

Effect of oral Supplementation with 25(OH)D₃ on Calcium mobilization of dry cows

Parturient paresis of dairy cows has an incidence of 5-10 % thus being a major issue of current milk production. At the beginning of the lactation period, calcium drain in peripartal cows exceeds the limit of their endogenous ability of calcium mobilization. In view of the high economical impact, it is of special interest to establish a feasible prophylaxis concerning parturient paresis. The substitution of vitamin D and its metabolites, respectively, is a common method of prophylaxis whose achievement is limited to a specific time frame after application. The thesis at hand is based on the hypothesis that the limiting factor is due to an overdose. Therefore it focuses on the investigation of the ability of calcium mobilization of experimental animals with respect to different doses of 25(OH)D₃ within a period of ten days. The subjects of study were two daily oral supplemented doses of 25(OH)D₃. The doses were based on preliminary experiments determining the dose-response-curves. The ability of calcium mobilization of experimental animals supplemented with a low dose of 15 mg and a higher dose of 40 mg have been compared with each other and with a control group. On day 3 and 10, an artificial hypocalcemia was induced by Na₂EDTA-infusion to test the ability of calcium mobilization. Within the scope of the study, a 25(OH)D₃ dose dependency has been verified. Compared to the control group a high dose of 40 mg showed no improvement of the ability of calcium mobilization whatsoever. The low dose of 15 mg showed an improvement of the ability of calcium mobilization only initially (day 3). The demonstrated dose dependency suggests that a dose lower than 15 mg will improve the ability of calcium mobilization for a prolonged period. Concerning further studies, this leads on one hand to the necessity to reduce the dose, and, on the other hand, to extend the period of supplementation with regard to day-to-day-praxis. Last but not least, a larger amount of preferably peripartal cows as experimental animals is required since an Na₂EDTA-infusion can simulate the boundary conditions of parturient paresis to a limited extent only.