Original Article

Use of a Portable Device for Atrial Fibrillation Screening Subclinical in Patients with Chronic Kidney Disease on Dialysis

Subclinical Atrial Fibrillation Screening in Dialytic Chronic Kidney Disease Patients Using Portable Device

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Summary

Background: Hemodialysis (HD) patients have high rates of cardiovascular morbidity and mortality, with a higher prevalence of arrhythmias. Atrial fibrillation (AF) is an independent risk factor for mortality and thromboembolic events in dialysis patients. Understanding and properly managing AF in these patients depends on knowledge of its prevalence. The use of a portable device would represent a pioneering approach for this patient group.

Objective: To screen hemodialysis (HD) patients for atrial fibrillation (AF) using a portable device and evaluate its diagnostic effectiveness.

Methodology: Patients undergoing hemodialysis (HD) at a tertiary hospital were screened for atrial fibrillation (AF) during HD sessions using MyDiagnostick® (from Applied Biomedical Systems). Various data were collected to assess possible associations. Statistical significance was defined as p < 0.05.

Results: 388 patients were evaluated (40.7% female; mean age 56.8 years, SD ± 14.7; HD time 27 months, 10-57). Screening was positive in 16 patients (4.1%). AF was confirmed by electrocardiogram in 7 patients (1.8%). Male patients (p = 0.019), older age (p = 0.007), with baseline electrocardiogram abnormalities (p < 0.001), increased serum potassium levels (p = 0.021), reduced systolic blood pressure at the start of HD (p = 0.007), and stable angina (p = 0.011) were associated with positive AF screening.
The device showed a specificity of 91.74% (95% CI; 86.65% to 96.91%) and sensitivity of 100% (95% CI; 100% to 100%), with a negative predictive value of 100% (95% CI; 100% to 100%) for AF screening.

Conclusion: The use of this device proved to be practical, with high sensitivity and excellent negative predictive value. Subclinical AF has a high prevalence and may be underestimated in this population.

Keywords: Atrial fibrillation; Dialysis; Diagnostic equipment.

Abstract

Background: *Cardiovascular morbidity and mortality rates are higher in hemodialysis (HD) patients, with an increased prevalence of arrhythmias. Atrial fibrillation (AF) is an independent risk factor for mortality and thromboembolic events in dialysis patients. For a better understanding and management of AF in these patients, it is important to know its prevalence. The use of a portable device would be pioneering for this group of patients.*

Objective: *To screen HD patients for AF using a portable gadget and evaluate the device's diagnostic performance.*

Methods: *HD patients at a tertiary hospital underwent AF screening during HD sessions using MyDiagnostick® (Applied Biomedical Systems). Multiple data were collected to evaluate potential associations. Statistical significance was defined as p < 0.05.*

Results: *388 patients were evaluated (female, 40.7%; mean age of 56.8 years old, SD ± 14.7; and HD time of 27 months, 10-57). Screening was positive in 16 (4.1%) patients. AF was confirmed by electrocardiogram in 7 (1.8%) patients. Male sex (p = 0.019), older age (p = 0.007), altered baseline electrocardiogram (p < 0.001), increased serum potassium (p = 0.021), reduced systolic blood pressure at the beginning*

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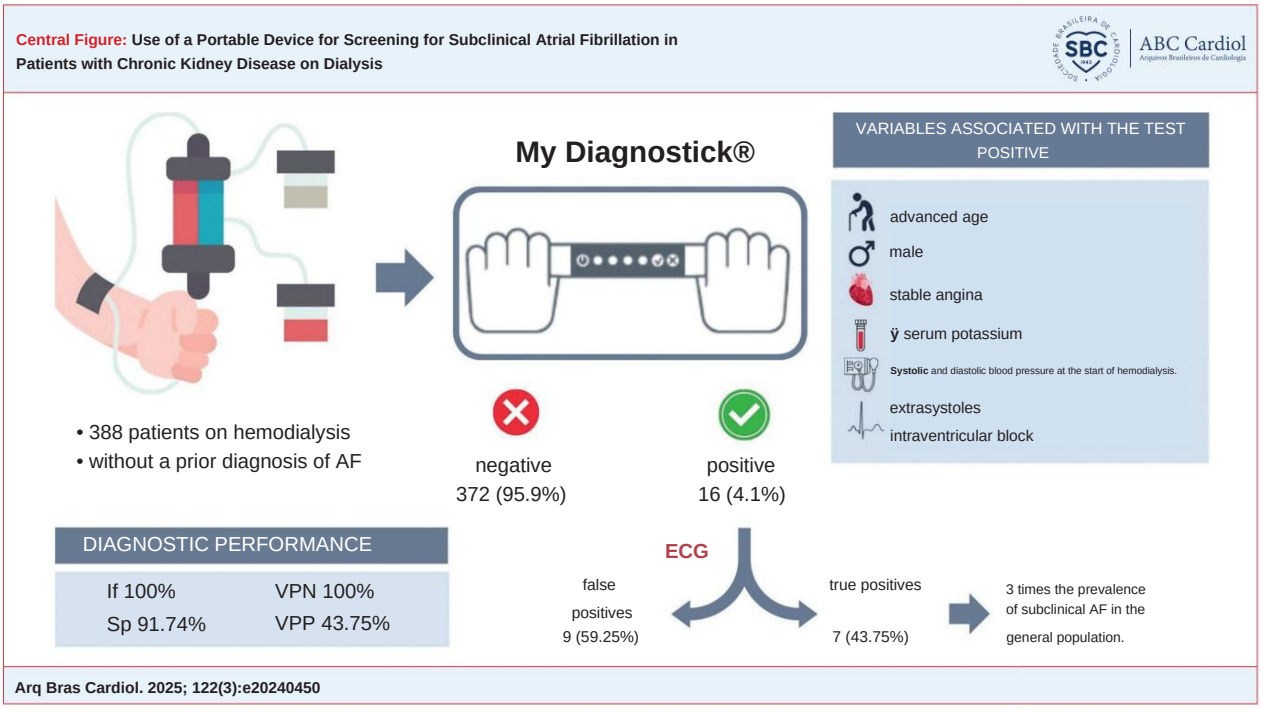
of dialysis (p = 0.007), and stable angina (0.011) were associated with positive screening for AF. The device presents a 91.74% specificity (95% CI, 86.65% to 96.91%) and 100% sensitivity (95% CI, 100% to 100%), with a negative predictive value of 100% (95% CI, 100% to 100%) for AF screening.

Conclusion: *The use of this device proved to be practical, with high sensitivity and excellent negative predictive value. Subclinical AF has a high prevalence and may be underestimated in this population.*

Keywords: *Atrial Fibrillation; Dialysis; Diagnostic Equipment.*

Full texts in English - https:// abccardiol.org/ en/

Central Figure: Use of a Portable Device for Screening for Subclinical Atrial Fibrillation in Patients with Chronic Kidney Disease on Dialysis



Screening for subclinical atrial fibrillation in patients with chronic kidney disease using a portable device. AF: atrial fibrillation; Se: sensitivity; Sp: specificity; NPV: negative predictive value; PPV: positive predictive value; SBP: systolic blood pressure; DBP: diastolic blood pressure; ECG: electrocardiogram. Figure developed by the authors.

Introduction

Chronic kidney disease (CKD) is a public health problem worldwide, with an estimated prevalence between 8 and 16%.1 Cardiovascular morbidity and mortality are inversely related to the glomerular filtration rate, with approximately 50% of all deaths among hemodialysis (HD) patients being attributed to cardiovascular causes.2,3 Renal replacement therapy (RRT) is the main treatment for end-stage renal disease, with HD being the most common modality.4 In this group of patients, an increased prevalence of ventricular arrhythmias, sudden cardiac death, and atrial fibrillation (AF) is observed.5-8

Atrial fibrillation (AF) is the most common cardiac arrhythmia in clinical practice, and it can contribute to reduced functional capacity, increased risk of cardioembolic events, hospitalization rates, heart failure, and death. The global prevalence of AF is estimated to be between 0.1% and 4%, with increasing rates in recent decades.⁹ Among dialysis patients, the prevalence is believed to range from 5.6% to 27%.10,11 The high prevalence is partially justified by the greater occurrence of comorbidities and specific aspects inherent to TSR, such as inflammation, sudden changes in blood volume, activation of the adrenergic system, and changes in cardiac chamber volumes.11,12 However, prevalence data show discrepancies, since there is a large variation in study design and diagnostic method for AF.5,10 Therefore, it is believed that AFs are underestimated.5,10

To understand and correctly manage AF in CKD patients undergoing renal replacement therapy, it is essential to know its true prevalence as a starting point for future research on treatments and complications. The use of a portable device, such as MyDiagnostick® (Applied Biomedical Systems, Maastricht, Netherlands), would be pioneering in this patient group and likely more effective than traditional methods, as it can be used easily and quickly at any time during hemodialysis by any trained professional. Therefore, the objective of this study is to...

This study aims to evaluate the prevalence of subclinical AF among patients with CKD undergoing hemodialysis using a portable device.13,14

Methods

This is an observational study with a cross-sectional approach that evaluated the prevalence of subclinical atrial fibrillation (AF) using a portable device (MyDiagnostick®) during hemodialysis sessions at the Nephrology Centers of the Evangelical Hospital of Belo Horizonte, in addition to its diagnostic accuracy. This study was approved by the Ethics Committee of the Evangelical Beneficent Association of Minas Gerais, of which the Evangelical Hospital is a part, as per the following records: Certificate of Presentation of Ethical Appraisal (CAAE) No. 05980819.2.0000.8787 and opinion No. 3.126.173.

The diagnostic accuracy of the device was evaluated based on the STARD *(Standards for Reporting Diagnostic Accuracy Studies)* protocol.15

Patients

The individuals were selected from the Centers of Nephrology Department of the Evangelical Hospital of Belo Horizonte. The inclusion criteria were patients with CKD on dialysis, over 18 years of age, on renal replacement therapy for more than 30 days, who agreed to participate in the study voluntarily.
Patients undergoing hemodialysis for acute and transient reasons, those on peritoneal dialysis, or those with a prior diagnosis of atrial fibrillation were excluded from the study.

Procedures

Clinical, social, and epidemiological data, comorbidities, cardiovascular risk factors, and medications used by patients were retrieved from each participant's medical record. Laboratory results refer to tests performed in the current month or prior to data collection.

Research data. Anthropometric data (dry weight, height, and body mass index) were obtained from the most recent nutritional assessment the patient underwent during the hemodialysis process. Clinical atrial fibrillation (AF) was defined as the description of the arrhythmia in each patient's medical record, or self-reported, associated with the presence of a 12-lead electrocardiogram (ECG) and/or Holter monitor consistent with the diagnosis of AF.

Blood pressure and ultrafiltration values were collected at the beginning and end of the HD session. Data on dialysis solution temperature and sodium were retrieved from the HD recording during screening.16,17 Patients without a prior diagnosis, with a positive screening on the device and a diagnosis confirmed by 12-lead ECG, and who did not present, during screening, symptoms of palpitations, chest pain, dyspnea, dizziness, focal neurological symptoms, or other symptoms frequently attributed to AF, were considered within the spectrum of subclinical AF.18

The screening was performed in the first session of the week, within the first hour and immediately after the end of the HD (hypertension), meaning each participant underwent the procedure twice. Participants were screened only in a single session. The timing chosen for the screening was based on previous studies that demonstrated an increase in... incidence of cardiac arrhythmias in this specific context.12,19
The explanation for this finding may lie in the intensity of the changes in electrolytes and blood volume that occur during the first HD session of the week.12,19 In this study, the MyDiagnostick® (Applied Biomedical Systems, Maastricht, Netherlands) was used to screen for AF during HD sessions.14 This device has high sensitivity and specificity, combined with easy and practical handling.13,14 The MyDiagnostick® is a wand-shaped device equipped with sensitive electrodes at both ends of a metal cable. It is used to analyze the patient's heart rhythm, who must touch and hold the device with both hands, one at each end, for one minute. The AF detection method in the MyDiagnostick® is based on measuring the irregularity of the RR interval. The obtained trace is pre-processed, the R waves are detected, and the RR intervals are calculated and used.

The algorithm for diagnosing AF takes into account rhythm, periodicity, and variability. When the recording is consistent with AF, a red light will illuminate; if it is not consistent, the light will be green. The device also offers a graphical representation that can be analyzed later.14

All positive recordings were subsequently analyzed by the principal investigator. The 12-lead ECG was used as the gold standard method for diagnosing AF. Patients who screened positive for AF underwent a 12-lead ECG to confirm a definitive diagnosis. A participant who screened positive for AF while using the portable device but did not simultaneously confirm the diagnosis by a 12-lead ECG was considered a false positive. For the diagnosis of subclinical AF (true positive), patients with a positive screening and subsequent confirmation of the diagnosis by a 12-lead ECG were considered. A sample of 100 patients with negative AF screening and no prior diagnosis of arrhythmia also underwent a 12-lead ECG to confirm the absence of AF (Figure 1). The ECGs were interpreted by the principal investigator.

Statistical analysis

The sample size calculation was performed taking into account a 95% confidence level, an 11% prevalence of AF in dialysis patients, and a confidence interval of 8±4. From these data, a sample of 235 patients was estimated.20
Considering a sensitivity of 95%, a confidence interval of 10%, and a ratio of individuals with negative to positive screenings of 9:1, a sample of 100 patients underwent a 12-lead ECG to perform the specificity calculation.21

Continuous variables were presented as mean ± standard deviation when they showed a normal distribution, or as median and interquartile range when they showed an asymmetrical distribution. Categorical variables were presented as frequencies and percentages. Qualitative characteristics were compared to response variables in contingency tables using the chi-square test with Yates' correction to compare proportions when there were only two categories in each variable. Pearson's chi-square test was used when there were

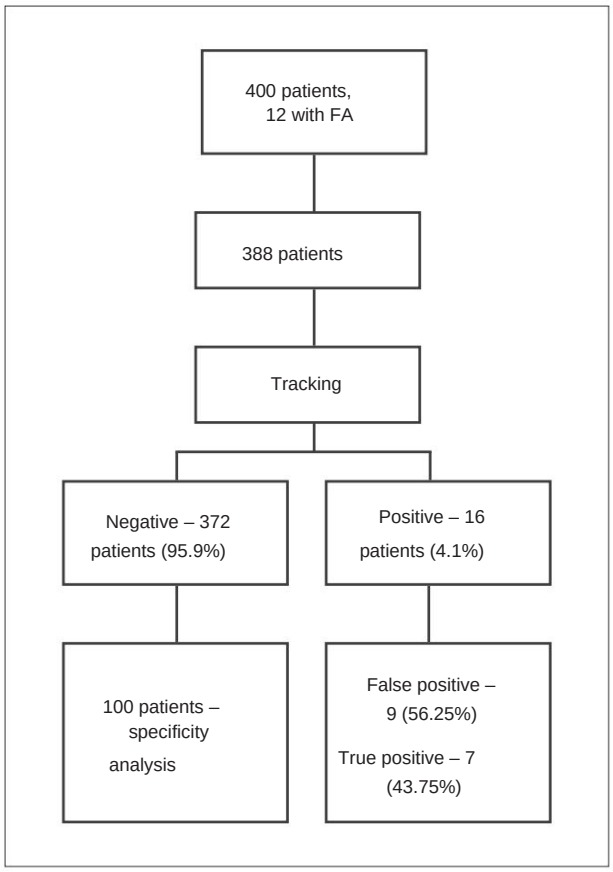


Figure 1 – *Patient selection for screening and specificity analysis. AF: Atrial fibrillation. Figure developed by the authors.*

More than two categories. Fisher's exact test was used when at least one expected frequency was less than five. Comparisons between response variables and quantitative characteristics were made using the unpaired Student's t-test when the usual model assumptions (normality and homoscedasticity) were met.

Otherwise, the Mann-Whitney test was used. The t-test assumptions were verified based on the Shapiro-Wilk test for normality and the Levene test for homoscedasticity. The level of statistical significance was defined as a p-value < 0.05. The 2x2 contingency table was used to calculate sensitivity, specificity, accuracy, positive likelihood ratio (LR+), and negative predictive value (NPV) and positive predictive value (PPV), respectively. The data were stored on the REDCap platform and subsequently analyzed using the Statistical Package for Social Sciences (SPSS) software, version 20 for Windows (SPSS, Chicago, IL, USA).22

Results

Initially, our study evaluated 400 patients.
In this analysis, 12 individuals diagnosed with AF were excluded, and 388 were enrolled in the study (Figure 1). Of the total

Of the sample, 40.7% were female patients, with a mean age of 56.8 years (± 14.7) and a median time on HD of 27 (10-57) months. Diabetic nephropathy was the main etiology found, followed by hypertensive nephroangiosclerosis. A history of acute coronary syndrome was identified in 10.6% (41) of cases and stroke in 8.8% (34) (Table 1).

Tracking

Screening was positive for AF in 4.1% (16) of participants, 87.5% (14) of whom were male, with a mean age of 66.6 ± 13 years and a median time on HD of 36 months. Baseline ECG changes, except for AF, were present in 80% (12) of patients.

Male patients in the sixth group, with stable angina, advanced age, presence of extrasystoles and intraventricular block on baseline ECG, elevated potassium levels, and lower systolic and diastolic blood pressures at the start of hemodialysis were associated with a positive screening (Table 1).

Diagnostic test performance

Atrial fibrillation (AF) was confirmed by 12-lead ECG in seven patients who screened positive for AF, resulting in a prevalence of subclinical AF of 1.8% in this population. The MyDiagnostick® device demonstrated high sensitivity and specificity, along with an excellent negative predictive value (NPV) for detecting subclinical AF. However, its positive predictive value (PPV) was low for the diagnosis of subclinical AF (Central Figure). The test also showed a favorable positive likelihood ratio (LR+) and high overall accuracy (Table 2).

The main findings identified as false positives included: premature ectopic beats (4 cases), type II sinoatrial block (1 case), multifocal atrial rhythm (1 case), sinus rhythm (2 cases), and hand tremor (1 case).

Discussion

This study was the first to evaluate the prevalence of subclinical AF in a dialysis population during a single HD session using a portable screening device. In a cohort of 388 patients, initially, 4.1% of individuals screened positive for AF. Subsequent confirmation of AF via 12-lead ECG established a prevalence of subclinical AF of 1.8%. The MyDiagnostick® device demonstrated high sensitivity and excellent NPV, but a limited PPV for the detection of subclinical AF.

The prevalence of subclinical AF found in our study was almost three times higher than in the general population.23,24 However, this value was much lower than that found in a recent study by Al Awwa et al., which showed a prevalence of 7.8% in the dialysis population. However, differences in methodology between the studies may justify this discrepancy, such as the definition of subclinical AF and the screening design. Al Awwa et al. included individuals with symptoms of palpitations, chest pain, dyspnea, dizziness, focal neurological symptoms, or other symptoms frequently attributed to AF. The screening

Table 1 – Demographic, clinical, echocardiographic, electrocardiographic, and laboratory characteristics of the patients

Features	General population N = 388	Tracking (+) N = 16	Tracking (-) N = 372	p-value
Female, N (%)	158 (40.7%)	2 (12.5%)	156 (41.9%)	0.019
Male, N (%)	230 (59.3%)	14 (87.5%)	216 (58.1%)	
Color, N (%)				0.633
Brown	323 (83.2%)	12 (75%)	311 (83.8%)	
Black	41 (10.6%)	2 (12.5%)	39 (10.5%)	
White	13 (3.4%)	1 (6.2%)	12 (3.2%)	
Others	7 (1.8%)	1 (6.2%)	6 (1.6%)	
Yellow	3 (0.8%)	0 (0%)	3 (0.8%)	
Age (mean ± SD), years	56.8 ± 14.7	66.6 ± 13	56.4 ± 14.8	0.007
Median hemodialysis time (IIQ), months	27 (10.57)	36 (19.72)	27 (10.56)	0.711
Etiology, N (%)				0.189
Diabetic nephropathy	106 (27.3%)	6 (37.5%)	100 (26.9%)	
Hypertensive	98 (25.3%)	7 (43.8%)	91 (24.5%)	
Undetermined	77 (19.8%)	2 (12.5%)	75 (20.2%)	
Others	90 (23.2%)	1 (6.2%)	89 (23.9%)	
Glomerulopathies	17 (19.8%)	0 (0%)	17 (4.6%)	
Hypertension, N (%)	362 (93.3%)	15 (93.8%)	347 (93.3%)	1
Diabetes mellitus NID, N (%)	33 (8.5%)	1 (6.2%)	32 (8.6%)	1
Diabetes mellitus ID, N (%)	143 (36.9%)	8 (50%)	135 (36.3%)	0.296
Dyslipidemia, N (%)	49 (12.6%)	3 (18.8%)	46 (12.4%)	0.438
Smoking, N (%)	18 (4.6%)	0 (0%)	18 (4.8%)	1
History of acute coronary syndrome, N (%)	41 (10.6%)	1 (6.2%)	40 (10.8%)	1
History of stroke, N (%)	34 (8.8%)	1 (6.2%)	33 (8.9%)	1
Chronic obstructive pulmonary disease, N (%)	17 (4.4%)	1 (6.2%)	16 (4.3%)	0.519
Peripheral arterial disease, N (%)	13 (3.4%)	2 (12.5%)	11 (3%)	0.95
Stable angina, N (%)	17 (4.4%)	1 (6.2%)	16 (4.3%)	0.011*
CCS, Class I	13 (3.4%)	2 (12.5%)	11 (3%)	
CCS, Class II	4 (1%)	1 (6.2%)	3 (0.8%)	
Use of medications, N (%)				
AAS	165 (42.5%)	9 (56.2%)	156 (41.9%)	0.252
Clopidogrel	14 (3.6%)	1 (6.2%)	13 (3.7%)	0.563
Warfarin	7 (1.8%)	0 (0%)	7 (1.9%)	1
Beta blocker	232 (59.8%)	11 (68.8%)	221 (59.4%)	0.456
Calcium channel blocker	228 (58.8%)	6 (37.5%)	222 (59.7%)	0.078
BRA	216 (55.7%)	12 (75%)	204 (54.8%)	0.112
Statin	198 (51%)	11 (68.8%)	187 (50.3%)	0.148

Ejection fraction (median, IQR), (%)	64 (59,67)	63.5 (47.66)	64 (59,57)	0.452
Left atrial diameter (median, IIQ), mm	42 (39,45)	45 (42,49)	42 (39,45)	0.169
Abnormal baseline ECG, N (%)	186 (47.9%)	12 (80%)	174 (49.7%)	0.022*
Extrasystole, N (%)	11 (2.8%)	3 (18.75%)	8 (2.15%)	0.000*
Ventricular extrasystole	7 (1.8%)	2 (13.3%)	5 (1.4%)	
Supraventricular extrasystole	4 (1%)	1 (6.7%)	3 (0.9%)	
Intraventricular conduction disorder, N (%)	76 (19.6%)	8 (53.3%)	68 (19.4%)	0.000*
BRD	4 (1%)	0 (0%)	4 (1%)	
BRE	8 (2.1%)	1 (6.7%)	7 (2%)	
BDAS	50 (12.9%)	3 (20%)	47 (13.4%)	
BDPI	1 (0.3%)	0 (0%)	1 (0.3%)	
BRD+BDAS	6 (1.5%)	2 (13.3%)	4 (1.1%)	
BRD+ BDPI	2 (0.5%)	0 (0%)	2 (0.6%)	
Nonspecific	5 (1.3%)	2 (13.3%)	3 (0.9%)	
Hemoglobin (mean±SD), g/dL	10.5 ± 2	10.5 ± 2	10.7 ± 2.1	0.754
Pre-analysis urea (mean ± SD), mg/dL	132 ± 43	134 ± 46.7	134 ± 43	0.963
Phosphorus (median, IQR), mg/dL	4.8 (3.8; 5.9)	4.5 (3; 5.7)	4.9 (3.8; 5.9)	0.205
Sodium (median, IIQ), mEq/L	138 (136,140)	138 (136,141)	138 (136,140)	0.859
Potassium (mean ± SD), mEq/L	5.5 ± 0.9	5.5 ± 0.9	4.9 ± 0.9	0.021
Calcium (median, IIQ), mg/dL	8.8 (8.3; 9.3)	8.5 (8.3; 9)	8.8 (8.3; 9.4)	0.335
Parathormone (median, IIQ), pg/mL	306.5 (136.513)	213 (88; 349)	316 (136,520)	0.058
Ultrafiltration (median, IIQ), L	3 (2.5; 3.8)	2.95 (2.4; 3.5)	3 (2.5; 3.9)	0.318
PASi (median, IIQ), mmHg	150 (130,160)	130 (120,150)	150 (130,167)	0.007
PADi (median, IIQ), mmHg 80 (70.90)		80 (70,80)	80 (70,80)	0.035

*Source: Table developed by the authors. Frequency: %; mean±SD: mean with standard deviation; median, IQR: median with interquartile range; NID: non-insulin dependent; ID: insulin dependent; CCS: Canadian Cardiovascular Society; AAS: acetylsalicylic acid; ECG: electrocardiogram; RBBB: right bundle branch block; LBBB: left bundle branch block; LABB: left anterior superior divisional block; LPBB: left posterior inferior divisional block; ARB: angiotensin II receptor blocker; PAD: peripheral arterial disease; BPDi: diastolic blood pressure at the start of hemodialysis; BPSi: systolic blood pressure at the start of hemodialysis; *statistical significance compared to the negative screening group.*

More than one detection method was used for each participant, including a 12-variation ECG, throughout the HD session.25

The high incidence of AF in the dialysis population is commonly associated with advanced age, male sex, and a prior diagnosis of coronary artery disease.25-27
Although it is not possible to establish a causal relationship between these factors and AF, participants with a positive AF screening were predominantly men, older, and had a higher prevalence of stable angina.

Potassium disturbances (both in pre-dialysis serum and in dialysis solution) are promising in attempts to understand the triggers of AF.28 Karaboyas et al. suggest that elevated pre-dialysis potassium levels (> 6 mEq/L) are associated with a higher incidence of cardiac arrhythmias.28 In

Consistent with these findings, the present study showed that positive screening for AF occurred more frequently in patients with high potassium levels compared to those with negative screening. However, it is possible that the "serum/dialysate potassium gradient" (difference between the potassium concentration in serum and the potassium in the dialysis solution) is the most relevant factor in this context, since high gradients would lead to greater variation in potassium levels during a HD session, predisposing to the occurrence of AF.

Table 2 – Diagnostic performance of MyDiagnostick®

ECG	Tracking (+) N = 16	Tracking (-) N = 100
Positive ECG	7 (43.75%)	0 (0%)
Negative ECG	9 (56.25%)	100 (100%)

Source: Table developed by the authors. Sensitivity = 100% (95% CI, 100% to 100%); specificity = 91.74% (95% CI, 86.65% to 96.91%), accuracy = 92.2%, positive predictive value = 43.75% (95% CI, 19.44% to 68%); negative predictive value = 100% (95% CI, 100% to 100%); positive likelihood ratio = 12.1 (95% CI, 6.5 to 22.6); Positive ECG: 12-lead electrocardiogram with a diagnosis of AF; Negative ECG: 12-lead electrocardiogram without a diagnosis of AF; Screening (+): positive screening for AF using the portable device; Screening (-): negative screening for AF using the portable device.

The sensitivity and NPV found in this study were similar to the findings of Tieleman et al. when studying the general population.14 However, other studies have shown lower sensitivity and specificity.29

In hospitalized individuals with heart disease, MyDiagnostick® demonstrated accuracy consistent with that observed in this study.30 When compared to studies using other single-lead recording devices, similar sensitivity was observed, but slightly lower specificity (91.7 vs. 96.5%).31 However, devices like MyDiagnostick® are more practical, as they indicate the presence of positive screening and are more economical.31,32

It is important to consider that these studies were conducted with non-dialysis populations, with different prevalences of AF. Therefore, the interpretation and comparison of these findings should be done with caution.

This study evaluated a population at high cardiovascular risk and an estimated prevalence of AF. The device proved useful in ruling out the possibility of AF (high sensitivity and NPV) and increasing the post-test probability of presenting AF (positive likelihood ratio of 12.1). Another important finding was observed among false positives, as there were significant electrocardiographic changes in 66.6% of cases. Considering the screening probability, by identifying an ECG with relevant changes that may correlate with structural heart disease, we find a specificity of 97%, a PPV of 81.25%, and a positive likelihood ratio of 34.1. Therefore, this device would have the benefit of identifying individuals with other heart diseases besides AF.33

The impracticality, low availability, and high cost of other screening methods for AF suggest that MyDiagnostick® can be used safely and with good performance in this specific scenario.13,14 Furthermore, it is possible that the collected data, along with external sensors and artificial intelligence techniques, could contribute to decision-making. This decision rests with both patients and healthcare professionals.34,35 In countries like Brazil, which have limited healthcare resources and difficulty accessing specialized professionals, this approach appears promising.30

Limitations

This study presented some limitations. The observational nature of the work does not allow for establishing causality between the associations found. Data collection from the analysis of patient records may contain biases in information recording. Furthermore, the screening performed in a single hemodialysis session and at only two time points may have underestimated the results of our study, since atrial fibrillation can present in a paroxysmal form. However, screenings with 24-hour Holter monitors or long-term devices would be impractical and costly, making them economically unfeasible in the context of public health.

Due to logistical reasons, we did not evaluate test-retest reproducibility. Similarly, a multivariate analysis was not performed due to the small number of patients with subclinical AF. Confirmation of a positive screening result occurred only with the device's light signal, without inspection of the simultaneous electrocardiographic recording, which could contribute to a false reduction in specificity and positive predictive value (PPV). However, manual inspection of the graph generated by the device, while increasing accuracy, would make point-of-care screening unfeasible. Our data reflect a specific population and cannot be generalized to other contexts.

Conclusions

The prevalence of subclinical atrial fibrillation (AF) among patients with chronic kidney disease (CKD) undergoing renal replacement therapy (RRT) during a single hemodialysis (HD) session was 1.8%. Positive screening for AF was associated with factors such as male sex, older age, stable angina, presence of extrasystoles and intraventricular block on baseline ECG, elevated potassium levels, and lower blood pressure at the start of HD. The MyDiagnostick® device demonstrated 100% sensitivity, 91.74% specificity, NPV of 100%, and PPV of 43.75% for the detection of subclinical AF.

Authors' contribution

Research conception and design; Data acquisition; Data analysis and interpretation; Statistical analysis; Manuscript writing and critical revision of the manuscript regarding content: Carvalho APV, Carmo GAL, Silva CA, Oliveira AC, Perez L, Carmo LPF, Ribeiro ALP.

Potential conflict of interest

There is no conflict with the present article.

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Academic affiliation

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Ethical approval and informed consent

This study was approved by the Ethics Committee of the Evangelical Beneficent Association of Minas Gerais under protocol number CAAE 05980819.2.0000.8787, opinion number 3.126.173. All procedures involved in this study are in accordance with the Declaration of Helsinki of 1975, updated in 2013. Informed consent was obtained from all participants included in the study.

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