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# Evaluating the Current Practice of Post Cesarean Thromboprophylaxis and Enhancing Guideline Adherence in Al-Najaf Hospitals

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## ABSTRACT

**Background:** Venous thromboembolism (VTE) is one of the most common cardiovascular disorders in the United States and is manifested as deep vein thrombosis (DVT) and pulmonary embolism (PE) which represented as the most important cause of death in pregnant women after cesarean section. Venous thromboembolism (VTE) is representing the second direct cause of death which is accounting for 13.8% of all mother's death in the world. The most common risk factor of venous thromboembolism (VTE) is cesarean section. **Objective**: The study aims to study the current practice of post-cesarean thromboprophylaxis in dosing calculation and duration of therapy. **Methods:** Between September 2020 and January 2021, an observational- interventional prospective pre and post-study, was conducted in all hospital of Najaf in the City center and the suburbs that contain gynecology and obstetric ward to assess the current practice of post-cesarean thromboprophylaxis and to evaluate the impact of pharmacist intervention program to improve guideline adherence then after intervention. Another 102 patients were enrolled to analyze the change thromboprophylaxis according to the guideline. **Results:** From patient data, the rate of adherence to guidelines raised significantly among the post-intervention patients' group by thromboprophylaxis dose according to body weight was increase significantly ($p<0.001$) from 56.9% in the observation phase to 83.3% after intervention and about the duration of thromboprophylaxis is significantly ($p<0.001$) from 18.6% in the observation phase to 52.0% after the intervention. **Conclusion:** This study showed that the clinical pharmacist's multifaceted intervention has resulted in encouraging guideline implementations as reflected by improving the proper use of thromboprophylaxis the duration anddosing calculations according to body weight.

**Keywords: Venous thromboembolism, deep vein thrombosis, pulmonary embolism.**

## 1. BACKGROUND

Venous thromboembolism (VTE) is one of the most common cardiovascular disorders in the United States. VTE is manifested as deep vein thrombosis (DVT) and pulmonary embolism (PE) resulting from thrombus formation in the venous circulation (1).

The true incidence of VTE in the general population is unknown because many patients, perhaps more than 50%, have no overt symptoms or go undiagnosed (2). The median absolute VTE risk during pregnancy is reported to be 5.7 per 10,000 deliveries, with the preponderance of studies showing an increased risk of VTE through each passing trimester of pregnancy, a peak one to three weeks postpartum and then a decline in risk equivalent to a non-pregnant state by 6 weeks postpartum (3).

The postpartum period is higher risk than the intrapartum period and women delivered by elective cesarean section have at least double the postpartum risk of VTE compared with vaginal birth (4). The risk of postpartum VTE after an emergency Cesarean section is twice that after an elective cesarean section and four times that after vaginal delivery (5).

## 2. OBJECTIVE

The study aims to study the current practice of post-cesarean thromboprophylaxis in dosing calculation and duration of therapy.

## 3. PATIENTS AND METHODS

Study Design and Setting for the Patient: between September 2020 and January 2021, an observational interventional prospective pre and post-study, was conducted in all hospital of Najaf in the city center and the suburbs that contain Gynecology and Obstetric ward at Najaf governorate, Iraq to the current practice of post-cesarean thromboprophylaxis and to evaluate the impact of pharmacist intervention to improve guideline adherence.

**Study Population and Sample of the Participants Patient**

**Observation Phase (Pre-intervention)**

For evaluation of the current practice, 102 patients' cases from Gynecology and obstetric wards were taken pre-intervention. Patients' medical records were excluded where data concerning unclear handwriting, and incomplete patient information. A purpose-designed data sheet was used to collect patients' details from the patient then compare them with a medical file. Regarding the main barriers and reasons behind the current prescribing of thromboprophylaxis, we designed a qualified questionnaire directed to main decision-makers in the hospital who are the obstetricians and collecting their opinion for the main reasons contributing to the current practice of post-cesarean thromboprophylaxis whether related to patients, health care system, as well as pharmacist, nurse and/or prescriber himself. 110 patients were reviewed for eligibility. Among them, 8 patients were excluded because of exclusion criteria, and 102 patients were enrolled and reviewed to evaluate the current practice of thromboprophylaxis of each patient.

**Inclusion criteria**

Women undergo Cesarean section.

**Exclusion criteria**

Contraindication of pharmacological thromboprophylaxis include one or more of the following: Evidence of active bleeding or high-risk bleeding or if the patient has a history of Heparin-Induced Thrombocytopenia (HIT) in which the platelet account less than 100000/mm3.

**Intervention phase**

After the observation phase and because the obstetricians are the decision-maker and the leader of any team in the operation room, the study intervention was implemented in which the clinical pharmacist performed a lecture presentationto activation the role of a clinical pharmacist to participate in the regulation dose and working as a team and to create awareness of the clinical pharmacist in the ward about VTE problem and the administration of dose according to body weight and the guideline recommendations according to the RCOG consensus guideline for VTE (6). The pharmacist multifaced intervention includes:

- A lecture presentation;
- Distribution of booklets to all clinical pharmacist, obstetricians, and all residents in Gynecology and Obstetric wards;
- Posters hanging in the gynecology and obstetric wards including the risk score to increase the .knowledge of all health care provides include the nurse, pharmacist, obstetricians, and residents

| Variable | | Patients' Group | | | | P. value |
|---|---|---|---|---|---|---|
| | | Before intervention (N = 102) | | After intervention (N=102) | | |
| | | No. | % | No. | % | |
| Age | Age ≤ 35 | 84 | 82.4 | 84 | 82.4 | 1.00 |
| | Age > 35 | 18 | 17.6 | 18 | 17.6 | |
| Weight (kg) | < 50 | 3 | 2.9 | 3 | 2.9 | 0.861 |
| | 50 - 90 | 79 | 77.5 | 82 | 80.4 | |
| | 91 - 130 | 20 | 19.6 | 17 | 16.7 | |
| Education | Illiterate | 21 | 20.6 | 26 | 25.5 | 0.539 |
| | Read and Write | 23 | 22.5 | 21 | 20.6 | |
| | Primary | 17 | 16.7 | 15 | 14.7 | |
| | Secondary | 24 | 23.5 | 25 | 24.5 | |
| | College or higher | 17 | 16.7 | 15 | 14.7 | |
| Occupation | Housewife | 70 | 68.6 | 74 | 72.5 | 0.926 |
| | Employed | 32 | 31.4 | 28 | 27.5 | |

**Table 1. Demographic characteristics of selected patients before and after intervention program**

| Variable | | Patients' Group | | | | P. value |
|---|---|---|---|---|---|---|
| | | Before intervention (N = 102) | | After intervention (N=102) | | |
| | | No. | % | No. | % | |
| Gravidity | 1 - 2 | 47 | 46.1 | 44 | 43.1 | 0.715 |
| | 3- 4 | 22 | 21.6 | 27 | 26.5 | |
| | > 4 | 33 | 32.4 | 31 | 30.4 | |
| Parity | Nulliparous | 23 | 22.5 | 25 | 24.5 | 0.953 |
| | 1 - 2 | 34 | 33.3 | 32 | 31.4 | |
| | 3 - 4 | 30 | 29.4 | 28 | 27.5 | |
| | > 4 | 15 | 14.7 | 17 | 16.7 | |
| Abortion | None | 69 | 67.6 | 66 | 64.7 | 0.568 |
| | 1 - 2 | 29 | 28.4 | 34 | 33.3 | |
| | 3 or more | 4 | 3.9 | 2 | 2.0 | |
| History of Cesarean sections | None | 51 | 50.0 | 48 | 47.1 | 0.752 |
| | 1 - 2 | 31 | 30.4 | 36 | 35.3 | |
| | 3 or more | 20 | 19.6 | 18 | 17.6 | |

**Table 2. Obstetrical history of patients before and after intervention program**

**Post-Intervention phase**

Out of 115 patients examined for eligibility, 13 patients did not meet the inclusion criteria or Patients' medical records were excluded where data concerning unclear handwriting, and incomplete patient information, and 102 patients were enrolled in this phase of the study. That was to check the improvement of thromboprophylaxis agent dose according to guideline recommendations.

**Data collection from the patients**

We examined the demographic variables of the patient about their age, weight, height to calculate the BMI which is an important risk factor for prophylaxis and the weight is important for the dose of the drug and ask

| Type | Patients' Group | | | | P. value |
|---|---|---|---|---|---|
| | Before intervention (N = 102) | | After intervention (N=102) | | |
| | No. | % | No. | % | |
| Elective | 79 | 77.5 | 75 | 73.5 | 0.515 |
| Emergency | 23 | 22.5 | 27 | 26.5 | |
| Total | 102 | 100.0 | 102 | 100.0 | |

**Table 3. Type of cesarean section labor of patients before and after intervention program**

| Preexisting Risk factor | Patients' Group | | | | P. value |
|---|---|---|---|---|---|
| | Before intervention (N = 102) | | After intervention (N=102) | | |
| | No. | % | No. | % | |
| Age > 35 | 18 | 17.6 | 18 | 17.6 | 1.00 |
| Parity ≥ 3 | 42 | 41.2 | 45 | 44.1 | 0.661 |
| Obesity | 38 | 37.3 | 35 | 34.3 | 0.671 |
| Smoking | 11 | 10.8 | 8 | 7.8 | 0.47 |
| Previous VTE | 2 | 2.0 | 3 | 2.9 | 0.651 |
| Previous VTE provoked by major surgery | 3 | 2.9 | 2 | 2.0 | 0.561 |
| Known high risk thrombophilia | 1 | 1.0 | 1 | 1.0 | 1.00 |
| Comorbidities | 11 | 10.8 | 14 | 13.7 | 0.522 |
| Family history of VTE | 2 | 2.0 | 1 | 1.0 | 0.561 |
| Immobility/ dehydration | 0 | 0.0 | 1 | 1.0 | 0.316 |
| Gross Varicose Veins | 17 | 16.7 | 13 | 12.7 | 0.429 |

**Table 4. Distribution of Preexisting Risk factors of patients before and after intervention program**

| Obstetrical Risk factor | Patients' Group | | | | P. value |
|---|---|---|---|---|---|
| | Before intervention (N = 102) | | After intervention (N=102) | | |
| | No. | % | No. | % | |
| Preeclampsia | 27 | 26.5 | 24 | 23.5 | 0.628 |
| Assisted reproductive therapy | 20 | 19.6 | 15 | 14.7 | 0.353 |
| Multiple pregnancy | 4 | 3.9 | 5 | 4.9 | 0.733 |
| Prolonged labor | 6 | 5.9 | 4 | 3.9 | 0.654 |
| Emergency Cesarean section in labor | 23 | 22.5 | 27 | 26.5 | 0.710 |
| Post-Partum Hemorrhage | 3 | 2.9 | 5 | 4.9 | 0.517 |
| Preterm birth < 37 weeks | 23 | 22.5 | 17 | 16.7 | 0.471 |
| Stillbirth in current pregnancy | 5 | 4.9 | 3 | 2.9 | 0.290 |

**Table 5. Distribution of obstetrical risk factors of patients before and after intervention program**

| Transient Risk factor* | Patients' Group | | | | P. value |
|---|---|---|---|---|---|
| | Before intervention (N = 102) | | After intervention (N=102) | | |
| | No. | % | No. | % | |
| Any surgical procedure in pregnancy | 2 | 2.0 | 0 | 0.0 | 0.477 |
| Dehydration | 14 | 13.7 | 16 | 15.7 | 0.693 |

**Table 6. Distribution of Transient Risk factor of patients before and after intervention program *Other transient risk factors were not reported among the patients**

the patient about the residence, occupation, education, gestational age, obstetric history (gravidity, parity, and abortion or stillbirth deliver), medical history, surgical history, type of Cesarean section and then finally make an assessment about the risk factors and ask them for all risk factors and additional information about the pharmacological prophylaxis after Cesarean section either elective or emergency and the dose with the duration of LMWH after delivery depending on individual risks of the patient. Then includes the evaluation performed by the clinical pharmacist who could improve VTE prophylaxis through the assessment of reporting of risk factors, receiving thromboprophylaxis when patients had absolute indications, Initiation of thromboprophylaxis, Thromboprophylaxis dose according to body weight, and duration of thromboprophylaxis according to patient calculated risk score.

## 4. RESULTS

After review of patients' medical records by the researcher, before and after intervention program to assess Thromboprophylaxis administration and adherence to VTE prophylaxis guidelines, it had been found that before intervention, risk factors of VTE were optimally reported in 63.7% of patients and scored according to the guideline. Vast majority of patients (98%) with absolute indication, received thromboprophylaxis, Proper initiation of thromboprophylaxis reported in 96.1%. Optimal thromboprophylaxis dose according to body weight was administered in 56.9%, and optimal duration of thromboprophylaxis reported in 18.6% of patients. After intervention the corresponding percentages of these evaluation items was optimized to a proportion of 80.4%, 100%, 97.1%, 83.3%, and 52%, respectively (Table 7).

Regarding the barriers of administration thromboprophylactic guidelines and adherence, high cost was the main cause of non-adherence with the guidelines which was reported by (86%), followed by concern about bleeding risks reported by 71.9%. Difficult or inconvenient to use guidelines in our patients, and patients complain and incompliance (52.6%). Other barriers are demonstrated in (Table 8).

## 5. DISCUSSION

During the observation phase, we found the obstetricians prescribe thromboprophylaxis and they initiated proper thromboprophylaxis. However, the risk factors are not well reported that means the obstetricians depend on their experience, knowledge, and practice to decide and calculate the risk factors, and decided

| Category | Patients' Group | | | | |
|---|---|---|---|---|---|
| | Before intervention | | After intervention | | P. value |
| | No. | % | No. | % | |
| Optimal reporting of risk factors | 65 | 63.7 | 82 | 80.4 | 0.008 sig |
| Thromboprophylaxis prescribed to patients with absolute indications | 100 | 98.0 | 102 | 100.0 | 0.477 ns |
| Proper initiation of thromboprophylaxis | 98 | 96.1 | 99 | 97.1 | 1.00 ns |
| Optimal Thromboprophylaxis dose according to body weight | 58 | 56.9 | 85 | 83.3 | < 0.001 sig |
| Optimal Duration of thromboprophylaxis | 19 | 18.6 | 53 | 52.0 | < 0.001 sig |

**Table 7. Results of Evaluation of practice and adherence to guidelines before and after intervention**

| Barrier | No. | % |
|---|---|---|
| 1-High costs | 49 | 86.0 |
| 2-Concern about bleeding risks | 41 | 71.9 |
| 3-Difficult or inconvenient to use guidelines in our patients, and patients complain and incompliance | 30 | 52.6 |
| 4-Lack of awareness of guidelines | 28 | 49.1 |
| 5-Need for new resources or facilities that are not available in our hospitals | 27 | 47.4 |
| 6-Lack of familiarity with guidelines | 19 | 33.3 |
| 7-Concern about infection resulting from wound hematomas | 14 | 24.6 |
| 8-Lack of self-efficacy of some physicians (perceived inability to follow guidelines) | 14 | 24.6 |
| 9-Disagreement between guidelines is confusing | 6 | 10.5 |
| 10-VTE not practiced as a problem in our experience | 3 | 5.3 |

**Table 8. Barriers and causes of current practice versus guideline adherence reported by obstetricians**

the treatment indicated or not based on their experience. However, one of the main finding that we found a significant gap in the dosing calculation according to bodyweight which is the main responsibilities of clinical pharmacist to optimize the patient therapy management and this can be done via joining obstetricians in the morning tour to ensure optimum dose calculations.

The use of thromboprophylaxis during the postpartum period and pregnancy is an important topic in the many literature and societies of obstetricians and gynecologist by using the correct thrombophylactic agent, timing, and dosing that interfere significantly with the outcome of the pregnancy and postoperatively in women undergoing Cesarean section (CS) (7, 9). The duration of the treatment is reported by the obstetricians according to the guideline but the true cause of nonadherence of the patient is the cost of the drugs and the patient can't buy the treatment from out pharmacy lead to nonadherence to thromboprophylaxis where the majority of obstetricians (86%) stated that they prescribed thromboprophylaxis but non-compliance of the patient to reject using the prophylactic agent due to high cost. In the previous multinational, longitudinal, observational study only 63.4% of patients are prescribed the same after hospital discharge.

The main reasons for the observed gap between real-life clinical practice low perception of the patient at hospital discharge and high cost of prophylaxis (10). During the last four years data available from the Ministry Of Health (M.O.H) showed that the incidence of VTE among patients undergo C.S is increasing for instance available data from the Department of Public Health in Najaf Health Directorate for this period revealed an increasing number of C.S which leads to increase in the risk of VTE; However among the different causes of maternal mortalities VTE particularly PE was a major cause of maternal mortality which is ranked number one among these cases and contributed 24% of all maternal mortality causes. Therefore, we needed to minimize any barrier to behind the current gap in prescribing practice of thromboprophylaxis. Another barrier is about 47.4% is no resources or facilities that are available in our hospitals that increase the compliance of the patients such as availability of LMWH for outpatient is very important to improve the adherence to guideline the correct duration should be supported by giving the patient all treatment before discharge. The duration of thromboprophylaxis which related to the absence or not the availability of the product in the hospital and the cost of the drug is high and the patient culture. Thirty obstetricians (52.6%) said that difficult or inconvenient to use guidelines in our patients, patients complain or in compliance due to pain at the site of injection or poor knowledge about VTE complication and this similar to the previous study have reported that poor adherence of patients and poor knowledge about VTE complications in the long term lead to noncompliance to their medication (11).

The major barrier to their use or practice of thromboprophylaxis the obstetricians was about 71.9% of them concerning bleeding risk this finding similar to a multicenter study by involving healthcare providers including physicians, pharmacists, and research coordinators in 27 intensive care units in Canada, certain barriers to thromboprophylaxis practices were identified. These include, in order of decreasing frequency; cost of acquiring drugs, fear of patient bleeding, lack of resident information (12). Then in the intervention phase, we initiated multifaced intervention to support the already existing program about thromboprophylaxis use which was started by the gynecology and obstetrics branch of medicine collage of Kufa University in collaboration with the Al-Najaf Heath Directorate since years in addition to activation the role of a clinical pharmacist to participate in the regulation dose and there is improvement in the reporting of risk factors, thromboprophylaxis dosing according to body weight andduration of thrombopro-

phylaxis according to score. This is similar to a previous study from the Kingdom of Saudi Arabia reported by Al-Tawfiq and Saadeh that the use of multiple interventions increased the VTE prophylaxis compliance rate (13). In another study in Italian, Teaching Hospital observed that the adoption of multiple interventions including presentation, pocket guidelines, implementation of the working group to identify barriers to change resulted in an increase as well as appropriate use of VTE prophylaxis among surgical patients from 64% to 97% (14).

## 6. CONCLUSION

This study showed the current practice of post-cesarean thromboprophylaxis need further optimization in dosing calculation and duration of therapy according to patient risk score and the clinical pharmacist's multifaceted intervention resulted in improving thromboprophylaxis prescribing pattern in accordance with guideline recommendations.


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