dose								X^2 Value
		Low		Moderate		High		Highest		
		f	%	f	%	f	%	f	%	
1	**Age in years**									$X^2 = 0.327$ Df =6 P= 0.999 (NS)
	a) <20years	7	26.9	5	27.8	2	33.3	0	0	
	b) 20-29 years	6	23.1	4	22.2	1	16.7	0	0	
	c) 30-39 years	6	23.1	4	22.2	1	16.7	0	0	
	d) 40+ years	7	26.9	5	27.8	2	33.3	0	0	
2.	**Religion**									$X^2 = 0.343$ Df =4 P= 0.987 (NS)
	a) Hindu	11	42.3	8	44.4	3	50.0	0	0	
	b) Christian	8	30.8	6	33.3	2	33.3	0	0	
	c) Muslim	7	26.9	4	22.2	1	16.7	0	0	

3.	**Parity**									$X^2 = 6.126$ Df = 2 P= 0.042 **(S)***
	a) Primiparous	13	50.0	9	50.0	3	50.0	0	0	
	b) Multiparous	13	50.0	9	50.0	3	50.0	0	0	
4.	**Gravidity**									$X^2 = 0.034$ Df = 4 P= 1.057 (NS)
	a) Nulligravida	5	19.2	4	22.2	1	16.7	0	0	
	b) Primigravida	10	38.5	7	38.9	2	33.3	0	0	
	c) Multigravida	10	38.5	7	38.9	2	33.3	0	0	
5.	**Area of living**									$X^2 = 0.056$ Df =2 P= 0.972
	a) Urban	14	53.8	10	55.6	3	50.0	0	0	

DISCUSSION:

The study findings indicate that intermediate-dose LMWH was more effective than low-dose LMWH among peripartum mothers. The intermediate-dose group demonstrated a higher mean outcome score (1.54 ± 0.639) compared to the low-dose group (1.40 ± 0.692), with a mean difference of 0.14, reflecting better overall efficacy and more consistent results. Although both groups showed comparable demographic characteristics and similar distributions of VTE risk levels, a greater proportion of mothers in the intermediate-dose group were classified as low risk and fewer as high risk. No participants in either group fell into the highest risk category. Overall, the findings suggest that intermediate-dose LMWH provides improved outcomes and may be a more effective prophylactic option for reducing venous thromboembolism risk in peripartum mothers.

CONCLUSION:

The study concluded that intermediate-dose LMWH is more effective than low-dose LMWH in reducing the risk of venous thromboembolism among peripartum mothers. It demonstrated better outcome scores and a greater proportion of mothers in the low-risk category. Both groups were demographically comparable, supporting the reliability of the findings. No mothers in either group were classified as highest risk. Overall, intermediate-dose LMWH was found to be the preferable prophylactic regimen

RECOMMENDATION:

Intermediate-dose LMWH is recommended for peripartum mothers at risk of venous thromboembolism, as it shows better effectiveness and consistent outcomes. Routine VTE risk assessment should be performed using standardized tools to guide appropriate dosing. Further large-scale and multicenter studies are recommended to strengthen the evidence and support clinical guidelines.

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