



## ABSTRACT

### Diagnostic yield and appropriateness of ambulatory electrography Holter monitor at Sultan Qaboos University Hospital

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**Background:** Ambulatory Holter monitor was developed to allow remote ECG monitoring of patients with suspected cardiac arrhythmias. It was first introduced by the American biophysicist Norman J. Holter in the 1940s. In recent years, there has been significant advancements in remote cardiac monitoring. The choice of the ECG-monitoring modality depends on the presenting symptom, symptom frequency, and degree of suspicion of a life-threatening arrhythmia.

**Objectives:** The aim of this study is to examine the diagnostic yield of 24-Hour and 48-Hour ambulatory ECG Holter monitoring in the management of patients at Sultan Qaboos University Hospital (SQUH). We also assessed the appropriateness of the ECG Holter requests based on the 2017 International Society for Holter and Non-invasive Electrocardiology (ISHNE) and the Heart Rhythm Society (HRS) guidelines indications.

**Methods:** This retrospective study included all 24-hour and 48-hour ambulatory ECG Holters performed at SQUH between April 2021 and April 2023. Data on patient demographics, cardiac risk factors, indication for the test, ordering specialty, and the findings of the Holter tests were collected.

**Results:** A total of 1050 patients were included in the analysis, with a mean age of 51.7 ± 19.04 years. The study population comprised 537 females (51.2%). The prevalence of cardiac risk factors



in the study cohort was as follows: hypertension 44.2%, diabetes mellitus 32.9%, coronary artery disease 19.4%, cerebrovascular disease 6.7%, dyslipidemia 19.5%, heart failure 5.6%, and atrial fibrillation (AF) 5.2%. The majority of indications were deemed appropriate (90.6%) based on the 2017 ISHNE-HRS expert consensus statement on ambulatory ECG and external cardiac monitoring. Inpatient indications accounted for 52.6% of all tests. Among Holters ordered with an indication of stroke, 14 out of 267 had pre-existing AF, and AF was detected in 5 additional patients without pre-existing AF. Comparisons between appropriate and inappropriate indications showed significant differences in age, ordering specialty, indication for the Holter, and patient setting ( $p < 0.05$ ). Analysis based on physician specialty revealed differences in indications, with internists and neurologists more frequently ordering tests for stroke patients. Cross tabulation of Holter findings and indications showed varying frequencies of abnormal ECG findings across different indications.

**Conclusion:** This study demonstrates the value of ambulatory ECG Holter monitoring in the management of patients with suspected cardiac arrhythmias. The high rate of appropriate indications based on international guidelines highlights the importance of using evidence-based criteria in ordering diagnostic tests as practiced in our University Hospital. The findings also underscore the need for interdisciplinary collaboration, as different specialties may have varying approaches to ordering tests and managing patients. Further research and education on appropriate use criteria could help optimize the diagnostic yield and cost-effectiveness of ambulatory ECG monitoring.