



EXTENDED HOLTER ELECTROCARDIOGRAPHIC MONITORING IN A PATIENT PRESENTING WITH SYNCOPE CAN IMPROVE DIAGNOSTIC YIELD

¹Dr. Keerthika Chowdary Ravella, ²Dr. Vijaya Pamidimukkala, ³Dr Raghava Sarma Polavarapu, ⁴Dr. Yudhistar Siripuram, ⁵Dr. Kalyan Chakravarthy, ⁶Dr. Hima Sanjana Perumalla, ⁷Dr. Sai Reshma Magam, ⁸Dr. Anurag Polavarapu

¹Sr. Consultant, ²Head of Department, ³Interventional Cardiologist and Head of Department, ⁴Jr. Consultant, ⁵Jr. Consultant, ⁶MBBS, ⁷Resident Internal Medicine, ⁸Sr. Resident
Department of Cardiology

Lalitha Super Specialties Hospital, Guntur, Andhra Pradesh, India

Abstract: In the recent era, there has been increased interest in extended Holter electrocardiographic (ECG) monitoring beyond 24 h as it provides additional diagnostic information in detecting significant arrhythmias in patients presenting with syncope. However, the question about optimal duration of Holter ECG monitoring remains unanswered. We hereby present a case of a 65-year-old male having a first syncope; initially, 24 h Holter ECG monitoring was normal; however, subsequent 72 h Holter ECG monitoring demonstrated the evidence of complete heart block. The patient was successfully managed with the implantation of a permanent pacemaker.

Index Terms - complete heart block; Holter monitoring; permanent pacemaker; syncope

I. Introduction

Syncope is characterized as a sudden transient loss of consciousness followed by spontaneous recovery, representing 1% of hospitalizations and about 3% of emergency department visits annually (1). Arrhythmias are major causes of cardiac-related syncope, which are often detected by 24 h Holter electrocardiography (ECG) monitoring in patients with syncope. However, this monitoring system is limited by low sensitivity and specificity in the detection of important arrhythmias. As portrayed in the literature, an extension of the recording time from 24 to 72 h can increase the rate of arrhythmia detection (2). We hereby report a case of an old gentleman who acquired the benefit of extended (72 hours) Holter ECG monitoring in detecting third-degree atrioventricular block.

II. Case presentation

A 65-year-old male presented with recurrent Stokes-Adams attacks was admitted to our hospital after a first syncope while sitting at home. The patient had a previous history of diabetes and hypertension. The patient's vitals were normal: blood pressure, 110/70 mmHg; respiratory rate, 15 breaths/min; heart rate, 100 beats/min, and temperature, 98.8°F. On admission, echocardiography demonstrated normal left ventricular systolic function and no wall motion abnormality. As shown in **Fig. 1**, the first 24 h Holter ECG monitoring was normal.



Fig. 1: Normal 24 h Holter electrocardiography monitoring

After 72 h, the ECG Holter monitoring was again performed, which revealed complete heart block with a slow heart rate (**Fig. 2**). It was planned to implant a permanent pacemaker. Dual-chamber, rate-modulated pacemaker was implanted. The patient was discharged from the hospital two weeks after permanent pacemaker implantation with hemodynamic stability. He did not have any recurrence of symptoms of syncope.

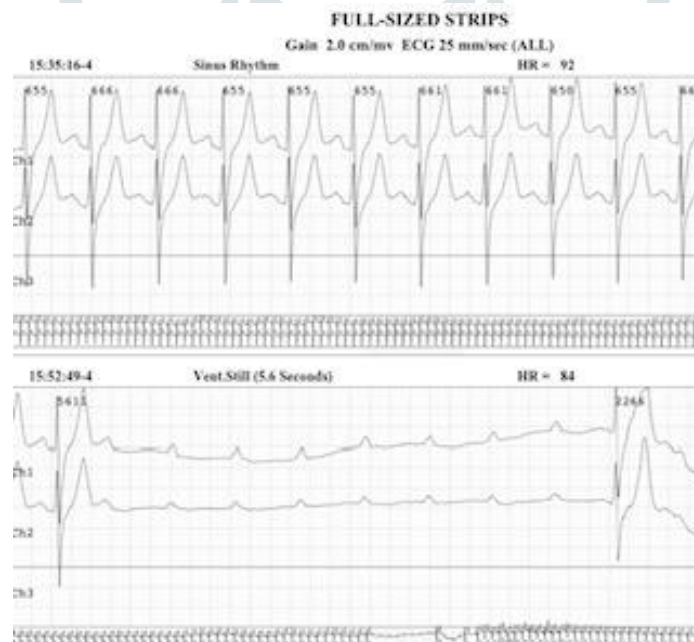


Fig. 2. Evidence of complete heart block on 72 h Holter electrocardiography monitoring

III. Discussion

In elder patients (≥ 60 years) with more co-morbidities and a higher frequency of adverse outcomes, it is quite difficult to differentiate between life-threatening etiologies like arrhythmias and benign etiologies like vasovagal syncope. Approximately 7% of elderly patients with the undifferentiated cause of syncope in the emergency department die or have serious cardiac outcomes within 30 days (3). Choosing tests depending on history and physical examination and prioritizing less resource-intensive and higher-yield diagnostic tests may ensure a more informed and cost-effective strategy in the assessment of elderly patients presenting with syncope.

Due to a variety of potential etiologies and differential diagnoses, patients presenting with syncope often undergo extensive diagnostic workups with unclear benefits. A 24 h Holter ECG monitoring is vastly used in the assessment of syncope and was examined almost entirely in the ambulatory or emergency department settings, with positive results ranging from 16% to as low as 1% (4, 5). Given that Holter ECG monitoring can result in longer hospital stays and higher treatment cost, up to what extent

duration of monitoring should extend is of utmost importance. However, optimal Holter ECG monitoring has not yet been established. Linzer et al. conducted a pooled analysis of patients with symptoms of syncope or presyncope and showed 4% correlation between symptoms and arrhythmias with Holter monitoring beyond 12 h (6). "The longer, the better" appears to be a logical strategy, and it is not surprising that a prolonged monitoring strategy employing an implantable loop recorder is considerably more likely to yield a diagnosis in patients with unexplained syncope (7). Bass et al. (2) stated that Holter monitoring is required to be extended to 48 h if the first 24 h Holter recording is normal. In his study, patients with syncope having one or more episodes were included. The finding emerged from the study demonstrated that significant electrocardiographic abnormalities were identified in 15% of patients in the first 24 h. In the remaining patients, another 11% had major abnormalities in the second 24 h. Further major abnormalities in the third 24 h occurred in only 4.2% of patients. Moreover, there was significant variability in the findings of major abnormalities over 3 days of monitoring since 10 of the 26 patients with major findings had at least one normal Holter recording during the 3 days. Thus, the study results hint that 24 h of monitoring is not sufficient for the detection of potentially serious abnormalities. The 48 h of monitoring showed that more patients were found to have potentially serious abnormalities, especially in patients who are elder, male, or have a non-sinus rhythm. Extending the duration of monitoring to 48 h may potentially lead to more useful diagnostic documentation. In agreement with earlier studies, old age, heart failure, and atrial fibrillation are risk factors that correlate best with a diagnostic Holter ECG monitoring (4, 8). Kwon et al. (9) postulated that atrial fibrillation detection could be improved with 72 h single-lead ECG monitoring with the adhesive patch-type device than the 24 h Holter test. In the present case, we extended Holter monitoring up to 72 h and we were able to detect complete heart block, and ultimately the patient was survived after the successful implantation of a permanent pacemaker.

IV. Conclusion

An extended Holter electrocardiographic monitoring for 72 h has been proved to be beneficial in patients with syncope by improving diagnostic yield.

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