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

Safa Emad J. Suker1, Ayad A Hussein AL-Ameen2, Najah R. Hadi3

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 and dosing 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

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 practice 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 presentation to activate 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 multifaceted 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

| Variable | Patients’ Group | Before intervention (N = 102) | After intervention (N=102) | P. value |
|----------|-----------------|------------------------------|-----------------------------|----------|
| Age      | Age ≤ 35        | 84                           | 84                          | 1.00     |
|          | Age > 35        | 18                           | 18                          |          |
| Weight (kg) | ≤ 50     | 3                            | 3                            | 0.861    |
|          | 50 - 90         | 79                           | 82                          | 0.840    |
|          | 91 - 130        | 20                           | 19                           | 0.539    |
|          | > 130           | 3                            | 2                            | 0.568    |
| Education | Illiterate      | 21                           | 26                           | 0.926    |
|          | Read and Write  | 23                           | 21                           |          |
|          | Primary         | 17                           | 17                           |          |
|          | Secondary       | 24                           | 25                           |          |
|          | College or higher | 17           | 17                           |          |
| Occupa- | Housewife       | 70                           | 74                           |          |
| tion     | Employed        | 32                           | 28                           |          |
|          | None            | 69                           | 66                           |          |
|          | Employed        | 32                           | 28                           |          |
| Gravid- | 1 - 2           | 47                           | 46                           | 0.715    |
| ity      | 3 - 4           | 22                           | 21                           |          |
|          | > 4             | 33                           | 31                           |          |
| Parity   | Nulliparous     | 23                           | 22                           | 0.953    |
|          | 1 - 2           | 34                           | 33                           |          |
|          | 3 - 4           | 30                           | 29                           |          |
|          | > 4             | 15                           | 14                           |          |
| Abortion | None            | 69                           | 66                           | 0.568    |
| History  | 1 - 2           | 29                           | 28                           |          |
| of Cesa- | 3 or more       | 4                            | 3                            |          |
| rean      | None            | 51                           | 50                           |          |
| sections | 1 - 2           | 31                           | 30                           | 0.752    |
|          | 3 or more       | 20                           | 19                           |          |

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

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

Knowledge of all health care provides include the nurse, pharmacist, obstetricians, and residents

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 patients 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
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
the prophylactic agent due to high cost. In the previous laxis but non-compliance of the patient to reject using cians (86%) stated that they prescribed thromboprophy-
to thromboprophylaxis where the majority of obstetri-
the treatment from our pharmacy lead to nonadherence
the guideline but the true cause of nonadherence of the
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 pre-
scribing practice of thromboprophylaxis. Another bar-
rier 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 medi-
cation (11).
The major barrier to their use or practice of thrombo-
prophylaxis 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 partici-
pate in the regulation dose and there is improvement in the reporting of risk factors, thromboprophylaxis dosing according to body weight and duration of thrombopro-

| Category                              | Patients’ Group | Before intervention | After intervention | P. value |
|---------------------------------------|-----------------|---------------------|--------------------|----------|
| Optimal reporting of risk factors     |                 | No.  | %      | No.  | %      | 0.008 sig |
| Thromboprophylaxis prescribed to patients with absolute indications | 65              | 63.7 | 82     | 80.4  | 0.477 ns |
| Proper initiation of thromboprophylaxis | 100            | 98.0 | 102   | 100.0  | 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 experi-
ence. 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 thromboplastic 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 our 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
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.

• Author’s contribution: All authors were involved in the preparation this article. Final proofreading was made by the first author.
• Conflict of interest: None declared.
• Financial support and sponsorship: Nil.

REFERENCES
1. Schiro TA, Sakowski J, Romanelli RJ, Jukes T, Newman J, Hudnut A, et al. Improving adherence to best-practice guidelines for venous thromboembolism risk assessment and prevention. Am J Health Syst Pharm. 2011 Nov 15; 68(22): 2184-2189. doi: 10.2146/ajhp10102. PMID: 22058105
2. Heit JA. Epidemiology of venous thromboembolism. Nat Rev Cardiol. 2015 Aug; 12(8): 464-474. doi: 10.1038/nrcardio.2015.83.
3. Carballes MG, Ríos-Vives MA, Fierro EC, Azogue XG, Herrero SG, Rodriguez AE, et al. A Pictorial Review of Postpartum Complications. Radiographics. Nov-Dec 2020; 40(7): 2117-2141. doi: 10.1148/rg.2020200031.
4. Domingues RMSM, Dias MAB, Schlithz AOC, Leal MdC. Factors associated with maternal near miss in childbirth and the postpartum period: findings from the birth in Brazil National Survey, 2011-2012. Reprod Health. 2016 Oct 17; 13(Suppl 3): 115. doi: 10.1186/s12978-016-0232-y.
5. Jackson E, Curtis KM, Gaffield ME. Risk of venous thromboembolism during the postpartum period: a systematic re-
view. Obstet Gynecol. 2011; 117(3): 691-703. doi: 10.1097/AOG.0b013e31820ce2db.
6. Royal college of obstetrician and gynecologist. Reducing the risk of venous thromboembolism during pregnancy and the puerperium. Green Top Guidel. 2015; (37a): 1-40.
7. Bates SM, Middeldorp S, Rodger MR, James AH, Greer I. Guidance for the treatment and prevention of obstetric-associated venous thromboembolism. J Thromb Thrombolysis. 2016 Jan; 41(1): 92-128. doi: 10.1007/s11239-015-1309-0.
8. Bates SM, Rajasekhar A, Middeldorp S, McIntock C, Rodger MA, James AH, et al. American Society of Hematology 2018 guidelines for management of venous thromboembolism: venous thromboembolism in the context of pregnancy. Blood Adv. 2018 Nov 27; 2(22): 3317-3359. doi: 10.1182/bloodadvances.2018024802.
9. Goecke T, Voigt F, Rath W. Thromboprophylaxis following cesarean section—a nation-wide survey from Germany. J Matern Fetal Neonatal Med. 2020 Jul; 33(14): 2359-2365. doi: 10.1080/14767058.2018.1550064.
10. Arcelus JJ, Felicissimo P, DEIMOS Investigators. Venous thromboprophylaxis duration and adherence to international guidelines in patients undergoing major orthopedic surgery: results of the international, longitudinal, observational DEIMOS registry. Thromb Res. 2013 Jun; 131(6): e240-e6. doi: 10.1016/j.thromres.2013.03.014.
11. Alzoubi KH, Khassawneh BY, Obeidat B, Asfoor SS. Awareness of patients who undergo cesarean section about venous thromboembolism prophylaxis. J Vasc Nurs. 2013; 31(1): 15-20. http://dx.doi.org/10.1016/j.jvn.2012.07.001
12. Cook D, Duffett M, Lauzier F, Ye C, Dodek P, Paunovic B, et al. Barriers and facilitators of thromboprophylaxis for medical-surgical intensive care unit patients: a multicenter survey. J Crit Care. 2014; 29(3): 471-e1
13. Al-Tawfiq JA, Saadeh BM. Improving adherence to venous thromboembolism prophylaxis using multiple interventions. Ann Thorac Med. 2011; 6(2): 82. doi: 10.4103/1817-1737.78425
14. Scaglione L, Piobbici M, Pagano E, Ballini L, Tamponi G, Ciccone G. Implementing guidelines for venous thromboembolism prophylaxis in a large Italian teaching hospital: lights and shadows. Haematologica. 2005 May; 90(5): 678-684.