



Sedative and echocardiographic effects of dexmedetomidine combined with butorphanol in healthy dogs

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Abstract Objectives: To evaluate the echocardiographic variables and sedation after two dosages of dexmedetomidine combined with butorphanol in healthy dogs. **Animals:** Fourteen healthy dogs.

Methods: The dogs received dexmedetomidine 5 mcg/kg IM and butorphanol 0.4 mg/kg (low dose (LD), n = 6) or dexmedetomidine 10 mcg/kg IM and butorphanol 0.4 mg/kg (recommended dose (RD), n = 8). Sedation scoring, noninvasive blood pressure measurement, and echocardiography were performed before sedation at baseline, at 20 minutes (T20), and 60 minutes (T60) after drug administration.

Results: The median sedation scores were increased at both T20 and T60 in the RD group, and at T60 in the LD group, compared with baseline ($p < 0.0001$, $p = 0.012$). At T60, the RD dogs were more sedated than the LD dogs ($p = 0.0093$). The median cardiac output (CO) decreased at both T20 (63%) and T60 (65%) in the RD group and at T60 (42%) in the LD group, compared with baseline ($p = 0.0011$, $p = 0.0055$). The median heart rate (HR) was decreased at both T20 and T60 in the RD group and at T60 in the LD group, compared with baseline ($p = 0.0009$, $p = 0.0001$). In both RD and LD dogs, valvular regurgitation developed and was identified by color Doppler imaging.

Conclusions: There were significant hemodynamic changes, mainly related to HR and indices of systolic function, following administration of dexmedetomidine in

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these healthy dogs. The changes also included decreases in systolic function and CO, as well as appearance of 'new' valvular regurgitation. Caution should be used when considering dexmedetomidine for sedation in dogs with, or being screened for, cardiovascular disease.

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Abbreviations

2D	two-dimensional
A	late, diastolic mitral valve inflow velocity
A'	peak, late diastolic velocity (tissue Doppler imaging)
Ao	aorta
AR	aortic regurgitation
AV	aortic valve
BL	baseline
BP	blood pressure
CO	cardiac output
CSA	cross-sectional area
E	early, diastolic mitral valve inflow velocity
E'	peak, early diastolic velocity (tissue Doppler imaging)
ECG	electrocardiogram
EF	ejection fraction
FS	fractional shortening
HR	heart rate
IVS	interventricular septum
IVS _d	interventricular septum in diastole
IVS _s	interventricular septum in systole
LA	left atrium
LD	low dose
LV	left ventricle
LVvol _d	left ventricular volume in diastole
LVvol _s	left ventricular volume in systole
LVID	left ventricular internal diameter
LVID _d	left ventricular internal diameter in diastole
LVID _s	left ventricular internal diameter in systole
LVPW	left ventricular posterior wall
LVPW _d	left ventricular posterior wall in diastole
LVPW _s	left ventricular posterior wall in systole
MR	mitral regurgitation
MV	mitral valve
PV	pulmonic valve
RD	recommended dose
RR	respiratory rate
S'	peak systolic velocity (tissue Doppler imaging)
SV	stroke volume
T0	time zero
T20	time 20 minutes
T60	time 60 minutes
TDI	tissue Doppler imaging
TR	tricuspid regurgitation
VTI	velocity time integral

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