

Effect of the hyper-immune egg yolk supplementation on weight gain in neonate puppies

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Colostrum provides puppies with most of their passive immune transfer, as in dogs only 5% of immunoglobulin G (IgG) is acquired via transplacental transfer¹. Inadequate colostrum intake during the first day of life will deprive puppies not only of immunoglobulins, but also of many hormones, growth factors and nutrients, increasing their risk for neonatal morbidity and mortality. Supplementation during the first hours of life with canine serum or plasma increased blood IgG concentration² in colostrum deprived puppies as well as improved their growth during the entire neonatal period (0-3 weeks)³. This study aimed to evaluate the effect of exogenous specific antibodies administered via egg yolk before the intestinal barrier closure (i.e., <8h after birth) on growth in pre-weaning puppies. Specific antibodies against canine parvovirus type 2 and *E.coli* were obtained in eggs from hens vaccinated against mentioned agents⁴. Hyper-immune solution was then prepared by mixing egg powder with a commercial milk replacer (Babydog Milk, Royal Canin, Aimargues, France; 1g of egg hyper-immunized egg powder with 12ml of reconstituted milk). A total of 334 puppies from 16 different breeds, enrolled in one breeding kennel, were included in the study. Depending on the expected adult body weight, puppies were classified into small breed dogs (S; adult weight < 25 kg), and large breed dogs (L; > 25 kg). Within each litter and taking into account the birth weight, puppies were randomly assigned into supplemented or control group, both allowed to suckle their mother freely. Each puppy from the supplemented group received orally 1.5 ml/100g bw of hyper-immune solution at once within the first 8 hours after birth. Puppies from the control group received at the same dose (1.5 ml / 100g) and time the milk replacer only. All puppies were weighed at birth and at 7, 14, and 21 days of life. Linear mixed models with litter modeled as a random effect were performed to determine the variables affecting birth weight and weight gain during the neonatal period: breed size, age, supplementation. L represent 38.3% (128/334) of the included puppies. Among L and S, 65 (50.8%) and 104 (50.5%) were supplemented, respectively. Weight gain during the neonatal period was influenced by time ($p<0.001$), supplementation ($p=0.031$) and the interactions between the breed size and supplementation ($p=0.027$) and time and breed size ($p=0.001$). L gained 176g [67; 294g] during the 1st week, 223g [158; 324g] during the 2nd week and 260g [160; 382g] during the 3rd week of life, with significantly greater weight gain compared with S only during the 1st week (S=116g [66; 172g]; $p=0.001$). Whatever the period concerned, supplemented L gained more weight during the entire neonatal period than the controls (841g [485; 1087g] vs. 623g [436; 858g]; $p=0.048$). No difference was evidenced between supplemented and control S ($p=1$). In our study large breed puppies supplemented at birth with the hyper-immune egg yolk had greater weight gain during the entire neonatal period. In one study, large breed puppies presenting digestive disorders gained less weight than healthy ones⁵. Thus it could be hypothesized that better growth in supplemented puppies reflects a better health. Nevertheless, further studies are needed in order to confirm our findings in other breeding kennels.

¹ Chastant-Maillard S et al. Timing of the intestinal barrier closure in puppies. *Reprod Dom Anim*. 2012;47:190-193; ²Poffenbarger EM et al. Use of adult dog serum as a substitute for colostrum in the neonatal dog. *Am J Vet Res*. 1991; 52(8):1221-4. ³“Canine health product containing antibodies against canine parvovirus type 2” WO2015004181 A1.; ⁴Nguyen S et al. Passive protection of dogs against clinical disease due to canine parvovirus-2 by specific antibody from chicken egg yolk. *Can J Vet Res* 2006;70:62–64. ⁵Grellet A et al. Validation of a fecal scoring scale in puppies during the weaning period. *Prev. Vet. Med*. 2012;106:315-323.

ABSTRACT BOOK

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