Abstract

In our study, we analyzed four stress markers (cortisol, cortisone, DHEA and DHEAS) in blood serum in young sows using minimally invasive heart catheterisation as the stress factor.

The marker levels were assessed in four defined periods of the experiment, beginning with the baseline level on the day before intervention (1), the second period was after the introduction of anaesthesia (2), the third was after conducting tissue stimulation or ablation (3), and the final period was after the end of the catheterisation (4). Cortisol and cortisone were detected using HPLC method, DHEA(S) by commercial kits. For statistical analyses non-parametric tests were used (due to non standard Gaussian data distribution).

In our study we arranged these experiments: 1. Diurnal variability in these markers concentration during heart catheterisation was tested. 2. Are there differences between stress markers concentration the day before experiment (sampling 1) and in the day of the catheterisation (samplings 2, 3, 4)? 3. Are there differences between these markers concentration during operation (the first sampling was excluded)? 4. The cortisol/cortisone ratio was calculated.

We found only minimal statistical differences in studied markers between the morning and afternoon group ($p > 0.05$) in experiment 1. For tested markers was Friedman test statistically significant for cortisol and DHEAS ($p < 0.05$), for cortisone and DHEA $p<0.001$. Experiment 3: For cortisol and cortisone was $p < 0.05$, for DHEA(S) there were statistical differences only minimal ($p > 0.05$) in experiment 2 and 3. Friedman test was statistically significant, $p<0.001$ in experiment 4.

Conclusions: Experiment 1: The absence of circadian variation in GCs levels could originate either at an early age of our experimental pigs or in stressful conditions on the experiment day or most likely the day before (e.g. social isolation, fasting, transport, and catheterisation), respectively. We can conclude there is no difference in the stress load between morning and afternoon experiments. Experiment 2 and 3: The first stress markers level was the lowest; therefore we could conclude this concentration is the basal level. Then levels of all markers increased and statistically significant changed. After anaesthesia induction cortisol decreased, cortisone, DHEA(S) increased, it corresponds to anaesthesia effect. Cortisone, DHEA and DHEAS acted as balanced system against the stress injurious effect Experiment 4: Cortisol/cortisone ratio was the highest the day before experiment, then decreased. We suppose cortisol concentration suddenly decreased, 11β-HSD2 activity increased and changed cortisol to cortisone.