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Effect of dietary addition of vitamin E and Selenium on semen quality in the Cairn-Terriers

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Sub- and infertility in the dog is a common problem and specific treatments are requested by breeders. Various substances and protocols are applied with the aim to improve semen quality. Among others, it is well known that a certain daily intake of selenium and vitamin E is required in humans and animals, to maintain normal reproductive function and both factors are also relevant for membrane stability. Consequently, some breeders and veterinarians suggest supplementation to improve semen quality and freezability. As scientific evidence documenting an effect in the dog is lacking by now, the aim of the present study was to investigate the effect of vitamin E and selenium supplementation on semen quality in a randomized, double-blinded trial in Cairn Terrier males. All dogs (n=3 per group; 4.3±1.5 years) received the same commercial diet and were supplemented with either 100 mg vitamin E/day, 0.1 mg selenium/day or 100 mg vitamin E + 0.1 mg selenium/day during the study period. Semen was collected and analyzed before the experiment and monthly in a three-month period. Semen parameters evaluated were progressive motility, % of living (eosine stain), membrane intact (hypoosmotic swelling test) and morphologically abnormal sperm (MAS, Spermac® stain); additionally, the sperm concentration was determined to calculate the total sperm count (TSC). Glutathioperoxidase (GSH-PX) was determined in blood samples and cell-free seminal plasma (SP) obtained at the time of semen collection as well as vitamin E in cell-free SP.

Two-factorial analysis of variance with repeated measures and Poisson-Wald test (in case of individual results of MAS) were performed to test for an effect of group and time, and a interaction between group and time. All included ejaculates were considered normospermic at the time of inclusion, only one dog had 37% of MAS with otherwise good semen quality. Vitamin E levels in SP were below the detection limit (1.0 mg/l) in all samples. GSH-PX was highly variable in blood (range: 1) before treatment – range: 885.3-2502.5 IU/l, 2) whole observation period: 164.0 – 2794.4 IU/l) and seminal plasma (range: 1) before treatment – range: 378.0-4326.0 IU/l, 2) whole observation period: 18.4 – 4326.0 IU/l). Statistical analysis revealed a significant effect of group only for the total % of head abnormalities (p=0.011) and a trend for TSC (p=0.057) with a higher TSC in the second sample (1 month after start of treatment) followed by a decrease thereafter (2 months after start). Time significantly affected the % of MAS (p=0.025), % of head abnormalities (p=0.007) and % proximal cytoplasmic droplets (p=0.001). Additionally, a significant effect was found for GSH-PX in SP (p=0.015) and a trend in blood (p=0.055). Finally, a significant interaction between time and group was identified for % of living sperm (p=0.048), % of head abnormalities (p=0.018), % of acrosomal defects (p=0.043) and % proximal cytoplasmic droplets (p=0.002).

Although an effect of treatment and a significant interaction between time and treatment could be identified for selected parameters, we failed to identify a clear trend about how a 3 months vitamin E and/or selenium supplementation at relatively high concentrations affects semen quality in normospermic Cairn terriers. It seems that beneficial effects are – if any – only visible short-term (after one month). Further studies including more and possibly also dysspermic males are necessary to shed light into a possible effect of vitamin E and/or selenium supplementation.

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