

Response of newborn calves to injectable vitamins A, D and E.

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Due to poor placental transfer, newborn calves depend mainly upon colostrum and milk to supply fat-soluble vitamin needs. If the dam has not received sufficient fat-soluble vitamins during gestation, colostrum may be deficient in these critically important vitamins resulting in deficiencies in the newborn. Weak-calf syndrome has been shown to be partly due to vitamins E and A deficiencies in calves. Injecting fat-soluble vitamins at birth is a method to enhance fat-soluble vitamin status during the first few weeks after birth. Two experiments were conducted to measure efficacy of a commercial product (VITAL E-Newborn, Stuart Products, Inc.) in newborn beef and dairy calves. The product contained 500 I.U. vitamin E, 50,000 I.U. vitamin A and 50,000 I.U. vitamin D per mL. In experiment one, newborn beef calves (n=4) were not injected and calves (n=4) injected S.Q. with 5 mL VITAL E-Newborn. Serum samples were taken initially and days 1, 2 and 7 post-injection and analyzed for α -tocopherol, total vitamin A (retinol plus retinyl-palmitate), and 25-OH-D3. In experiment two, newborn dairy calves (n=4) were not injected and calves (n=7) were injected S.Q. with 5 mL VITAL E-Newborn. Serum samples were taken 62 h post-injection and analyzed for α -tocopherol, retinol and 25-OH-D3. For experiment one, serum α -tocopherol concentrations in non-injected calves were 0.26, 0.46, 0.63, and 1.14 $\mu\text{g/mL}$; total vitamin A concentrations were 0.077, 0.126, 0.152, and 0.123 $\mu\text{g/mL}$; and 25-OH-D3 concentrations were 10.0, 9.0, 9.3, and 10.6 ng/mL , for d 0, 1, 2 and 7, respectively. Vitamin-injected calves had serum α -tocopherol concentrations of 0.40, 16.4, 12.6, 5.9 $\mu\text{g/mL}$; total vitamin A concentrations of 0.053, 0.262, 0.270, and 0.151 $\mu\text{g/mL}$; and 25-OH-D3 concentrations of 6.0, 23.0, 42.1 and 54.7 ng/mL for d 0, 1, 2, and 7, respectively. All post-injection serum vitamin concentrations between treatments were different ($P < 0.001$). Experiment two had similar results as experiment one. At 62 h post-injection, average serum α -tocopherol concentrations were 1.30 and 10.20 ($P < 0.001$); average serum retinol concentrations were 0.128 and 0.154 $\mu\text{g/mL}$ ($P < 0.10$); and average serum 25-OH-D3 concentrations were 24.2 and 78.6 ng/mL ($P < 0.001$) for control and injected calves, respectively. Injecting newborn calves with a bioavailable source of fat-soluble vitamins is an excellent method to assure that newborn beef and dairy calves have adequate levels of these critically important vitamins after birth.

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