**NEONATAL MORTALITY ("FADING SYNDROME" IN NEWBORN PUPPIES OR KITTENS)**

**BASICS**

**OVERVIEW**
- Death occurring from birth to 2 weeks of age
- "Neonatal" is defined as the period immediately following birth and up to the first 14 days following birth
- "Mortality" is defined as death

**GENETICS**
- Inbreeding—higher incidence of having identical recessive genes in the genetic make-up of an individual (known as a "homozygous recessive genotype")

**SIGNALMENT/DESCRIPTION of ANIMAL**

**Species**
- Dogs and cats

**Breed Predilections**
- Purebred or pedigree puppies and kittens—more prone to congenital (and hereditary) defects; congenital defects are conditions present at birth, they may or may not be inherited

**Mean Age and Range**
- Birth to 2 weeks of age

**SIGNS/OBSERVED CHANGES in the ANIMAL**
- Preweaning losses—typically 10% to 30% of the litter; about 65% of these losses occur during the first week of life; greater losses in a cattery or kennel should be considered abnormal
- Historical and physical examination findings rarely help determine the diagnosis, because of the limited number of ways newborns (neonates) can respond to illness
- Low birth weight, loss of weight, and/or failure to gain weight
- Decreased activity and appetite
- Weakness
- Constantly vocal or restless early, quiet and inactive later
- Tendency to remain separate from the dam and the rest of the litter
- Low body temperature (known as "hypothermia")—normal newborn body temperature is about 35.5° C (96° F), rising to 37° to 37.8° C (99°–100° F) during the fourth week of life; low blood-glucose levels in the blood (known as "hypoglycemia"); dehydration—common and often inter-related
- Breathing difficulties (known as "respiratory distress"), diarrhea, or dark colored urine due to the presence of hemoglobin (known as "hemoglobinuria;" hemoglobin is a breakdown product of red-blood cells)—may be seen
- Gross anatomic defects—may be detectable

**CAUSES**

**Noninfectious**
- Dam-related—difficult birth (known as “dystocia”) or prolonged labor; cannibalism; failure to produce milk (lactation failure); trauma; inattention or over attention to newborn; inadequate nutrition, including taurine deficiency in kittens (taurine is a necessary amino acid)
- Environmental—any factor that discourages nursing and allows low body temperature (hypothermia), including temperature extremes, humidity extremes, inadequate sanitation, overcrowding; and stress
- Nutritional—inadequate or ineffective nursing; low blood-glucose levels (hypoglycemia); low body temperature (hypothermia)-induced digestive malfunction
- Breakdown of red-blood cells due to the presence of antibodies from the mother in the milk (condition known as “neonatal isoerythrolysis”)—queen (mother cat) with blood type B; kitten with blood type A
- Birth defects
- Gross anatomic defects—more frequently in kittens (about 10% of nonsurviving newborn kittens) than in puppies
- Gastrointestinal abnormalities—congenital (present at birth) opening in the palate (known as “cleft palate”); lack of formation of a section of the intestine (known as “segmental intestinal agenesis”) or lack of development of normal tubular opening of the intestines (known as “intestinal atresia”)
- Abnormalities of the head and/or face (known as “craniofacial abnormalities”)—failure of midline closure, causing herniation
- Heart defects—valvular dysplasia; ventricular septal defect; atrioventricular fistula
- Respiratory defects—chest wall abnormalities; depression of the sternum and chest (known as “pectus excavatum”); inherited defect leading to lack of removal of respiratory secretions (known as “primary ciliary dyskinesia”); surfactant deficiency
- Inborn errors of metabolism—usually autosomal recessive traits

**Infectious**
- Viral (puppies)—canine adenovirus type 1; canine distemper virus; canine herpesvirus; canine parvovirus type 1
- Viral (kittens)—feline calicivirus; feline leukemia virus (FeLV); feline immunodeficiency virus (FIV); feline herpesvirus type 1, feline panleukopenia virus
- Bacterial—exposure to infectious bacteria mainly across the placenta, in the birth canal, via the umbilicus, gastrointestinal tract, respiratory tract, urinary tract, or skin wounds
- Generalized bacterial infection of the newborn (known as “neonatal sepsis”)—primarily from E. coli, β-hemolytic streptococcus, coagulase-positive staphylococcus, and gram-negative enteric organisms
- Respiratory—Bordetella bronchiseptica, Pasteurella multocida
- Gastrointestinal tract—E. coli; Salmonella; Campylobacter
- Brucella canis—puppies
- Parasitic infection—heavy infection with intestinal worms (such as Toxocara canis, Toxocara cati, Toxascaris leonina, Ancylostoma caninum, or Ancylostoma tubaeforme); coccidian parasites (such as Toxoplasma, Neospora, Isospora, Cryptosporidium, or Giardia)

**RISK FACTORS**
- Subnormal birth weight or failure to grow normally—kittens: minimum daily gain of 7 to 10 grams; puppies: should double in weight by 10 to 12 days; both: 5% to 10% gain per day generally acceptable
- Difficult birth (known as “dystocia”) or prolonged labor
- Inbreeding—higher incidence of having identical recessive genes in the genetic make-up of an individual (homozygous recessive genotype)
- Sire with blood type A and queen (mother cat) with blood type B (cats)

**TREATMENT**

**HEALTH CARE**
- Correct any underlying deficiencies in husbandry or breeding selection
- Warmth—slowly warm newborn (neonate) to 36° to 36.7° C (97° to 98° F) over several hours, if necessary; provide ambient temperature of 29° to 35° C (85° to 95° F) and relative humidity of 55% to 65%
- Oxygen—supplement at 30% to 40%, if necessary
- Intravenous fluids—consider administration of warmed dextrose in water (D5W) solution if newborn has low blood-glucose levels (hypoglycemia); administer warm lactated Ringer’s solution or half-strength lactated Ringer’s and D2.5W (may be administered into a vein [intravenously], into a bone/bone marrow [intraosseously], or under the skin [subcutaneously])
- Do not attempt to feed if body temperature less than 35° C (95° F) and newborn has no sucking reflex; once warmed, encourage nursing
- Breakdown of red-blood cells (neonatal isoerythrolysis) due to the presence of antibodies from the mother cat in the milk—do not allow nursing for first 24 hours after birth

**MEDICATIONS**
Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.
- Antibiotics—commonly used are penicillins (penicillin G, ampicillin, amoxicillin, amoxicillin with clavulanic acid) and first-generation cephalosporins
- Supplement—milk-replacer formula
- Vitamin K1

**FOLLOW-UP CARE**

**PATIENT MONITORING**
- Hydration status—check daily; dryness of mouth and yellow golden urine indicate dehydration
- Body weight—monitor daily or every other day in growing newborns (neonates)
- Dam—check that nursing and care are adequate; supplement nursing with milk-replacer formula, if necessary

**PREVENTIONS AND AVOIDANCE**
- Breakdown of red-blood cells (neonatal isoerythrolysis) due to the presence of antibodies from the queen (mother cat) in the milk—do not allow nursing for first 24 hours after birth
KEY POINTS

- Death occurring from birth to 2 weeks of age
- Purebred or pedigree puppies and kittens—more prone to congenital (and hereditary) defects; congenital defects are conditions present at birth, they may or may not be inherited
- Body weight—monitor daily or every other day in growing newborns (neonates)
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