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Effect of atenolol on heart rate, arrhythmias, blood pressure, and dynamic left ventricular outflow tract obstruction in cats with subclinical hypertrophic cardiomyopathy☆

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Abstract *Objective:* To investigate the negative chronotropic, antiarrhythmic, and obstruction-relieving effects of atenolol in cats with subclinical hypertrophic cardiomyopathy (HCM).
Animals: Seventeen cats with HCM.
Methods: Results for echocardiography, electrocardiography, Doppler blood pressure, and 24 h Holter monitoring were compared in cats before and 2—4 weeks after atenolol therapy (6.25—12.5 mg PO q 12 h).
Results: The left ventricular outflow tract maximum velocity (LVOT Vmax) decreased after atenolol administration (mean Vmax pre-treatment 3.3 m/s ± 1.8 m/s; post-treatment 1.6 m/s ± 1.0 m/s, $p < 0.0001$). Heart rate (HR) decreased after atenolol for all HR modalities. The total number of ventricular origin complexes (TotVent) and ventricular premature complexes (VPCs) decreased after

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atenolol. The VPCs decreased from a geometric mean of 61 complexes/24 h (range, 11—620 complexes/24 h) to 15 complexes/24 h (range, 1—1625 complexes/24 h) ($p < 0.0001$). Murmur grade decreased after atenolol from a median grade of 3/6 to 2/6 ($p < 0.0001$). The systolic blood pressure did not change (mean pre-treatment 130 mmHg $\pm$ 16 mmHg, mean post-treatment 123 mmHg $\pm$ 20 mmHg, $p = 0.2$).
Conclusion: Atenolol decreases HR, murmur grade, and LVOT obstruction, and to a lesser degree, frequency of ventricular ectopy, in cats with subclinical HCM. Further studies are needed to determine if sudden cardiac death or long-term outcome is influenced by atenolol administration.

Abbreviations

2D	two-dimensional
24 AVE HR	24 h average heart rate obtained by Holter monitor
24 MAX HR	24 h maximum heart rate obtained by Holter monitor
24 MIN HR	24 h minimum heart rate obtained by Holter monitor
AIVR	accelerated idioventricular rhythm
AUSC HR	heart rate obtained by auscultation
AVE HR	average heart rate obtained during a single hour of Holter monitoring
BP	systolic blood pressure
ECG	electrocardiogram
ECG HR	heart rate obtained by ECG
HR	heart rate
IVSd	interventricular septum measured in diastole
IVSs	interventricular septum measured in systole
LA	left atrial
LA:Ao	left atrial to aorta ratio
LVIDd	left ventricular internal dimension in diastole
LVIDs	left ventricular internal dimension in systole
LVOT	left ventricular outflow tract
LVPWd	left ventricular posterior wall measured in diastole
LVPWs	left ventricular posterior wall measured in systole
MAX HR	maximum heart rate obtained during a single hour of Holter monitoring
MIN HR	minimum heart rate obtained during a single hour of Holter monitoring
SAM	systolic anterior motion
SCD	sudden cardiac death
TotSV	total number of supraventricular complexes (premature, idiojunctional, and junctional escape)
TotVent	total number of ventricular origin complexes (premature, accelerated, and escape)
Vmax	maximum velocity measured
VPCs	ventricular premature complexes

Introduction

Hypertrophic cardiomyopathy (HCM) is a primary myocardial disease of cats characterized by concentric left ventricular hypertrophy leading to diastolic dysfunction and eventually left atrial enlargement. Hypertrophic cardiomyopathy can be associated with a long preclinical period, which in some cats lasts the entirety of life, or can progress to clinical disease including