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Evaluation Of Anticoagulants Prescribing Patterns At A Tertiary Care Hospital

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Abstract
Background: *Anticoagulants are essential for managing cardiovascular conditions and preventing thromboembolic events. This study evaluates the prescribing patterns of anticoagulants in cardiac and medicine wards at a tertiary care hospital, emphasizing drug utilization and safety profiles.*
Methods: *A prospective, observational study was conducted over six months, involving patients admitted to cardiac and medicine wards. Data were collected on anticoagulant prescriptions, including the types of drugs used, patient demographics, and adverse drug reactions (ADRs). Coagulation parameters (PT, INR, aPTT, and platelet counts) were monitored to assess the efficacy and safety of the treatments.*
Results: *The most frequently prescribed anticoagulant was Heparin (57.24%), followed by Enoxaparin (13.82%), Acenocoumarol (9.21%), Apixaban (9.21%), and Warfarin (0.66%). Adverse drug reactions were reported in 4.2% of patients, primarily related to bleeding, with Acenocoumarol and Apixaban being the most commonly implicated drugs. Coagulation parameters remained stable across the patient population, indicating effective management of anticoagulation therapy. The study's findings are consistent with global trends favoring direct oral anticoagulants (DOACs) over traditional agents like Warfarin, particularly in terms of safety and convenience.*
Conclusion: *This study highlights a clear shift toward DOACs in clinical practice, reflecting their growing acceptance due to better safety profiles and ease of use. The findings support the need for ongoing monitoring of anticoagulant therapy to minimize risks, particularly in high-risk populations. Tailoring treatment to individual patient profiles is essential for optimizing outcomes.*

Keywords: *Anticoagulants, Prescribing patterns, Prothrombin time, INR, Apixaban, NOACs, Enoxaparin, Heparin, DOACs*

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I. Introduction

In contemporary healthcare settings, the irrational use of medicines remains a significant challenge primarily attributed to inappropriate prescriptions and patient non-compliance. The World Health Organization (WHO) estimates that more than half of all medicines are prescribed, dispensed, or sold inappropriately, with a corresponding failure by half of patients to adhere to prescribed treatments.[1] Prescription patterns, synonymous with drug utilization patterns, critically assess the appropriateness of drug use within hospital settings to optimize treatment regimens.[2] Anticoagulants, crucial in preventing clot formation, find extensive use in managing conditions such as atrial fibrillation, thromboembolisms, and during dialysis.[3] Traditional therapies like Heparin and Vitamin K antagonists have been standard, but newer oral anticoagulants (NOACs), including direct thrombin inhibitors like Dabigatran and Factor Xa inhibitors like Apixaban, Rivaroxaban, and Edoxaban (collectively known as DOACs), are increasingly replacing them.[4] Recent studies highlight DOACs' efficacy, showing a substantial shift towards their use, particularly in primary care settings, due to lower adverse event rates compared to older agents.[5] Tools such as the CHA2DS2VASc score aid in assessing stroke risk in atrial fibrillation patients, guiding appropriate anticoagulant selection.[6] Conversely, the HAS- BLED score helps manage bleeding risks associated with anticoagulant therapy.[7,8] Despite their advantages, challenges persist, including cost implications and variations in clinical experience, influencing their adoption in hospital settings.[4] This study aims to assess the current utilization trends of NOACs compared to traditional anticoagulants across various departments, highlighting ongoing considerations in optimizing anticoagulant therapy.[9]

II. Objectives

Primary Objective:

- To evaluate the prescribing patterns of anticoagulants in patients within the cardiac and medicine departments.

Secondary Objectives:

- To examine demographic details and comorbidities of patients.
- To correlate the effects of anticoagulants on PT, INR, aPTT, and platelet levels.
- To identify adverse drug reactions (ADRs) associated with anticoagulant use.
- To assess bleeding and stroke risk using the HAS-BLED and CHA2DS2-VASc scoring systems.
- To analyze the prescription trends of Novel Oral Anticoagulants (NOACs).

III. Methodology

Study Design: This study employed a prospective, observational design to evaluate the prescribing patterns and utilization of anticoagulants within the cardiac and medicine departments of a tertiary care center over a six-month period. The research focused on understanding the factors influencing anticoagulant prescription, the effectiveness of these medications, and their associated risks.

Data Sources: Data were meticulously collected from multiple sources to ensure comprehensive analysis, including:

- **Patient Case Notes:** Detailed records capturing patient history, diagnosis, and clinical progress.
- **Treatment Charts:** Documentation of prescribed medications, including dosage, frequency, and route of administration.
- **Laboratory Reports:** Results of relevant tests such as Prothrombin Time (PT), International Normalized Ratio (INR), Activated Partial Thromboplastin Time (aPTT), and platelet levels, which were crucial for assessing anticoagulant efficacy and safety.

Inclusion Criteria:

- Inpatients who were actively receiving anticoagulant therapy.
- Both male and female patients admitted to the cardiac and medicine wards.
- Patients administered anticoagulants as a prophylactic measure.

Exclusion Criteria:

- Pregnant women, due to the unique pharmacokinetic and pharmacodynamic considerations.
- Pediatric patients, as the study focused on adult populations.
- Emergency patients, where rapid decision-making precluded detailed study participation.

Data Collection and Study Procedure: Patients meeting the inclusion criteria were systematically identified and enrolled in the study. For each participant, demographic data (including age, weight, gender, and admission date) were recorded. Treatment specifics, such as the type of anticoagulant used, its administration route, dosage, frequency, and timing, were meticulously documented. Medication charts were reviewed to identify potential drug interactions, and laboratory parameters were monitored to evaluate the therapeutic impact of the anticoagulants.

Adverse events were closely monitored, with a specific focus on bleeding and thromboembolic complications. Risk assessments for bleeding and stroke were performed using the HAS-BLED and CHA2DS2-VASc scoring systems, respectively. Follow-up assessments were conducted throughout the treatment period to track patient outcomes, detect side effects, and adjust treatment protocols as necessary. The efficacy and safety of anticoagulant therapies were critically analyzed based on the data collected.

Ethical Considerations: This study was conducted as an observational study where no drugs were administered neither were the treatment regimens altered hence no ethical clearance was required.

IV. Results

Patient Demographics, Departmental Allocation, and Comorbidity Profile:

The study population consists of 120 patients, with a slightly higher representation of males (53.33%) compared to females (46.67%). The patients' ages range from 20 to 99 years, with a mean age of 62.93 years and a standard deviation of 17.61 years, indicating significant age variability. The majority of patients fall

within the 60-69 year age group (29.17%), followed by the 70-79 year group (18.33%). Most patients were treated in the General Medicine department (58.33%), with the remainder in Cardiology (41.67%). Hypertension was the most prevalent comorbidity, affecting 68.33% of the patients, followed by diabetes mellitus (58.33%) and a combination of both conditions (43.33%). Other notable comorbidities included venous thromboembolism (19.17%), heart failure (20%), and atrial fibrillation (18.33%), details depicted in Table 1.

Table 1: Patient Demographics, Departmental Allocation, and Comorbidity Profile

Category	Variable	Frequency (n)	Percentage (%)
Gender Distribution	Male	64	53.33
	Female	56	46.67
Age Distribution	20-29 years	7	5.83
	30-39 years	2	1.67
	40-49 years	12	10
	50-59 years	18	15
	60-69 years	35	29.17
	70-79 years	22	18.33
	80-89 years	20	16.67
	90-99 years	4	3.33
Department	Cardiology	50	41.67
	General Medicine	70	58.33
Comorbidities	Hypertension (HTN)	82	68.33
	Diabetes Mellitus (DM)	70	58.33
	HTN & DM	52	43.33
	Atrial Fibrillation (AF)	22	18.33
	Venous Thromboembolism (VTE)	23	19.17
	Heart Failure	24	20
Statistics	Mean Age	62.93 years	
	Standard Deviation	17.61 years	

Comprehensive Summary of Anticoagulant Therapy, Antiplatelet Combination, Adverse Drug Reactions, and Coagulation Parameter Changes:

In a study of 120 patients, the most commonly prescribed anticoagulant was Heparin (57.24%), followed by Enoxaparin (13.82%) Acenocoumarol (9.21%) and Apixaban (9.21%). Warfarin was the least prescribed (0.66%). Combination therapy involving antiplatelets was administered to 65 patients, while 55 did not receive antiplatelet therapy. Adverse drug reactions were observed primarily with Acenocoumarol and Apixaban, manifesting as coagulopathy and bleeding. Analysis of coagulation parameters (PT, INR, aPTT, and platelets) before and after treatment revealed minimal changes, indicating stable management across both general medicine and cardiology departments. These findings underscore the prevalent use of combination therapy and the overall safety and efficacy of anticoagulant treatment in the study population, details are depicted in Table 2.

Table 2: Comprehensive Summary of Anticoagulant Therapy, Antiplatelet Combination, Adverse Drug Reactions, and Coagulation Parameter Changes

Category	Variable	Value
Anticoagulants Prescribed	Heparin	87 patients (57.24%)
	Warfarin	1 patient (0.66%)
	Apixaban	14 patients (9.21%)
	Acenocoumarol	14 patients (9.21%)
	Rivaroxaban	12 patients (7.89%)
	Dabigatran	3 patients (1.97%)
	Enoxaparin	21 patients (13.82%)
Combination Therapy with Antiplatelet	Patients on Antiplatelet Therapy	65 patients
	Patients not on Antiplatelet Therapy	55 patients
Adverse Drug Reactions (ADR)	Coagulopathy (Acenocoumarol)	2 cases
	Bleeding (Acenocoumarol)	1 case
	Bleeding (Apixaban)	2 cases
Coagulation Parameters	Before Treatment	After Treatment
	PT (Mean)	14.55
	INR (Mean)	1.22
	aPTT (Mean)	31.15
	Platelets (Mean)	278
Effect of Anticoagulants (General Medicine)	Before Treatment	After Treatment
	PT (Mean)	13.1
	INR (Mean)	1.09
	aPTT (Mean)	31.5
	Platelets (Mean)	248.9

	Effect of Anticoagulants (Cardiology)	Before Treatment	After Treatment
		PT (Mean)	13.7
		INR (Mean)	1.2
		aPTT (Mean)	28.5
		Platelets (Mean)	255.4

Comprehensive Risk Assessment Summary:

The study assessed bleeding and stroke risks among 120 patients using the HAS-BLED and CHA2DS2VASc scores, revealing that the 80-89 age group had the highest bleeding risk, with 13 patients scoring 3-5 on the HAS-BLED scale, followed by the 60-69 group with 10 high-risk patients. In contrast, the 30-39 age group exhibited the lowest bleeding risk, with no patients in the high-risk category. Gender analysis showed that males had a slightly higher bleeding risk than females, with 21 males versus 17 females in the high-risk category. Additionally, stroke risk was evaluated in 22 patients with Atrial Fibrillation, with females showing a higher stroke risk. Notably, two females had CHA2DS2VASc scores of 7, and one had a score of 9, indicating significant stroke risk, while males had lower stroke risk with CHA2DS2VASc scores between 3 and 6, details are depicted in Table 3.

Category	**Low Bleeding Risk (HAS- BLED 0-2)**	**High Bleeding Risk (HAS-BLED 3-5)**	**Stroke Risk (CHA2DS2VASc Score)**
Age Group			
20-29	6	1	-
30-39	2	0	-
40-49	11	1	-
50-59	17	2	-
60-69	25	10	-
70-79	14	8	-
80-89	6	13	-
90-99	1	3	-
Gender			
Male	43	21	3 (Score 3), 1(Score 4), 1 (Score 5) 2 (Score 6)
Female	39	17	2 (Score 2), 1 (Score 3), 2 (Score 4),4 (Score 5), 1 (Score 6), 2 (Score 7), 1(Score 9)

V. Discussion

This study assessed the prescribing patterns of anticoagulants in cardiac and medicine wards at a tertiary care hospital, with a focus on Heparin, Enoxaparin, Acenocoumarol and Apixaban. The findings align with global trends, where newer direct oral anticoagulants (DOACs) are increasingly replacing traditional therapies like Warfarin. This transition is driven by DOACs' improved safety profiles, including lower rates of bleeding and thromboembolic events, as supported by recent studies.[10] Heparin was the most commonly prescribed anticoagulant in this study, followed by Enoxaparin, Acenocoumarol and Apixaban. The low prescription rate of Warfarin is consistent with other studies that emphasize the challenges of managing Warfarin therapy, including the need for regular INR monitoring and higher bleeding risk.[11] Studies such as those by Patel et al. have shown that DOACs like Apixaban are preferable due to their lower incidence of major bleeding and comparable efficacy to Warfarin.[12] The study's results also highlight the safety and efficacy of anticoagulant therapy, as reflected in stable coagulation parameters (PT, INR, aPTT, and platelet counts) pre- and post-treatment. This is in line with literature indicating that DOACs and low-molecular-weight heparins (LMWHs) like Enoxaparin offer consistent anticoagulation with minimal impact on these parameters.[13] Adverse drug reactions (ADRs) were observed, particularly with Acenocoumarol and Apixaban, manifesting as bleeding complications. This finding echoes the existing literature, which acknowledges that while DOACs generally present a lower bleeding risk than traditional anticoagulants, careful patient monitoring remains essential, especially in populations with comorbidities.[14] Additionally, the HAS-BLED and CHA2DS2-VASc scores in this study underscored the importance of risk assessment tools in guiding anticoagulant therapy to balance efficacy and safety, particularly in elderly patients with multiple comorbidities.

VI. Conclusion

This study highlights the prescribing patterns of anticoagulants in the cardiac and medicine wards of a tertiary care hospital, showing a preference for Heparin, Enoxaparin, Acenocoumarol and Apixaban over traditional anticoagulants like Warfarin. This reflects a broader trend towards direct oral anticoagulants (DOACs) due to their better safety profiles and ease of use. However, the occurrence of adverse drug reactions,

particularly bleeding, emphasizes the need for careful monitoring and individualized therapy, especially in high-risk patients. The research adds valuable real-world data on anticoagulant trends, supporting the shift to DOACs and stressing the importance of personalized treatment plans to enhance patient outcomes.

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Declaration

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Conflict of Interest: No conflict of interest

Abbreviations

HTN: Hypertension; ***DM***: Diabetes Mellitus; ***HF***: Heart Failure; ***AF***: Atrial Fibrillation; ***NOAC***: Novel Oral Anticoagulant; ***INR***: International Normalized Ratio; ***ADR***: Adverse Drug Reaction; ***DOAC***s: Direct Oral Anticoagulants; ***APTT***: Activated Partial Thromboplastin Time; ***PT***: Prothrombin Time.

References:

[1] Jain S, Jain P, Moghe V, Et Al. A Systematic Review Of Prescription Pattern Monitoring Studies And Their Effectiveness In Promoting Rational Use Of Medicines. Perspect Clin Res. 2015;6(2):86. Doi:10.4103/2229-3485.154005

[2] Hinojar R, Jiménez-Natcher JJ, Fernández-Golfín C, Zamorano JL. New Oral Anticoagulants: A Practical Guide For Physicians. Eur Hear J - Cardiovasc Pharmacother. 2015;1(2):134-145. Doi:10.1093/Ehjcvp/Pvv002

[3] Wang TKM, Sathananthan J, Marshall M, Kerr A, Hood C. Relationships Between Anticoagulation, Risk Scores And Adverse Outcomes In Dialysis Patients With Atrial Fibrillation. Hear Lung Circ. 2016;25(3):243-249. Doi:10.1016/J.Hlc.2015.08.012

[4] Loo SY, Dell'Aniello S, Huiart L, Renoux C. Trends In The Prescription Of Novel Oral Anticoagulants In UK Primary Care. Br J Clin Pharmacol. 2017;83(9):2096-2106. Doi:10.1111/Bcp.13299

[5] Vedovati MC, Germini F, Agnelli G, Becattini C. Direct Oral Anticoagulants In Patients With VTE And Cancer: A Systematic Review And Meta-Analysis. Chest. 2015;147(2):475-

[6] 483. Doi:10.1378/Chest.14-0402

[7] Gažová A, Leddy JJ, Rexová M, Hlivák P, Hatala R, Kyselovič J. Predictive Value Of CHA2DS2-Vasc Scores Regarding The Risk Of Stroke And All-Cause Mortality In Patients With Atrial Fibrillation (CONSORT Compliant). Medicine (Baltimore). 2019;98(31):E16560. Doi:10.1097/MD.0000000000016560

[8] Maes F, Dalleur O, Henrard S, Et Al. Risk Scores And Geriatric Profile: Can They Really Help Us In Anticoagulation Decision Making Among Older Patients Suffering From Atrial Fibrillation? Clin Interv Aging. 2014;9:1091-1099. Doi:10.2147/CIA.S62597

[9] Pengo V, Legnani C, Noventa F, Palarenti G. Oral Anticoagulant Therapy In Patients With Nonrheumatic Atrial Fibrillation And Risk Of Bleeding: A Multicenter Inception Cohort Study. Thromb Haemost. 2001;85(3):418-422. Doi:10.1055/S-0037-1615599

[10] Sikorska J, Uprichard J. Direct Oral Anticoagulants: A Quick Guide.Eur Cardiol Rev . 2017;12(1):40doi:10.15420/Ecr.2017:

[11] Patel MR, Mahaffey KW, Garg J, Et Al. "Rivaroxaban Versus Warfarin In Nonvalvular Atrial Fibrillation." N Engl J Med. 2011;365:883-891.

[12] Connolly SJ, Ezekowitz MD, Yusuf S, Et Al. "Dabigatran Versus Warfarin In Patients With Atrial Fibrillation." N Engl J Med. 2009;361:1139-1151.

[13] García DA, Libby E, Crowther MA. "The New Oral Anticoagulants." Blood. 2010;115:15-20.

[14] Kakkar AK, Mueller I, Bassand JP, Et Al. "Risk Profiles And Anticoagulant Treatment Of Patients With Newly Diagnosed Atrial Fibrillation At Risk Of Stroke: Perspectives From The International GARFIELD-AF Registry." Plos One. 2013;

[15] Ruff CT, Giugliano RP, Braunwald E, Et Al. "Comparison Of The Efficacy And Safety Of New Oral Anticoagulants With Warfarin In Patients With Atrial Fibrillation: A Meta- Analysis Of Randomized Trials." Lancet. 2014;383:955-962.