URL: http://dx.doi.org/10.31703/gpsr.2023(VIII-II).04 DOI: 10.31703/gpsr.2023(VIII-II).04

Citation: Hadi, N., Asfandiyar, Alam, S., Khan, J., Raza, S., & Shah, I. (2023). Frequency of Cardiac Arrhythmias Detection on 24 Hours Holter Monitoring. *Global Pharmaceutical Sciences Review, VIII*(II), 18-22. https://doi.org/10.31703/gpsr.2023(VIII-II).04

Cite Us

Vol. VIII, No. II (Spring 2023) Pages: 18 – 22 ISSN (Print): 2788-5569 ISSN (Online): 2788-5445

Frequency of Cardiac Arrhythmias Detection on 24 Hours Holter Monitoring

Noorul Hadi [a] | Asfandiyar [b] | Shafiq Alam [c]

Jehandad Khan [d] | Sarmad Raza [e] | Ibrahim Shah [f]

Abstract: *To determine the clinical outcomes and assess the diagnostic yield of Holter monitoring and its potential use in diagnosing and managing abnormal rhythms, along with identifying patterns or trends in the prevalence of different arrhythmias, which could modify and design future research and clinical practice. It was a descriptive cross-sectional study carried out at MMC Mardan on around 1000 patients, from June 2017 to December 2022. Three trained Cardiologists having more than 03 years of experience reviewed the 24-hour monitor data through the system. Among these 1000 patients, 31% had at least one arrhythmia detected on 24-hour Holter monitoring. The most common arrhythmias detected were premature ventricular contractions (54%), followed by Atrial fibrillation (18%) and supraventricular tachycardia (15%) while 2.3% had first-degree AV block, 4.5% had second-degree AV block, and 0.8% had third-degree AV block. In conclusion, our study showed that Holter monitoring for 24 hours is a useful tool for detecting a range of cardiac arrhythmias, with premature ventricular contractions being on the top, with some forms of AV block also being detected in a small group of patients, having first-degree AV block being the most common type.*

Key Words: Cardiac Arrhythmias, Holter Monitoring, Cardiology, Mardan Medical Complex, AV Block, Ventricular Contractions

Introduction

A Holter monitor is used for cardiac monitoring that records the heart's electrical activity over a specific period of time, typically for 24 to 48 hours (Barrett et al., 2014). The device used is a portable electrocardiogram (ECG) machine attached to the patient's chest using electrodes (Bansal & Joshi, 2018), which are connected to a small recording device that the patient carries with them throughout the monitoring period and is then decoded with computer-based software's. (Fensli et al., 2005)

Holter monitoring is used to analyze the heart's rate and rhythm during routine activities, and it can help to detect abnormal heartbeats or arrhythmias that a short strip of ECG usually doesn't pick (Lobodzinski & Laks, 2012). A Holter monitor is also very helpful in determining disorders such as palpitations, fainting, and chest pain and also in assessing the effectiveness of various medications or treatments. (Linzer, 1997)

A study published in the American College of Cardiology Journal found that Holter monitoring was helpful in identifying significant arrhythmias in 10.9% of people who had previously undergone a standard ECG, which turned out to be normal yet they

[a] Assistant Professor, Cardiology Unit, MTI Mardan Medical Complex, Mardan, KP, Pakistan.
[b] Assistant Professor, Cardiology Unit, MTI Mardan Medical Complex, Mardan, KP, Pakistan.
[c] Assistant Professor, Cardiology Unit, MTI Mardan Medical Complex, Mardan, KP, Pakistan.
[d] Post Graduate Trainee, Cardiology Unit, MTI Mardan Medical Complex, Mardan, KP, Pakistan.
[e] Post Graduate Trainee, Cardiology Unit, MTI Mardan Medical Complex, Mardan, KP, Pakistan.
[f] Associate Professor, Gajju Khan Medical College, Swabi, KP, Pakistan.

Corresponding Author: Shafiq Alam (Assistant Professor, Cardiology Unit, MTI Mardan Medical Complex, Mardan, KP, Pakistan. Email: iamkhani2020@gmail.com)

experienced symptoms (Al-Khatib et al., 2018). This indicates that this can be a valuable tool for recognizing arrhythmias that were not detected using 12 lead standard ECGs. Additionally, studies also found that it was also effective in identifying asymptomatic arrhythmias in patients who had previously suffered a stroke or transient ischemic attack (Ziegler et al., 2012) (Sejr et al., 2017).

Studies done in the past have focused on target patient populations or types of arrhythmias, like those with palpitations or who have suffered a stroke or transient ischemic attack. However, there is a lack of comprehensive studies that examine the overall frequency and distribution of different types of arrhythmias detected on 24-hour Holter monitoring in diverse patient populations. That's why this study will help us in providing valuable information for clinicians in terms of understanding the diagnostic yield of Holter monitoring and its potential use in diagnosing and managing abnormal rhythms. Additionally, this study will help in identifying patterns or trends in the prevalence of different arrhythmias, which could modify and design future research and clinical practice.

Materials and Methods

It was a descriptive cross-sectional study carried out at Medical teaching institution, Mardan Medical Complex. Approval was granted by the Ethical Committee of the hospital. Around 1000 patients were reviewed at the Cardiac Diagnostic Centre of Cardiology Department MMC Mardan, from June 2017 to December 2022. A structured Performa was made according to the design of our study. Three trained Cardiologists having more than 03 years of experience reviewed the 24-hour monitor data through the system. All variables were documented on the questionnaire first and then entered into the Excel sheet. SPSS Version 22 was used to import the data from an Excel file. Frequencies and prevalence of cardiac arrhythmias were calculated.

Results

About 1000 patients were reviewed. 31% had at least one arrhythmia detected on 24 hours of Holter monitoring. The most common arrhythmias detected were premature ventricular contractions (54%), followed by Atrial fibrillation (18%) and supraventricular tachycardia (15%).2.3% had first-degree AV block, 4.5% had second-degree AV block, and 0.8% had third-degree AV block.

Table

Arrhythmias	Frequency	Percentage
PVCs	72	54%
AF	24	18%
SVT	20	15%
First-degree AV Block	3	2.3%
Second-degree AV Block	6	4.5%
3rd degree AV Block	1	0.8%

Discussion

The findings of our study suggested that 24-hour Holter monitoring can be an effective tool for detecting a range of cardiac arrhythmias in patients, based on the fact that arrhythmias were detected in 31% of the patients being reviewed who underwent the test. This is consistent with previous research that has reported prevalence rates ranging from 13% to 46% depending on the population being studied and the specific type of arrhythmia being evaluated (Gibson & Heitzman, 1984) (Priori et al., 2013).

These findings were also consistent with previous studies, which revealed that premature ventricular contractions were the most common rate ranging from 1.3% to 5.5% depending on the population being studied and the specific type of AV block being evaluated. The most common type of AV block detected in our study was first-degree, followed by second-degree and complete heart block. While the clinical significance of first-degree AV block is often considered to be minimal, second-degree and complete heart blocks may require further evaluation and management (Kusumoto et al., 2019) (Watanabe et al., 2014) (Solomon et al., 2016).

In addition to the prevalence of arrhythmias found on 24-hour Holter monitoring, the clinical consequences of these results must be considered. Using Holter monitoring to detect arrhythmias can provide useful insights into the underlying heart problems and suggest proper therapeutic methods. For example, the detection of severe arrhythmias like atrial fibrillation or supraventricular tachycardia might lead to the implementation of tailored treatments or interventions to lower the risk of consequences like stroke or hemodynamic instability.

Overall, this study helps to improve the present literature on the proper utilization of the Holter monitor as a diagnostic tool for cardiac arrhythmias. The findings suggest that it can be an effective source

to identify a range of arrhythmias, including those that may not be detected on a standard electrocardiogram. However, further research is required to establish the significance and outcomes linked to these arrhythmias and to assess proper and suitable strategies for managing patients with these abnormalities.

Conclusion

In conclusion, our study showed that Holter monitoring for 24 hours is a useful tool for detecting a range of cardiac arrhythmias, with premature ventricular contractions being on the top, with some forms of AV block also being detected in a small group of patients, having first-degree AV block being the most common type. Hence highlighting the importance of Holter monitoring in the diagnosis and management of cardiac arrhythmias, particularly in patients with symptoms such as palpitations or syncope.

References

Al-Khatib et al. (2018). 2017 AHA/ACC/HRS guideline for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. *Circulation, 138*(13). https://doi.org/10.1161/cir.0000000000000615

Bansal, A., & Joshi, R. (2018). Portable out-of-hospital electrocardiography: A review of current technologies. *Journal of Arrhythmia*, *34*(2), 129–138. https://doi.org/10.1002/joa3.12035

Barrett, P. M., Komatireddy, R., Haaser, S., Topol, S. E., Sheard, J., Encinas, J., Fought, A. J., & Topol, E. J. (2014b). Comparison of 24-hour Holter Monitoring with 14-day Novel Adhesive Patch Electrocardiographic Monitoring. *The American Journal of Medicine*, *127*(1), 95.e11-95.e17. https://doi.org/10.1016/j.amjmed.2013.10.003

Fensli, R., Gunnarson, E., & T, G. (2005b). *A Wearable ECG-Recording System for Continuous Arrhythmia Monitoring in a Wireless Tele-Home-Care Situation*. https://doi.org/10.1109/cbms.2005.22

Gibson, T. G., & Heitzman, M. R. (1984). Diagnostic efficacy of 24-hour electrocardiographic monitoring for syncope. *American Journal of Cardiology*, *53*(8), 1013–1017. https://doi.org/10.1016/0002-9149(84)90628-3

Kusumoto, F., Schoenfeld, M. H., Barrett, C., Edgerton, J. R., Ellenbogen, K. A., Gold, M. H., Goldschlager, N., Hamilton, R. J., Joglar, J. A., Kim, R. Y., Lee, R. T., Marine, J. E., McLeod, C. J., Oken, K., Patton, K. K., Pellegrini, C. N., Selzman, K. A., Thompson, A., & Varosy, P. D. (2019). 2018 ACC/AHA/HRS Guideline on the Evaluation and Management of Patients With Bradycardia and Cardiac Conduction Delay. *Journal of the American College of Cardiology*, *74*(7), e51–e156. https://doi.org/10.1016/j.jacc.2018.10.044

Liao, J., Khalid, Z., Scallan, C., Morillo, C. A., & O'Donnell, M. (2007). Noninvasive Cardiac Monitoring for Detecting Paroxysmal Atrial Fibrillation or Flutter After Acute Ischemic Stroke. *Stroke*, *38*(11), 2935–2940. https://doi.org/10.1161/strokeaha.106.478685

Linzer, M. (1997). CLINICAL GUIDELINE: Diagnosing Syncope: Part 1: Value of History, Physical Examination, and Electrocardiography. *Annals of Internal Medicine*, *126*(12), 989. https://doi.org/10.7326/0003-4819-126-12-199706150-00012

Lobodzinski, S. S., & Laks, M. M. (2012). New devices for very long-term ECG monitoring. *Cardiology Journal*, *19*(2), 210–214. https://doi.org/10.5603/cj.2012.0039

Priori, S. G., Wilde, A. A., Horie, M., Cho, Y., Behr, E. R., Berul, C. I., Blom, N. A., Brugada, J., Chiang, C., Huikuri, H. V., Kannankeril, P. J., Krahn, A. D., Leenhardt, A., Moss, A. J., Schwartz, P. J., Shimizu, W., Tomaselli, G. F., & Tracy, C. M. (2013). HRS/EHRA/APHRS Expert Consensus Statement on the Diagnosis and Management of Patients with Inherited Primary Arrhythmia Syndromes. *Heart Rhythm*, *10*(12), 1932–1963. https://doi.org/10.1016/j.hrthm.2013.05.014

Sejr, M. H., Nielsen, J., Damgaard, D., Sandal, B. F., & May, O. (2017). Atrial fibrillation detected by external loop recording for seven days or two-day simultaneous Holter recording: A comparison in patients with ischemic stroke or transient ischemic attack. *Journal of Electrocardiology*, *50*(3), 287–293. https://doi.org/10.1016/j.jelectrocard.2017.01.009

Solomon, M. D., Yang, J., Sung, S. H., Livingston, M. L., Sarlas, G., Lenane, J. C., & Go, A. S. (2016). Incidence and timing of potentially high-risk arrhythmias detected through long-term continuous ambulatory electrocardiographic monitoring. *BMC Cardiovascular Disorders*, *16*(1). https://doi.org/10.1186/s12872-016-0210-x

Watanabe, E., Tanabe, T., Osaka, M., Chishaki, A., Takase, B., Niwano, S., Watanabe, I., Sugi, K., Katoh, T., Takayanagi, K., Mawatari, K., Horie, M., Okumura, K., Inoue, H., Atarashi, H., Yamaguchi, I., Nagasawa, S., Moroe, K., Kodama, I., . . . Aizawa, Y. (2014). Sudden cardiac arrest recorded during Holter monitoring: Prevalence, antecedent electrical events, and outcomes. *Heart Rhythm*, *11*(8), 1418–1425. https://doi.org/10.1016/j.hrthm.2014.04.036

Ziegler, P. D., Glotzer, T. V., Daoud, E. G., Singer, D. E., Ezekowitz, M. D., Hoyt, R. E., Koehler, J., Coles, J. F., & Wyse, D. G. (2012). Detection of Previously Undiagnosed Atrial Fibrillation in

Patients With Stroke Risk Factors and Usefulness of Continuous Monitoring in Primary Stroke Prevention. *American Journal of Cardiology*, *110*(9), 1309–1314. https://doi.org/10.1016/j.amjcard.2012.06.034

Zoni-Berisso, M., Lercari, F., Carazza, T., & Domenicucci, S. (2014). Epidemiology of atrial fibrillation: European perspective. *Clinical Epidemiology*, 213. https://doi.org/10.2147/clep.s47385