STRESS ECHOCARDIOGRAPHY IN HORSES : COMPARISON OF CARDIAC OUTPUT DURING INCREMENTAL DOBUTAMINE INFUSION IN ATROPINISED AND NON-ATROPINISED PONIES

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Exercise stress echocardiography is of growing interest in equine medicine, since it might increase the chance of detection of cardiac abnormalities associated with poor performance that are subclinical at rest and also allow refinement of determination of the prognosis of cardiac diseases in general. Unfortunately, this technique requires a treadmill and appears to be technically difficult to perform in the immediate post exercise period. As an alternative to physical exercise, pharmacological stimulation of the heart with dobutamine has recently been tested, but was shown to be cardiotoxic and arrhythmogenic in horses. The aim of this study was to investigate the effect of a low-dose dobutamine challenge in previously atropinised ponies on heart rhythm, heart rate (HR) and cardiac output (CO), in order to develop an alternative protocol to high-dose dobutamine for equine stress echocardiography.

In 13 healthy Shetland ponies, aortic diameter and flow were measured with pulsed waved Doppler ultrasound at rest and during a pharmacological challenge. Seven of the ponies received dobutamine infusion at incremental rates of 5 μg/kg/min for 5 mins to a maximal rate of 30 μg/kg/min. The other 6 ponies received dobutamine infusion in incremental rates of 1 μg/kg/min every 5 mins from 2–5 μg/kg/min after premedication with 2 boluses of 0.025 mg/kg atropine 5 mins apart. Mean maximal CO was significantly different from resting CO in both groups but not significantly different between the 2 groups. In both groups, the increase in CO was mediated by a significant increase in HR, while stroke volume rather decreased. All ponies that received high doses of dobutamine without previous atropine application showed excessive restlessness, cardiac arrhythmias and a high individual variability in the cardiac response to the pharmacological challenge. None of the atropinised ponies showed cardiac arrhythmias and restlessness was only slight.

We conclude that premedication with atropine 1) allows reduction of the dobutamine dose by approximately 10 times whilst still inducing the same haemodynamic effects as dobutamine alone and 2) drastically reduces adverse side-effects and variability in cardiac response to a dobutamine challenge.