Hypertrophic Cardiomyopathy in Oman: Prevalence, Clinical Characteristics, and Predictors of Arrhythmia and Sudden Cardiac Death

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Background

Hypertrophic cardiomyopathy (HCM) is a common, yet often under-diagnosed monogenic cardiovascular disorder characterized by diverse phenotypic presentations and natural histories. First comprehensively described by the Braunwald group at the National Institutes of Health 55 years ago, the understanding of HCM has evolved significantly, particularly in Western countries. However, there is a lack of studies on HCM in Oman, a country with a population of 5 million, of which 61% are Omani nationals. The worldwide prevalence of HCM is estimated to be around 1:200 to 1:500, with only 10% of cases clinically diagnosed.

Purpose

This study aims to evaluate the prevalence, clinical presentation, and imaging features of patients with HCM in Oman. It also seeks to identify high-risk features predicting the risk of ventricular arrhythmias and sudden cardiac death in the local population and compare them with international risk models.

Methods

This retrospective cohort study included all patients aged 16 years and above diagnosed with HCM at the two largest cardiology services in Oman. Data on clinical features, imaging characteristics and defibrillator implantation were recorded for patients diagnosed between January 2016 and December 2023.

Results

A total of **110 patients** with HCM were enrolled during the study period, with a mean age at diagnosis of **35 years** and a **male** predominance (78%). Most patients (75%) were sporadic cases with no family history of HCM. The most common clinical presentations included dyspnea (31%), chest pain (24%), palpitations (33%), and syncope (12%). Atrial fibrillation was present in 16% of patients, all of whom were anticoagulated regardless of age. The mean left ventricular thickness on echocardiography was 22 ± 6 mm, with the septal variant being the most common (68%). Septal reduction therapy was performed in 7 patients due to symptomatic left ventricular outflow tract obstruction (5 patients underwent myomectomy, and 2 patients underwent alcohol septal ablation). According to the 2020 AHA/ACC hypertrophic cardiomyopathy guidelines for ICD therapy, 62 patients had an indication for defibrillator therapy, but only 26 patients had an ICD implanted. Compared to 10 patients eligible for defibrillator therapy with an ESC HCM risk calculator of more than 6% in 5 years, only 7 patients had an ICD implanted. Seven patients had appropriate therapies for ventricular tachycardia. Six patients died from arrhythmic etiology in our cohort, all without prior defibrillator therapy and before undergoing cardiac MRI.

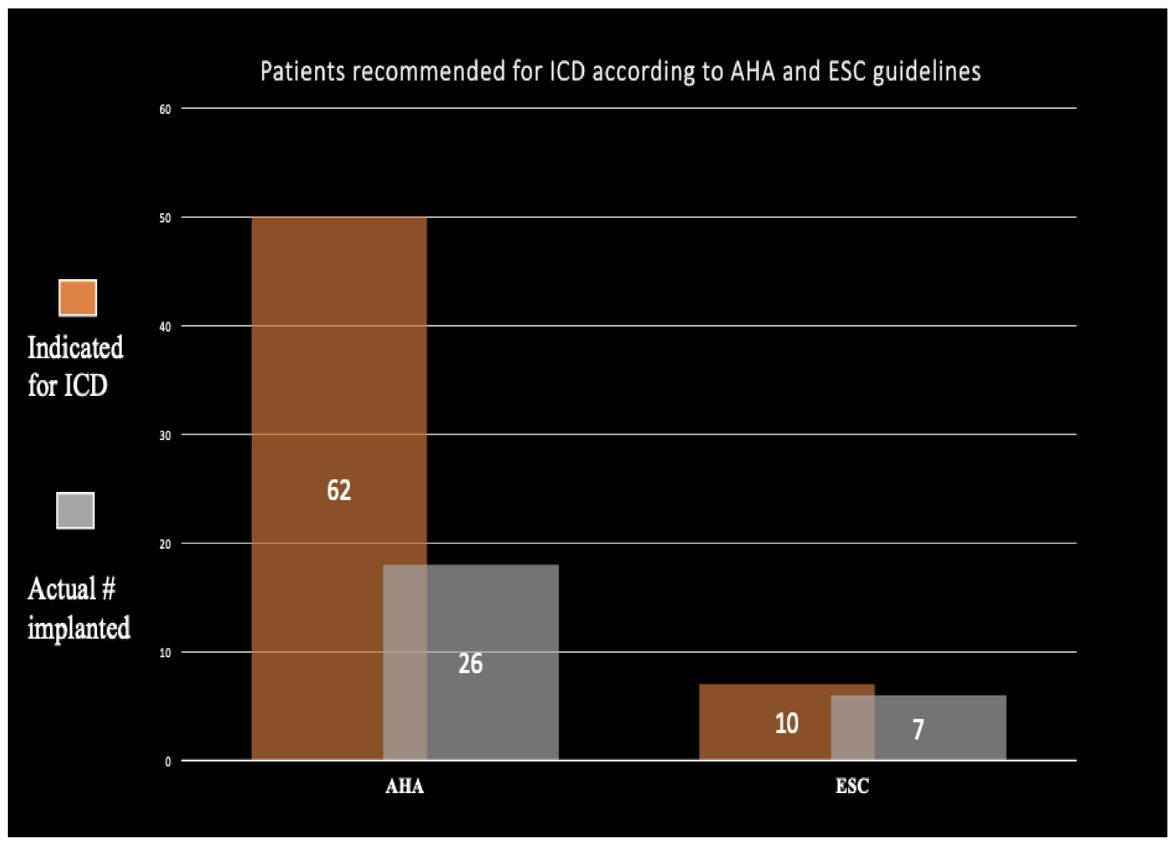

Figure 1: ICD indications based on 2020 AHA/ACC HCM guidelines vs ESC risk calculator.

Conclusion

This study represents the first comprehensive analysis of HCM in Oman and highlights its severe underdiagnosis in the country. The relatively young age at diagnosis and the high prevalence of risk factors for ventricular arrhythmias underscore the need for greater awareness and diagnostic vigilance. The findings of this study have led to the establishment of a specialized genetic cardiomyopathy clinic in Oman, representing a crucial step towards a national and regional HCM registry in the Middle East.