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COMMON CHALLENGES IN MISDIAGNOSIS AND DELAYED DIAGNOSIS OF ATRIAL FIBRILLATION IN PATIENTS OF A TERTIARY CARE HOSPITAL, ASSAM WITH A FOCUS ON STROKE PREVENTION

Cardiology

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ABSTRACT

Background: Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia and a leading cause of ischemic stroke. Low resource settings such as Assam, India, delays and misdiagnoses of AF are frequent, contributing to missed opportunities for timely intervention and stroke prevention. **Aims And Objective:** To assess the prevalence of misdiagnosis and diagnostic delays in patients with AF, identify contributing factors, and propose strategies for improved early detection and stroke prevention. **Methodology:** This retrospective observational study analyzed medical records of 140 patients diagnosed with AF over a three-year period at a tertiary care hospital in Assam. Data were collected through chart reviews, clinician interviews, and mapping of diagnostic timelines. Inclusion criteria were adults (≥18 years) with ECG-confirmed AF and documented stroke or TIA events. Data analysis was conducted using Jamovi software and Microsoft Excel. **Results:** Out Of 140 patients (mean age 55.9 ± 9.7 years; 64.3% male), 25% experienced delayed diagnosis, particularly older patients and those with persistent/permanent AF or delayed referrals from peripheral hospitals. Misdiagnoses often included anxiety disorders and benign palpitations. Inadequate clinician training and diagnostic resource limitations were major contributors. Stroke risk increased by 40% in cases of delayed diagnosis which is identify using logistics regression analysis. Statistical analysis showed a significant age difference between promptly diagnosed and delayed cases ($p = 0.035$). **Conclusion:** Misdiagnosis and delayed diagnosis of AF significantly elevate stroke risk. Enhancing clinical suspicion, improving ECG access, and training healthcare providers especially at peripheral centers are vital steps to improve outcomes. Findings highlight the need for system-level changes in AF management.

KEYWORDS

Stroke, Atrial Fibrillation, Delayed diagnosis and Misdiagnosis.

INTRODUCTION

The relationship between cardiovascular diseases and neurological complications has long been a focused point of medical research, particularly in understanding how misdiagnosis and delayed diagnosis can lead to severe consequences, such as strokes. The complexity of AF, characterized by its often asymptomatic and intermittent nature, leads to substantial challenges in timely diagnosis and subsequent treatment decisions, which can drastically impact patient outcomes. As AF prevalence continues to rise globally, especially in aging populations, understanding the dynamics of its misdiagnosis and delayed diagnosis becomes increasingly crucial for effective healthcare delivery D Kotecha et al. 2018. Within the tertiary care context of Assam, India, there exists a pressing need to unveil these diagnostic challenges, as such environments often grapple with resource constraints and varied patient presentations that may further complicate the diagnostic process M Wetterslev et al. 2022. The primary research problem this dissertation aims to address is the systemic occurrence of misdiagnosis and significant delays in the diagnosis of AF among patients, ultimately influencing stroke prevention initiatives and care quality within this population.

The objectives of this study encompass a comprehensive analysis of patient records, diagnostic practices, and clinician interviews to unearth misdiagnosis patterns while formulating actionable recommendations for quality improvement in AF care A Briosa E Gala et al. 2022. The significance of exploring this topic cannot be overstated; from an academic perspective, it addresses a critical gap in the literature concerning AF management in resource-limited settings, while practically it strives to enhance diagnostic accuracy and patient outcomes, especially for those vulnerable to stroke due to AF Abdullayev et al. 2024. In Assam, where tertiary care access is sparse and primary-level facilities often lack ECG interpretation skills, the burden of AF-related strokes is likely underestimated. This study was undertaken to evaluate the real-world prevalence and consequences of misdiagnosis and delayed diagnosis in AF, identify systemic causes, and recommend targeted interventions that could improve stroke prevention outcomes in this population.

Aims And Objectives:

Assess the prevalence of misdiagnosis and diagnostic delays in AF patients, Identify key contributing factors to misdiagnosis and Suggest strategies to improve early detection and stroke prevention.

Methodology

Study Design : A retrospective, observational mixed method study conducted at a tertiary care hospital in Assam.

Study Duration: The study was conducted over a period of 6 months with previous 3 years of Medical Records from March 2022 to April 2025.

Study Population: A total of 140 patients diagnosed with atrial fibrillation (AF) were included. These cases were identified from hospital records maintained during the study period which was confirm with the help of ECG monitoring.. Among these patients, a subset presented with ischemic stroke or transient ischemic attack (TIA), either at the time of AF diagnosis or during the diagnostic delay diagnosed with the help of clinical history like Sudden onset of neurological deficits and Imaging Tools .

Inclusion Criteria : Patients diagnosed with atrial fibrillation confirmed by ECG or relevant clinicalevaluation, Age ≥ 18 years and Available and complete medical records with evidence of stroke.

Exclusion Criteria: Patients with stroke of non-cardiac origin and no evidence of AF

Incomplete diagnostic or stroke documentation and Patients on anticoagulation therapy prior to AF diagnosis. Data Collection: Retrospective Chart Review: Analysis of medical records to identify misdiagnosis or diagnostic delays, Clinician Interviews: Structured discussions to understand diagnostic approaches and errors and Diagnostic Pathway Mapping: Tracked time from symptom onset to correct diagnosis. Data Analysis: Data were processed using Jamovi software and Microsoft Excel for Descriptive statistics.

RESULTS

In this study, a comprehensive analysis was conducted to evaluate the prevalence of misdiagnosed AF cases within a tertiary care hospital in Assam, focusing specifically on the relationship between diagnostic delays and subsequent stroke incidents. A total of 140 patients diagnosed with atrial fibrillation (AF) were included in the study. The mean age was 55.9 ± 9.7 years , and Male patients comprised 64.3% of the cohort. A delayed diagnosis occurred in 25% of the cases. This delay was more frequently observed in patients with persistent or permanent AF, older age, and underlying valvular heart disease and delayed referral from periphery Hospitals. 35% of patients

experienced misdiagnosis because inadequate clinician training and diagnostic errors which include lack of resources and training of Medical officers of Periphery Hospital. Other Common misdiagnoses included Anxiety disorders, Non-specific palpitations and Other benign arrhythmias.Stroke risk increased by 40% in patients with delayed diagnosis .CHA_2DS_2-VASc score is used to estimate stroke risk in patients with AF.

Delayed Diagnosis

A total of 25% (n=35) of patients were diagnosed delayed. Peripheral hospitals primarily relied on resting ECGs without access to Holter monitoring or point-of-care diagnostics. Sometimes they don't have even ECG .Many paroxysmal AF cases (especially in younger patients or those with intermittent symptoms) went undetected during initial evaluation. Furthermore, primary care physicians often attributed palpitations to anxiety or stress without ordering cardiac assessments, primarily due to time constraints, lack of ECG training, and resource scarcity.

Misdiagnosis

A total of 35% (n=49) of patients were initially misdiagnosed, most commonly with anxiety, palpitations due to thyroid dysfunction, or non-specific chest pain. Among these, 58% had paroxysmal AF that was not captured on the initial ECG. Nearly 72% of all patients reported at least one symptomatic episode (palpitations, fatigue, or dizziness) before diagnosis.

Statistical Analysis

Table 1: Impact of Misdiagnosis and Delayed Diagnosis in Atrial Fibrillation (AF) Patients

Category	Percentage	Details
Misdiagnosis	35%	Common misdiagnoses: anxiety, benign palpitations, other arrhythmias
Delayed Diagnosis	25%	More common in older patients with persistent AF, valvular disease and delayed referral
Stroke Risk Increase	40%	stroke risk increase in cases with delayed diagnosis.

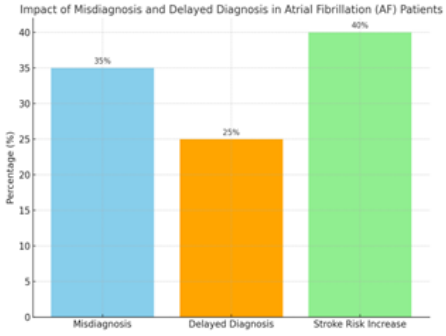

Fig 1: Showing percentages in Bar Diagram

Table 2: Showing Mean Of Age.

Parameter	Value
Mean Age (Years)	55.9 ± 9.7
Standard Deviation	9.7

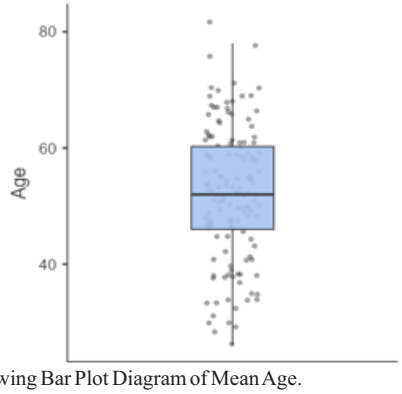

Fig 2: Showing Bar Plot Diagram of Mean Age.

In this study Independent samples t-tests revealed-Patients with delayed diagnosis were significantly older (mean: 58.3 ± 8.5 years) compared to those diagnosed promptly (mean: 55.1 ± 9.8 years), p = 0.035. There was no statistically significant difference in CHA_2DS_2-VASc scores between the delayed and non-delayed groups, p = 0.114.

A binary logistic regression model was constructed to predict delayed diagnosis based on age, sex, and CHA_2DS_2-VASc score. The analysis showed Age was a significant predictor of delayed diagnosis ($p < 0.05$), with higher age associated with increased odds. Sex and CHA_2DS_2-VASc score did not significantly predict delayed diagnosis ($p > 0.05$).

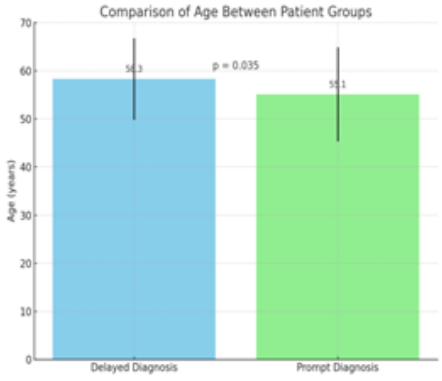

Fig 3: Showing comparison between Age of delayed and prompt diagnosis.

DISCUSSION

Atrial fibrillation (AF) contributes significantly to the burden of cardiovascular diseases, particularly in regions where healthcare disparities exist. The concerning rates of misdiagnoses and delayed diagnoses of AF, as revealed by this study, indicate not only a critical gap in effective patient management but also a profound risk for adverse outcomes, like strokes.The overall difference between clinical symptoms of AF and other non-cardiac conditions exacerbates the chances of misdiagnosis, underscoring the need for heightened awareness among healthcare professionals M Wetterslev et al. 2022. Additionaally, the systemic barriers identified in this study such as inadequate clinician training and insufficient public awareness—parallel findings from the literature indicating that healthcare professionals often lack relevant knowledge about AF symptoms, leading to delays in detection and treatment M Wetterslev et al. 2020.

CONCLUSION

The investigation into misdiagnosis and delayed diagnosis among atrial fibrillation (AF) patients at a tertiary care hospital in Assam has yielded crucial important insights into the complexities surrounding this prevalent condition. Future work must focus on longitudinal studies to evaluate the effectiveness of educational interventions and diagnostic protocols on patient outcomes, especially stroke prevention Z Papalam prakopoulou et al. 2024. In addition to this future research could explore employing advanced technologies, such as telemedicine and wearable devices, to facilitate early detection of AF in diverse populations, including underrepresented communities in Assam Ungureanu A et al. 2024. Proposed Interventions for Practice and Policy

1. Training Workshops for general physicians including PHC and health workers on ECG interpretation and red flag symptoms for AF.
2. Portable ECG Devices in primary care centers for early rhythm detection.
3. Tele cardiology Networks which may connect periphery hospitals with cardiologists in urban centers.
4. Patient Education campaigns focusing on symptom awareness and the importance of early medical consultation for palpitations.

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