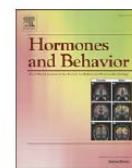




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Cortisol release and heart rate variability in horses during road transport

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ABSTRACT

Based on plasma cortisol concentrations it is widely accepted that transport is stressful to horses. So far, cortisol release during transport has not been evaluated in depth by non-invasive techniques such as analysis of salivary cortisol and faecal cortisol metabolites. Transport also causes changes in heart rate and heart rate variability (HRV). In this study, salivary cortisol, faecal cortisol metabolites, heart rate and HRV in horses transported by road for short (one and 3.5 h) and medium duration (8 h) were determined. With the onset of transport, salivary cortisol increased immediately but highest concentrations were measured towards the end of transport (4.1 ± 1.6 , 4.5 ± 2.6 , 6.5 ± 1.8 ng/ml in horses transported for one, 3.5 and 8 h, respectively). Faecal cortisol metabolite concentrations did not change during transport, but 1 day after transport for 3.5 and 8 h had increased significantly ($p < 0.01$), reflecting intestinal passage time. Compared to salivary cortisol, changes in faecal cortisol metabolites were less pronounced. Heart rate increased and beat-to-beat (RR) interval decreased ($p < 0.05$) with the onset of transport. Standard deviation of heart rate increased while root mean square of successive RR differences (RMSSD) decreased in horses transported for 3.5 (from 74 ± 5 to 45 ± 6 ms) and 8 h (from 89.7 ± 7 to 59 ± 7 ms), indicating a reduction in vagal tone. In conclusion, transport of horses over short and medium distances leads to increased cortisol release and changes in heart rate and HRV indicative of stress. The degree of these changes is related to the duration of transport. Salivary cortisol is a sensitive parameter to detect transient changes in cortisol release.

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