Original Article
http://mjiri.iums.ac.ir
Medical Journal of the Islamic Republic of Iran (MJIRI)

Med J Islam Repub Iran. 2025 (18 Aug);39.108. https://doi.org/10.47176/mjiri.39.108

Consistency of Blood Pressure Measurement Methods in Atrial Fibrillation

Shadi Mostafavi[1], Majid Haji Karimi[2]*, Ali Pazoki[2], Abbas Allami[2], Kimia Rahimi Ardali[3], Shahin Aliakbari[3], Amir Behnam Kharazmy[3]

Received: 14 Jul 2024 Published: 18 Aug 2025

Abstract

Background: Ensuring precise measurement of blood pressure (BP) is crucial for effectively diagnosing and treating hypertension in atrial fibrillation patients. However, the reliability and agreement between the two commonly utilized techniques, oscillometric and auscultatory methods, remain unclear in these individuals. This study seeks to bridge this gap by examining the consistency of BP measurements using these methods in atrial fibrillation patients.

Methods: This cross-sectional study included 100 patients with atrial fibrillation and sinus rhythm. BP was measured using both methods (three times with each method): 1) the auscultatory method based on Korotkoff sounds and 2) the oscillometric method. The SPSS version 25 software was used for data analysis. In all steps, *P*-values < 0.05 are considered significant.

Results: The mean systolic blood pressure (SBP) measured by the oscillometric method was 116.38±16.73 mmHg in the sinus group and 127.29±21.51 mmHg in the atrial fibrillation (AF) group. In contrast, the mean by the auscultatory method was 116.18 ±15.46 mmHg in the Sinus rhythm group and 131.07±23.72 mmHg in the AF group (respectively *P*=0.006, *P*<0.001). This study shows a significant difference in the SBP measured using the two methods in patients with AF (*P*=0.003). We also found that the significant difference between the two methods only applies to heart rates of 80 beats per minute and higher (*P*=0.017).

Conclusion: The findings of this study indicated that although there is a significant correlation between oscillometric and auscultatory methods for assessing blood pressure in patients with atrial fibrillation, a significant difference was observed in the measurement of systolic blood pressure.

Keywords: Hypertension, Atrial Fibrillation, Blood Pressure, Measurement

Conflicts of Interest: None declared
Funding: This study was supported by the Research and Technology Vice-Chancellor of Qazvin University of Medical Sciences, Qazvin, Iran.

Cite this article as: Mostafavi S, Haji Karimi M, Pazoki A, Allami A, Rahimi Ardali K, Aliakbari S, Kharazmy AB. Consistency of Blood Pressure Measurement Methods in Atrial Fibrillation. *Med J Islam Repub Iran.* 2025 (18 Aug);39:108. https://doi.org/10.47176/mjiri.39.108

Introduction

Atrial fibrillation (AF) is the most prevalent cardiac arrhythmia, characterized by irregular electrical impulses that do not follow a defined pathway within the heart. It is caused by the rapid rotation of the electrical pulse inside the atria of the heart (one of the most common arrhythmias with a recirculation mechanism) (1).

AF is the most common sustained arrhythmia, affecting millions of people worldwide (2-4), with a prevalence ranging from 1% to 2% (5, 6). In 2010, the number of individuals affected by AF was estimated to be between

Corresponding author: Dr Majid Haji Karimi, m.hajikarimi@qums.ac.ir

1. Clinical Research Development Unit of Advanced Medicine, Qazvin University of Medical Sciences, Qazvin, Iran
2. Clinical Research Development Unit, Booalisina Hospital, Qazvin University of Medical Sciences, Qazvin, Iran
3. Student Research Committee, Qazvin University of Medical Sciences, Qazvin, Iran

↑What is "already known" in this topic:
Blood pressure assessment in patients with atrial fibrillation is very important as a causative factor and a comorbidity of this disease. An oscillometric device is recommended as a suitable method of measuring blood pressure, especially at home, for sinus rhythm, but there is no consensus on the rhythm of atrial fibrillation.

→What this article adds:
In a comparison of the two methods of measuring blood pressure, oscillometric and ausculatory, in patients with atrial fibrillation, there is a significant difference in the measurement of systolic blood pressure at heart rates above 80. Therefore, in high ventricular responses, blood pressure measurement should be performed more accurately.

[DOI: 10.47176/mjiri.39.108]

2.1 and 6.1 million, and this number is projected to rise to approximately 12.1 million by 2030 (7). AF is associated with an increased risk of morbidity, mortality, cardiovascular complications, and a higher demand for healthcare resources (3, 8).

Among the various etiological contributors to AF, arterial hypertension (AH) is considered one of the most prevalent (9, 10), which increases the risk of AF by 1.5 and 1.4 times for men and women, respectively (11). So, timely diagnosis and effective AH treatment are essential for AF patients (10, 12). The coexistence of hypertension and AF markedly increases the risk of stroke, making regular monitoring and strict control of blood pressure (BP) essential. Diagnosis and subsequent treatment of hypertension in patients with atrial fibrillation is very important because treating hypertension reduces both the occurrence of arrhythmia and its complications. This can be achieved through home BP self-monitoring, which provides greater clinical value than BP measurement in a clinic. In addition, home BP monitoring can facilitate more precise management of AH and support its early detection (13, 14). BP is usually measured using manual or automatic devices 12 in clinical settings. The oscillometric method (which uses an electronic sensor to measure changes in blood flow) has significantly simplified BP self-monitoring and is often considered the preferred method for home measurement (15). Despite their widespread use, oscillometric BP devices can challenge patients with AF due to the high heart rate variability and stroke volume during arrhythmias in these patients (16-18). In addition, most automated BP devices are validated and calibrated exclusively for patients in sinus rhythm (SR), and even manufacturers advise caution when applying them in individuals with arrhythmias (15). But today, more BP oscillometric devices are used for AF in clinical practices (19).

Several studies have compared the accuracy of BP measurement by oscillometric and auscultatory methods in patients with AF, but the results have been mixed (20, 21). Some studies have reported that oscillometric devices provide more accurate measurements if repeated measurements are performed. In contrast, some studies suggest that oscillometric devices may be reliable for measuring systolic but not diastolic BP, making them more appropriate for home rather than office use (22, 23).

However, oscillometric devices are still controversial in patients with arrhythmias, especially AF. A study comparing oscillometric BP measurements with invasive assessment concluded that AF does not substantially compromise the accuracy of oscillometry when three consecutive readings are obtained (15).

Since oscillometric BP measurement relies on the assumption of a regular heart rhythm, its accuracy in patients with AF remains a subject of debate. Patients with AF frequently exhibit greater variability across three consecutive BP measurements compared with those in SR (24-26). It is challenging for physicians to assess BP values using oscillometric methods in AF patients.

While both methods have advantages and limitations, their consistency in measuring BP in patients with AF remains unclear. Since measuring and diagnosing blood pressure in patients with atrial fibrillation is very important and there are conflicting results regarding the best method of measuring blood pressure in these patients, we decided to conduct this study. So, this study aims to evaluate the difference between oscillometric and auscultatory methods of BP measurement in patients with AF and SR. In this study, we also investigated the relationship between these two measurement methods with respect to heart rate, which had received less attention in previous studies.

Methods

Study design

This was a cross-sectional study conducted at Booalisina Hospital. It was carried out in accordance with the principles of the Declaration of Helsinki and received approval from the Research Council and Ethics Committee of Qazvin University of Medical Sciences (IR.QUMS.REC.1400.145). All eligible people were selected after providing explanations regarding the purpose and method of starting the desired plan and after obtaining informed and written consent.

Participants

This study included the group of hospitalized or outpatient patients with persistent AF and the group of patients with SR. The study starts in July 2021 and continues until March 2022. The exclusion criteria were congenital heart diseases, severe heart failure, patients with known heart valve disease, and patients with both SR and arrhythmias (the patient had frequent premature ventricular contractions (PVCs) or premature atrial contractions (PACs) in the electrocardiogram (ECG) taken in the clinic or emergency room). Based on the cardiac rhythm at the time of BP measurement, patients were assigned to two groups: one comprised patients with AF and the other with SR. An ECG was tracked before the BP was measured to determine the rhythm. The Helsinki Declaration has been followed for involving human subjects in the study.

Data collection

After obtaining written informed consent, demographic and clinical information—including age, sex, body mass index, medical history, and medication use—was recorded. The heart rate of the patients was calculated from a standard 12-lead EKG taken before the BP measurements. BP measurements were performed using the auscultatory method based on Korotkoff sounds and the oscillometric method. An arm device of the Omron brand was used to perform the oscillometric method (Vietnam). A stethoscope and a manual sphygmomanometer were utilized for the auscultatory method. The calibration followed the manufacturer's instructions. Composed of guidelines, a standard auscultatory method was used to measure BP accurately (12). We used an adult-sized cuff to measure BP on the right arm in SR patients; after 5 minutes of rest in a sitting position, the BP was measured three times with both

[DOI: 10.47176/mjiri.39.108]

methods, and the HR was recorded (27). Each patient underwent six measurements. In AF rhythm patients, BP and HR were taken the same as in SR patients. The time between measurements was found to be within a 5-minute range to reduce venous congestion and BP variability to a minimum.

Statistical analysis

Statistical analysis was conducted using SPSS software, version 25. Inferential statistics are used to test study hypotheses. The Kolmogorov-Smirnov test checks the normality of the data. In quantitative changes, the value and median describe the center of the data, and the standard deviation and/or interquartile range (IQR) represent the dispersion of the data. Qualitative data described from frequency and percentage. For data analysis in qualitative tests, two tests (or Fisher's exact test) are used, and in quantitative tests, the T-Test (or non-parametric Mann-Whitney test) is used. It is obtained by multiplying the Pearson correlation. In all steps, a p-value of less than 0.05 was considered statistically significant.

Results

The study comprised 100 patients: 50 with AF and 50 with SR, with their BP measured using oscillometric and auscultatory methods. The mean age of the patients was 57 years (range, 16-87 years), and 36% were male. We found a significant difference between the two groups in the prevalence of HTN (P<0.001), IHD (P<0.001), age (P<0.001), and smoking (P<0.046). Detailed demographic characteristics of the study population are presented in Table 1.

The mean BP obtained by the two methods (i.e., oscillometric and auscultatory) significantly correlated (P=0.001). The mean systolic blood pressure (SBP) measured by the oscillometric method was 116.38±16.73 mmHg in the SR group and 127.29 ±21.51 mmHg in the AF group. In contrast, the mean by the auscultatory method was 116.18 ±15.46 mmHg in the SR group and 131.07 ±23.72 mmHg in the AF group (respectively, P=0.006, P<0.001). The mean diastolic blood pressure (DBP) measured by the oscillometric method was 73.84 ±8.63 mmHg in the SR group and 83.35 ±16.24 mmHg in the AF group, while the mean by the auscultatory method was 72.85 ±7.38 mmHg in the SR group and 84.70 ±13.05 mmHg in the AF group (P<0.001) (Table 2).

Pearson's correlation analysis showed a strong

Table 1. Basic, demographic, medical, and paraclinical information of patients with sinus rhythm and atrial fibrillation

Variable		Rhythm		*P*-value
		Sinus Rhythm	Atrial Fibrillation	
		Mean ± Standard Deviation Or Count (%)		
Age (years)		47 ± 16	67 ± 9	<0.001*
Gender	Male	18 (36.0)	20 (40.0)	0.585
	Female	32 (64.0)	30 (60.0)	
Weight (kg)		74 ± 22	73 ± 9	0.923
Height (m)		167 ± 10	161 ± 13	0.010*
Body mass index (kg/m^2)		26.30 ± 5.87	28.58 ± 5.43	0.054
Smoker	NonSmoker	42 (84.0)	48 (96.0)	0.046
	Smoker	8 (16.0)	2 (4.0)	
IHD	Without IHD	49 (98.0)	36 (72.0)	<0.001*
	With IHD	1 (2.0)	14 (28.0)	
DM	Without DM	46 (92.0)	40 (80.0)	0.084
	Diabetic	4 (8.0)	10 (20.0)	
DLP	without DLP	43 (86.0)	46 (92.0)	0.338
	With DLP	7 (14.0)	4 (8.0)	
HTN	Without HTN	41 (82.0)	20 (40.0)	<0.001*
	With HTN	9 (18.0)	30 (60.0)	
Heart rate (beats per minute)		79 ± 13	84 ± 12	0.056

IHD: Ischemic heart disease, DM: Diabetes mellitus, DLP: Dyslipidemia, HTN: Hypertension

Table 2. Summary of measurement results by the two methods in Sinus Rhythm and AF

Variable	Rhythm Mean±Standard Deviation		*P*-value
	Sinus Rhythm	Atrial Fibrillation	
Korotkoff systole 1	116.50 ± 15.98	134.00 ± 25.58	<0.001*
Korotkoff diastole 1	73.30 ± 7.26	83.60 ± 13.25	<0.001*
Digital systole 1	116.94 ± 17.18	128.56 ± 22.40	0.005*
Digital diastole 1	74.60 ± 8.64	87.20 ± 16.57	<0.001*
Korotkoff systole 2	116.12 ± 15.41	130.70 ± 23.99	0.001*
Korotkoff diastole 2	72.92 ± 7.52	85.10 ± 13.15	<0.001*
Digital systole 2	116.10 ± 16.61	126.70 ± 21.58	0.007*
Digital diastole 2	73.64 ± 8.74	86.92 ± 17.12	<0.001*
Korotkoff systole 3	115.92 ± 15.28	128.50 ± 23.06	0.002*
Korotkoff diastole 3	72.34 ± 7.70	85.31 ± 13.93	<0.001*
Digital systole 3	116.10 ± 16.54	126.60 ± 21.54	0.008*
Digital diastole 3	73.28 ± 8.71	84.94 ± 16.49	<0.001*

*: Significant, measurement unit of all variables is mmHg unless noted.

[DOI: 10.47176/mjiri.39.108]

Table 3. Summary of measurement results and the differences between the two methods in Sinus Rhythm and AF

Variable		Rhythm Mean ± Standard Deviation or Count (%)		*P* value
		Sinus Rhythm	Atrial Fibrillation	
The difference in Systolic measurements 1		-0.44 ± 6.96	5.44 ± 10.54	0.001*
The difference in Systolic measurements 2		0.02 ± 6.48	4.00 ± 11.60	0.037*
The difference in Systolic measurements 3		-0.18 ± 6.17	1.90 ± 10.17	0.220
The difference in Diastolic Measurements 1		-1.30 ± 4.95	-3.60 ± 7.48	0.073
The difference in Diastolic Measurements 2		-0.72 ± 5.09	-1.82 ± 9.38	0.468
The difference in Diastolic Measurements 3		-0.94 ± 4.73	0.69 ± 8.15	0.227
Mean of the SBP Korotkoff sound technique		116.18 ± 15.46	131.07 ± 23.72	<0.001*
The mean of digital systolic pressure		116.38 ± 16.73	127.29 ± 21.51	0.006*
Difference between	SBP Korotkoff < Digital	12 (24.0)	7 (14.0)	0.023*
the two methods (> [5] mmHg)	SBP Korotkoff = Digital	27 (54.0)	19 (38.0)	
	SBP Korotkoff > Digital	11 (22.0)	24 (48.0)	
The mean difference between the Korotkoff sound and digital SBP		-0.2 ±0 6.24	3.78 ± 8.50	0.009*
Mean of the diastolic Korotkoff sound		72.85 ± 7.38	84.70 ± 13.05	<0.001*
The mean of digital diastolic pressure		73.84 ± 8.63	86.35 ± 16.24	<0.001*
Difference between	DBP Korotkoff < Digital	12 (24.0)	15 (30.0)	0.074
the two methods (> [5] mmHg)	DBP Korotkoff = Digital	36 (72.0)	27 (54.0)	
	DBP Korotkoff > Digital	2 (4.0)	8 (16.0)	
Difference between the mean Korotkoff sound technique and digital DBP		-0.99 ± 4.67	-1.65 ± 6.67	0.564

*: Significant, measurement unit of all variables is mmHg unless noted, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

Table 4. Pearson correlation coefficients between the mean of oscillometric and auscultatory methods for measuring BP in sinus rhythm and AF

Rythm		Digital systole	Digital diastole
Sinus Rhythm	Korotkoff systole	0.928**	-
	Korotkoff diastole	-	0.841**
Atrial Fibrillation	Korotkoff systole	0.934**	-
	Korotkoff diastole	-	0.919**

**: significant (P<0.001)

concordance between the two methods (P<0.001). We found a significant difference between the two methods in the mean SBP of AF patients (P=0.003). This difference between the two methods proves to be necessary only in heart rates over 80 beats per minute (P=0.017), and there are no other significant differences between the methods according to our findings (Tables 2 and 3).

Overall, the study results demonstrated strong agreement between oscillometric and auscultatory methods for measuring BP in patients with AF (Table 4). However, there was a significant difference between the two methods in measuring the SBP of AF patients.

Discussion

Evaluating the consistency of blood pressure measurement by oscillometric and auscultatory methods in patients with AF is essential in determining the accuracy and reliability of these methods in this specific patient population. AF can lead to fluctuations in blood pressure, and accurate blood pressure measurement is crucial in managing atrial fibrillation and guiding appropriate treatment interventions. Considering the increased risk of embolic events and heart failure caused by AF, timely identification and treatment of patients is vital in preventing these complications (28). The present study aimed to evaluate the consistency of BP measurement by oscillometric and auscultatory methods in patients with AF. To assess the concordance of BP measured by two oscillometric and auscultatory methods, the BP of patients was measured three consecutive times by both methods, and the results were analyzed. Based on our results, in the measurement of SBP in AF patients, there is a significant difference between the two oscillometric and auscultation methods.

The results obtained from this study show a significant correlation between BP measured by auscultation and oscillometric methods. However, a significant difference is seen in the measurement of SBP in patients with AF. We found a good correlation between the two methods of measuring blood pressure in AF patients, which mostly follows previous studies that have compared the two methods of BP measurement in AF patients (29). The cross-sectional study by Aistėja Šelmytė–Besusparė et al. studied 71 patients and concluded that there is a significant difference between the two methods of measuring BP in AF patients. However, their study concluded that oscillometric BP measurement of AF patients gives 6.3 mmHg higher than the auscultatory methods, which is opposite to our findings.

The results of our study are controversial compared to the results of the meta-analysis done by Stergiou et al. (29). They analyzed 566 patients with AF and concluded that oscillometric BP measurement is more accurate in measuring SBP than DBP. However, our findings suggest a significant difference in SBP measurement while having a solid correlation in DBP measurements. Another important finding of our study is that the difference between the two oscillometric and auscultatory methods is only substantial at HR 80 beats per minute and higher, which has never been studied before. Therefore, in patients with atrial fibrillation, the difference between the two blood pressure measurement methods will be more noticeable at high heart rates compared to low heart rates, which can be used in assessing the blood pressure of these

[DOI: 10.47176/mjiri.39.108]

patients in practice.

This study offers valuable insights into the consistency of BP measurement by oscillometric and auscultatory methods in patients with atrial fibrillation. Further research is necessary to confirm these findings and investigate the factors influencing the accuracy of blood pressure measurement in this specific patient group.

Limitations

We opted not to utilize the gold-standard method of BP measurement involving invasive arterial catheterization due to ethical considerations. Instead, our results are based on a comparison of two commonly employed techniques.

Conclusion

The research indicates a high level of agreement between both measurement techniques for assessing BP in patients with AF. However, there is a notable difference between the two methods when measuring systolic blood pressure in these patients. Healthcare professionals should be aware of potential inaccuracies in measurements at heart rates of 80 beats per minute and above, and proactive steps should be taken to address this issue. This discrepancy is greater at heart rates above 80, which is a new finding in this study, and it can be concluded that blood pressure should be measured more accurately at high heart rates compared to low heart rates in patients with atrial fibrillation rhythm.

Authors' Contributions

M HajiKarimi and A. Pazoki conceived of the presented idea, developed the theory, and supervised the findings of the work. Sh. Mostafavi carried out the experiment. A. Allami performed the analytic calculations. K Rahimi Ardali, Sh Aliakbari, and AB Kharazmy wrote the manuscript and helped supervise the project. All authors discussed the results and contributed to the final manuscript.

Ethical Considerations

The study's research plan received approval from the medical ethics committee of Qazvin University of Medical Sciences (IR.QUMS.REC.1400.145).

Acknowledgment

We thank all nurses of Booalisina Hospital of Qazvin University of Medical Sciences for their kind cooperation. In addition, the authors would like to thank Clinical Research Development Unit of Advanced Medicine, Qazvin University of Medical Sciences, Qazvin, Iran.

Conflict of Interests

The authors declare that they have no competing interests.

References

1. Staerk L, Sherer JA, Ko D, Benjamin EJ, Helm RH. Atrial Fibrillation: Epidemiology, Pathophysiology, and Clinical Outcomes. Circ Res. 2017;120(9):1501-17.

2. Scanavacca M, Darrieux F. Factors in deciding between novel and traditional oral anticoagulants to prevent embolism in atrial fibrillation patients. SciELO Brasil; 2016. p. 1-3.

3. Miller JD, Aronis KN, Chrispin J, Patil KD, Marine JE, Martin SS, et al. Obesity, Exercise, Obstructive Sleep Apnea, and Modifiable Atherosclerotic Cardiovascular Disease Risk Factors in Atrial Fibrillation. J Am Coll Cardiol. 2015;66(25):2899-906.

4. Gurdogan M, Ari H, Tenekecioglu E, Ari S, Bozat T, Koca V, Melek M. Predictors of Atrial Fibrillation Recurrence in Hyperthyroid and Euthyroid Patients. Arq Bras Cardiol. 2016;106(2):84-91.

5. UK GYL, De Caterina R, UK IS, Atar D, Hohnloser SH, Hindricks G, UK PK. 2012 focused update of the ESC Guidelines for the management of atrial fibrillation. European Heart Journal. 2012;33:2719-47.

6. Vlachos K, Letsas KP, Korantzopoulos P, Liu T, Georgopoulos S, Bakalakos A, et al. Prediction of atrial fibrillation development and progression: Current perspectives. World J Cardiol. 2016;8(3):267-76.

7. Benjamin EJ, Virani SS, Callaway CW, Chamberlain AM, Chang AR, Cheng S, et al. Heart disease and stroke statistics—2018 update: a report from the American Heart Association. Circulation. 2018;137(12):e67-e492.

8. Ishii M, Ogawa H, Unoki T, An Y, Iguchi M, Masunaga N, et al. Relationship of hypertension and systolic blood pressure with the risk of stroke or bleeding in patients with atrial fibrillation: the Fushimi AF Registry. American Journal of Hypertension. 2017;30(11):1073-82.

9. Wachtell K, Hornestam B, Lehto M, Slotwiner DJ, Gerdts E, Olsen MH, et al. Cardiovascular morbidity and mortality in hypertensive patients with a history of atrial fibrillation: The Losartan Intervention For End Point Reduction in Hypertension (LIFE) study. J Am Coll Cardiol. 2005;45(5):705-11.

10. Kirchhof P, Lip GY, Van Gelder IC, Bax J, Hylek E, Kaab S, et al. Comprehensive risk reduction in patients with atrial fibrillation: emerging diagnostic and therapeutic options--a report from the 3rd Atrial Fibrillation Competence NETwork/European Heart Rhythm Association consensus conference. Europace. 2012;14(1):8-27.

11. Manolis AJ, Rosei EA, Coca A, Cifkova R, Erdine SE, Kjeldsen S, et al. Hypertension and atrial fibrillation: diagnostic approach, prevention and treatment. Position paper of the Working Group 'Hypertension Arrhythmias and Thrombosis' of the European Society of Hypertension. J Hypertens. 2012;30(2):239-52.

12. Mancia G, Fagard R, Narkiewicz K, Redon J, Zanchetti A, Böhm M, et al. 2013 ESH/ESC practice guidelines for the management of arterial hypertension: ESH-ESC the task force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). Blood pressure. 2014;23(1):3-16.

13. Hanninen MR, Niiranen TJ, Puukka PJ, Johansson J, Jula AM. Prognostic significance of masked and white-coat hypertension in the general population: the Finn-Home Study. J Hypertens. 2012;30(4):705-12.

14. Ohkubo T, Obara T, Funahashi J, Kikuya M, Asayama K, Metoki H, et al. Control of blood pressure as measured at home and office, and comparison with physicians' assessment of control among treated hypertensive patients in Japan: first report of the Japan Home versus Office Blood Pressure Measurement Evaluation (J-HOME) study. Hypertension Research. 2004;27(10):755-63.

15. Pagonas N, Schmidt S, Eysel J, Compton F, Hoffmann C, Seibert F, et al. Impact of atrial fibrillation on the accuracy of oscillometric blood pressure monitoring. Hypertension. 2013;62(3):579-84.

16. O'Brien E, Asmar R, Beilin L, Imai Y, Mallion JM, Mancia G, et al. European Society of Hypertension recommendations for conventional, ambulatory and home blood pressure measurement. J Hypertens. 2003;21(5):821-48.

17. Maselli M, Giantin V, Corrado D, Franchin A, Attanasio F, Pengo V, et al. Reliability of Oscillometric Blood Pressure Monitoring in Atrial Fibrillation Patients Admitted for Electric Cardioversion. J Clin Hypertens (Greenwich). 2015;17(7):558-64.

18. O'Brien E, Waeber B, Parati G, Staessen J, Myers MG.

[DOI: 10.47176/mjiri.39.108]

Blood pressure measuring devices: recommendations of the European Society of Hypertension. BMJ. 2001;322(7285):531-6.
19. Badheka AO, Patel NJ, Grover PM, Shah N, Patel N, Singh V, et al. Optimal blood pressure in patients with atrial fibrillation (from the AFFIRM Trial). Am J Cardiol. 2014;114(5):727-36.
20. Feenstra RK, Allaart CP, Berkelmans GF, Westerhof BE, Smulders YM. Accuracy of oscillometric blood pressure measurement in atrial fibrillation. Blood Pressure Monitoring. 2018;23(2):59-63.
21. Li L, Bing S, Liu K, Jiang J, Zhang J, Chen C, Wan Y. Diagnostic accuracy of an oscillometric blood pressure monitor for atrial fibrillation screening. Blood Pressure Monitoring. 2023;28(3):144-8.
22. Jani B, Bulpitt CJ, Rajkumar C. Blood pressure measurement in patients with rate controlled atrial fibrillation using mercury sphygmomanometer and Omron HEM-750CP deice in the clinic setting. J Hum Hypertens. 2006;20(7):543-5.
23. Carlsson AC, Wandell P, Sundquist K, Johansson SE, Sundquist J. Effects of prescribed antihypertensives and other cardiovascular drugs on mortality in patients with atrial fibrillation and hypertension: a cohort study from Sweden. Hypertens Res. 2014;37(6):553-9.
24. Myers MG, Stergiou GS. Should oscillometric blood pressure monitors be used in patients with atrial fibrillation? The Journal of Clinical Hypertension. 2015;17(7):565.
25. Parati G, Stergiou GS, Asmar R, Bilo G, de Leeuw P, Imai Y, et al. European Society of Hypertension practice guidelines for home blood pressure monitoring. J Hum Hypertens. 2010;24(12):779-85.
26. Wang XX, Shuai W, Hong K, Xu J, Li JX, Li P, et al. How to evaluate BP measurements using the oscillometric method in atrial fibrillation: the value of pulse rate variation. Hypertension Research. 2016;39(8):588-92.
27. Juraschek SP, Ishak AM, Mukamal KJ, Wood JM, Anderson TS, Cohen ML, et al. Impact of 30-versus 60-second time intervals between automated office blood pressure measurements on measured blood pressure. Hypertension. 2021;78(5):1502-10.
28. Morillo CA, Banerjee A, Perel P, Wood D, Jouven X. Atrial fibrillation: the current epidemic. J Geriatr Cardiol. 2017;14(3):195-203.
29. Šelmytė–Besusparė A, Barysienė J, Petrikonytė D, Aidietis A, Marinskis G, Laucevičius A. Auscultatory versus oscillometric blood pressure measurement in patients with atrial fibrillation and arterial hypertension. BMC cardiovascular disorders. 2017;17:1-8.

[DOI: 10.47176/mjiri.39.108]