An Observational study of Drug Utilization Evaluation of Anticoagulantsin tertiary care hospital

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Abstract:

Background: Anticoagulants commonly known as blood thinners are chemical substances that prevent coagulation of blood, by prolonging clotting time. Drug utilization an evaluation of anticoagulant drugs essential considering it as narrow therapeutic range and associated risks. **Aim:** To study DUE of anticoagulants and emphasizing on ADRs associated with it. The study also focuses on ADRs associated with anticoagulants and its management.

Methodology: It is a prospective and observational study. It is carried out in a sample size of 360 patients from the month of November 2020- February 2021, in a tertiary care hospital. **Results:** IV form of anticoagulant is accounted for 85% of prescriptions were as oral anticoagulants and 15% was found during the study it was observed that administration of anticoagulants were irrespective of INR, APTT, PT, BT, CT and we have observed that 27 %patients accountant with bleeding complications, thrombocytopenia and anemia were the most common ADR observed in the patients accounted for 48% of the patients.

Conclusion: Anticoagulants being a narrow therapeutic index drugs comes up with complications when not administered properly there is a need to emphasize on its dose regimen and duration to improve the mortality and morbidity of the patients where the role of clinical pharmacist place a vital role in TDM of anticoagulants

Keywords: Anti coagulants, TDM, INR, APTT.

Introduction

Anticoagulants are the class of agents which help in prolonging the clotting time and prevent clotting of blood and are commonly known as 'blood thinners'. It has a wide range of therapeutic usage which involves cardiac complications, embolisms like deep vein thrombosis, maintenance therapy in dialysis , surgeries etc,. Because of its narrow therapeutic index this class of agents are placed under high risk medication as it requires constant monitoring when administered as non compliance to the prescribing guidelines may lead to blood disorders, irregular internal bleeding & hemorrhage which can be life threatening . Hence there is a need to emphasize on rational use of blood thinning agents to avoid complications. Deviation from guidelines may result in therapeutic value, cost effectiveness and ADR occurrences. Factors associated with noncompliance generally include lack of knowledge and training regarding the pattern of administration and improper utilization of drugs. In this study we planned to conduct a Drug Utilization Evaluation (DUE) which can serve as a major tool in constant monitoring and preventing medication errors, adverse drug reactions (ADRs), drug-drug interactions, drugtoxicity and therapeutic duplication. There is a need for a proper monitoring system to combat the occurrence of ADR associated with non-compliance of the anticoagulants where the clinical pharmacist along with health care professionals can play an active role in reducing the mortality and morbidity associated with anticoagulants.

Methodology

It is a descriptive and observational study involving 360 subjects of either gender between the age group of 20-70 years old who were on anticoagulant therapy were enrolled in the study from various departments of the hospital. for a period of six months i.e, from November 2020February 2021. A well defined proforma was designed for conducting DUE based on monitoring parameters as well including patient demographics, medication history , laboratory values, final diagnosis and discharge medication etc., and got

validated by the health care professionals. The pattern of anticoagulants 'utilization,their brand name, generic name, indication, dose,dosage form, administration site and numbers of drugs in prescription were studied. . All the cases were observed and monitored extensively. The guidelines assessed for prescribing factors were ASH VTE guidelines. Drug interaction of anticoagulants were categorized as major, moderate and minor according to their severity and were investigated using MEDSCAPE, LEXICOMP, DRUG.COM, INTERACTION CHECKER. Assessment of ADRs were done using Naranjo"s causality scale. A proper report of the study was made

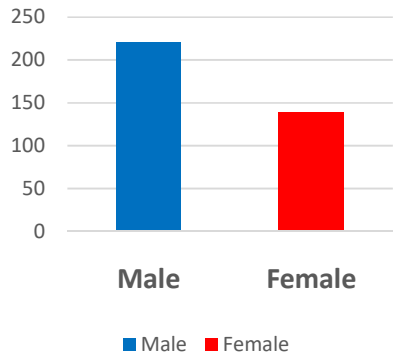
Statistical Analysis

Statistical analysis was done using collected data, which were analyzed using microsoft excel. The results are expressed in terms of numbers and percent.

Results:

1. Table: 1 Gender - wise distribution of the subjects:

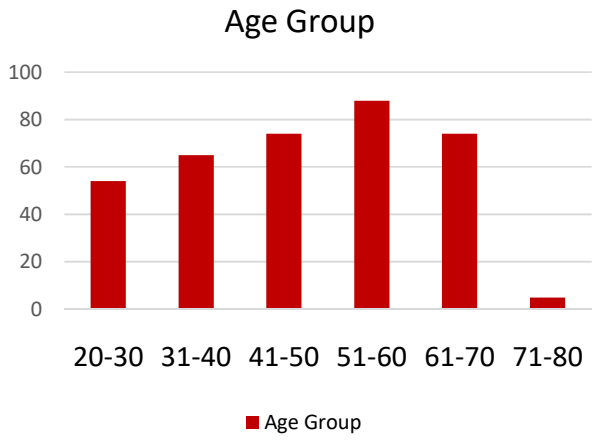
S.No	Gender	Total No. of patients/Percentage
1	Male	221 (62%)
2	Female	139 (38%)



Graph 1: Showing gender wise distribution of subjects during the study from Nov 2020 to Feb 2021

Table: 2 Age- wise distribution:

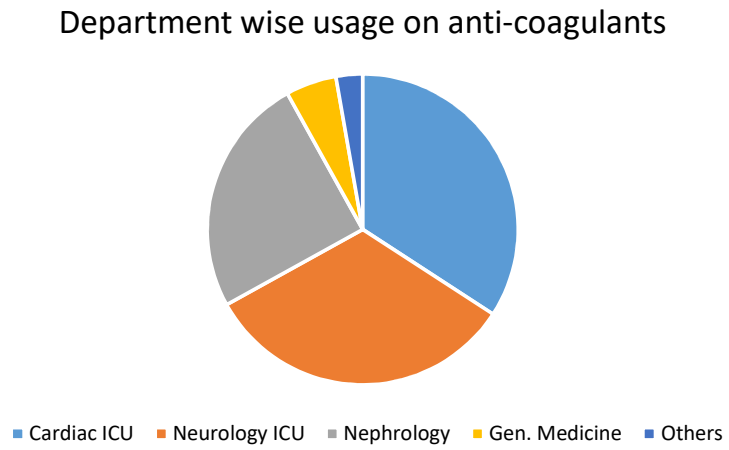
S.No	Age group	Total No. of patients
1	20-30	54
2	31-40	65
3	41-50	74
4	51-60	88
5	61-70	74
6	71-80	05



Graph.2: The graph indicates the age wise distribution of the patients involved in the study from November 2020- February 2021.

Table 3: Department wise distribution of anticoagulants used:

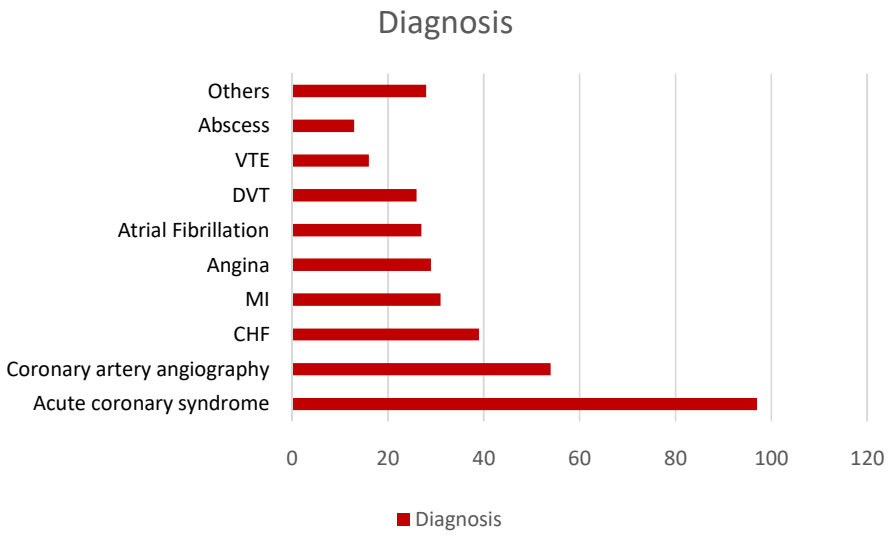
S.No	Department	Total No. of Patients
1	Cardiac ICU	123
2	Neurology ICU	118
3	Nephrology (Dialysis)	90
4	General Medicine	19
5	Others	10



Graph.3: Showing department wise usage of anti-coagulants

Table 4: Reason for Hospital admission:

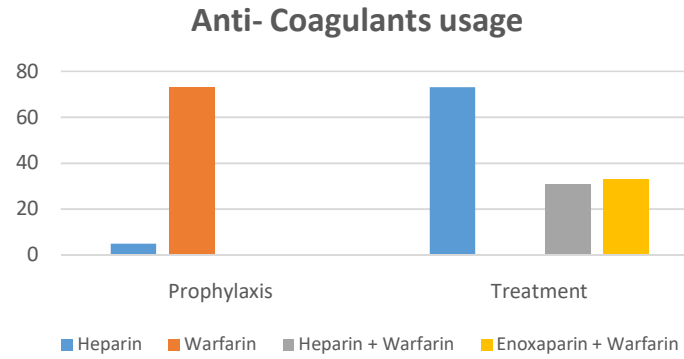
S.No	Diagnosis	Total no of patients
1	Acute coronary syndrome	97
2	Coronary artery angiography	54
3	CHF	39
4	Myocardial Infarction	31
5	Angina	29
6	Atrial fibrillation	27
7	DVT	26
8	VTE	16
9	Abscess	13
10	Others	28



Graph 4: Showing the reason of hospital admission of the subjects during the study.

Table 5: Therapeutic goals achieved by anticoagulants:

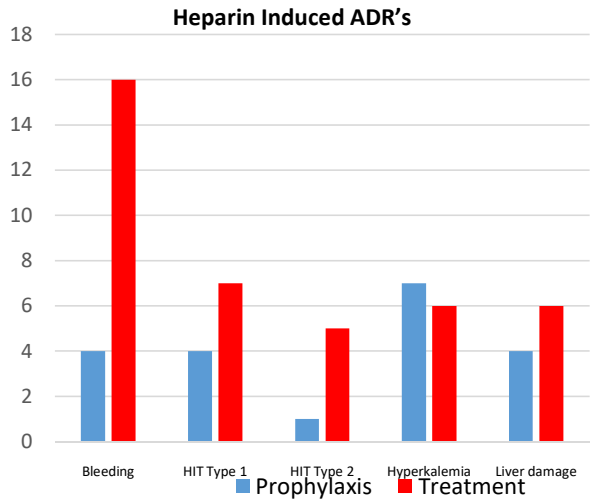
Indication	Choice of anticoagulants	Achieved therapeutic goal
Prophylaxis	Heparin	5
	Warfarin	73
Therapeutic	Heparin	73
	Heparin + warfarin	31
	Enoxaparin + Warfarin	33



Graph 5: Showing prescribing patterns of anti coagulants.

Table 6: Heparin induced ADR's during the study

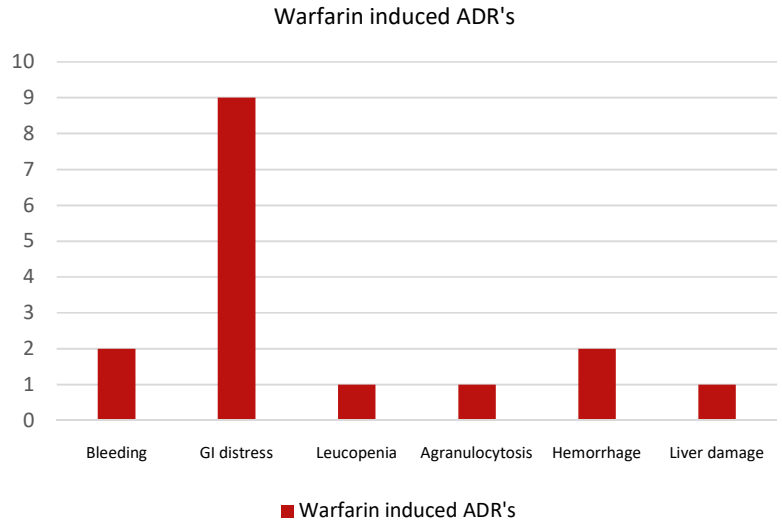
Indication	ADR of Heparin	Total no of ADR
Prophylaxis	Bleeding	4
	HIT Type 1	4
	HIT Type 2	1
	Hyperkalemia	7
	Liver Damage	4
Treatment	Bleeding	16
	HIT Type 1	7
	HIT Type 2	5
	Hyperkalemia	6
	Liver Damage	6



Graph 6: Showing heparin induced ADR's during the study

Table 7: Warfarin induced ADR:

S.NO	ADR of Warfarin	Total no of ADR
1	Bleeding	2
2	GI distress	9
3	Leucopenia	1
4	Agranulocytosis	1
5	Hemorrhage	2
6	Liver damage	1



Graph 7: Showing the ADR's associated with warfarin usage during the study.

Discussion:

The current examination showed that the anticoagulants are generally utilized for treatment and for prophylaxis.The example of utilization depended more on clinician's judgment and experience. More than four months of study on patients going from age 20 to 80 years, it was seen that there were 10 (11.6%) of anticoagulants where patients were endorsed anticoagulant treatment with no sign. This acquires an additional expense weight to the patient including cost of observing alongside undesirable torment and longer term of emergency clinic stay. Being a showing clinic, centralization of patients from lower class and lower working class is seen more and adding financial weight of this kind won't be savvy.

A few investigations recommended expansion in potassium levels when treated with LMWH which was not found in our studies.LMWH represented greatest expense incase of anticoagulants. It was utilized in patients with Ischemic Coronary illness (IHD), cardiovascular mishap, hyper obstructive cardiomyopathy, femur break, cerebrovascular mishap, Fringe Corridor Infection, PE, DVT, PE-DVT.

Conclusion

Despite the existence of comprehensive guidelines for prevention and treatment of VTE, it is not performed accurately. The lack of acquaintance of the prescribers with the guidelines may be a major potential reason for administrating anticoagulants appropriately in the hospital. Furthermore, she every general hospital, it is recommended to have a local thromboticprophylaxis protocol. Therefore, arranging a meeting for preparing such an agreed protocol with describing the proper Implementation and the potential impact on the system with the relevant health care professionals who are in charge of prescription, especially for more precious and critical medications, may be needed in the teaching hospitals to manage prescribing standards.

References

[1] Singh V, Gopinath K, Behzadpour A, Meera NK. Anticoagulant utilization evaluation in a Tertiary Care Teaching Hospital: An observational prospective study in medical in patients. Indian Journal of Pharmacy Practice. 2015 Apr;8(2):61.

[2] en. m. wikipedia, org > wiki > Anticoagulants.

[3] Lakshmi R, James E, Kirthivasan R. Study on impact of clinical pharmacist's interventions in the optimal use of oral anticoagulants in stroke patients. Indian journal of pharmaceutical sciences. 2013 Jan;75(1):53.

[4] https;//healthengine. com. au /info / anticoagulants.

[5] Soha N, Iman K. Drug utilization evaluation of unfractionated heparin on a cardiac care unit in Iran. Journal of Pharmacy Research. 2011;4(5):1471-2

[6] Amaraneni A, Chippa V, Rettew AC. Anticoagulation safety. StatPearls [Internet]. 2020 Aug 11.

[7] Vineela C, Gangula VNM, Vasa VVS, Gonela S, Medha S. Drug utilization evaluation and assessment of economic burden of anticoagulants in a tertiary care hospital in South India.
Journal of Pharmaceutical and Scientific Innovation. 2018;7(5):188-94.

[8] Sachdeva PD, Patel BG. Drug utilization studies- scope and future perspectives. International Journal on Pharmaceutical and Biological Research. 2010;1(1):11- 7.

[9] Rekha MM, Mubeena T. A study on role of Doctor of Pharmacy in Drug Utilization Evaluation Pattern Analysis in inpatient units and reporting its co morbidities in a tertiary care teaching hospital. Pharma Tutor. 2017;5(10):55-62.

[10] Reshma EJ, Jeny SS, Mamatha KM, Nagamalesh UM. Oral anticoagulant prescription analysis for utilization pattern among inpatients at a tertiary care hospital. International Journal of Pharmacy and Pharmaceutical Sciences. 2018;10(3):76-80.

[11] Ansell J, Hirsh J, Poller L, Bussey H, Jacobson A, Hylek E. The pharmacology and management of the vitamin K antagonists: The Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Chest 2004;126:204S-233.

[12] Bond CA, Raehl CL. Pharmacist-provided anticoagulation management in United States hospitals: Death rates, length of stay, Medi carecharges, bleeding complications, and transfusions. Pharmacotherapy 2004;24:953-63.

[13] Jackson MR, Danby CA, Alving BM. Heparinoid anticoagulation and topical fibrin sealant in heparin-induced thrombocytopenia. The Annals of Thoracic Surgery 1997; 64(6): 1815-7

[14] Fahimi F, Baniasadi S, Behzadnia N, et al. Enoxaparin Utilization Evaluation: An Observational Prospective Study in Medical Inpatients. Irianian Journal of Pharmaceutical Research 2008; 7(1): 77.

[15] Geerts WH, Pineo GF, Heit JA. Prevention of venous thrombo embolism: the seventh ACCP conference on antithrombotic and thrombolytic therapy. Chest 2004; 126(3): 338S-400.

[16] Baglin TP, Keeling DM, Watson HG, British Committee for Standards in Haematology. Guidelines on oral anticoagulation (warfarin): Third edition – 2005 update. Br J Haematol 2006;132:277-85.

[17] Ansell JE. Anticoagulation management as a risk factor for adverse events: Grounds for improvement. J Thromb Thrombolysis 1998;5:13-8.

[18] Freedman MD. Oral anticoagulants: Pharmacodynamics, clinical indications and adverse effects. J Clin Pharmacol 1992;32:196-209.

[19] Lewis SM, Kroner BA. Patient survey of a pharmacist-managed anticoagulation clinic. Manag Care Interface 1997;10:66-70.

[20] Ansell JE, Hughes R. Evolving models of warfarin management: Anticoagulation clinics, patient self-monitoring, and patient self-management. Am Heart J 1996;132:1095-100.

[21] Crowther MA, Ginsberg JB, Kearon C, Harrison L, Johnson J, Massicotte MP, et al. A randomized trial comparing 5-mg and 10-mg warfarin loading doses. Arch Intern Med 1999;159:46-8.

[22] Chiquette E, Amato MG, Bussey HI. Comparison of an anticoagulation clinic with usual medical care: Anticoagulation control, patient outcomes, and health care costs. Arch Intern Med 1998;158:1641-7.

[23] Ebrahim I, Bryer A, Cohen K, Mouton JP, Msemburi W, Blockman M. Poor anticoagulation control in patients taking warfarin at a tertiary and district-level

prothrombin clinic in Cape Town, South Africa. South African Medical Journal. 2018 Jun 1;108(6):490-4.

[24]]Pastori D, Pignatelli P, Angelico F, Farcomeni A, Del Ben M, Vicario T, Bucci T, Raparelli V, Cangemi R, Tanzilli G, Lip GY. Incidence of myocardial infarction and vascular death in elderly patients with atrial fibrillation taking anticoagulants: relation to atherosclerotic risk factors. Chest. 2015 Jun 1;147(6):1644-50.

[25] Åsberg S, Eriksson M, Henriksson KM, Terént A. Reduced risk of death with warfarin–results of an observational nationwide study of 20 442 patients with atrial fibrillation and ischaemic stroke. International Journal of Stroke. 2013 Dec;8(8):689-95.