

# Technical Assistance of the Neonate in the Immediate Post Partum Period



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# Neonatal Survival Is Variable

- General stillbirth rate  
5-33%
- C-section delivery  
stillbirth rate  
6-11%
- Overall neonatal death  
rate (1<sup>st</sup> 14 days)  
9-26%



# Neonatal Survival



## Contributory Factors:

- Dam condition prepartum
- Dystocia
- Neonatal resuscitation
- Low birth weight
- Congenital malformation
- Genetic defects
- Injury
- Environmental exposure
- Malnutrition
- Parasitism
- Infectious disease

# Neonatal Survival

## Veterinary Intervention

**What:** optimizes husbandry, labor management & periparturient care

**Result:** decreased puppy/kitten and bitch/queen morbidity and mortality

**Assistance dog survival rate**  
9% → 2%



# Neonatal Survival

## Optimal Husbandry

- Genetic screening
- Optimal stud selection
- Bitch health evaluation
- Ovulation timing, breeding management, pregnancy evaluation
- Prevent injury/control exercise
- Control parasitism
- Reduce infectious disease
- Gold standard nutrition
- Best environment for dam & litter



# Neonatal Survival

## Infectious Agents 3 week rule

- Herpesvirus
- Minute (parvovirus type-1) virus
- Canine parvovirus type 2 (cpv-2)
- Canine distemper virus
- *Campylobacter* spp.
- *Escherichia coli*
- Beta hemolytic streptococci
- Mycoplasma
- Ureaplasma
- *Toxoplasma gondii*
- *Neospora caninum*
- Felv, FIV, FIP



# Neonatal Survival

## Prenatal Nutrition

- Prepared diets are balanced
- Avoid supplements/additions
- Count calories
- Diet formulated for pregnancy and lactation
- “Complete for all life stages”
- AAFCO tested/ adequate
- Protein 27-34% animal based
- > 18% fat (balance n-6 & n-3 fa)
- 20-30% cho
- Switch at 30 days when pregnancy diagnosed
- Or
- Switch at breeding

Kelley RL. Canine reproduction: factors influencing litter size. Proc of the 2002 SFT annual conference, Colorado springs, CO, aug 2002.



# Neonatal Survival





# Neonatal Survival

## Optimal Labor Management

- **Client education:** normal labor & delivery, how to recognize dystocia
- Uterine & fetal monitoring

(Veterinary Perinatal Services *WhelpWise*)



# Neonatal Survival

## Optimal Periparturient Care

### *Neonatal Resuscitation*

#### *Team Approach*

- One person one neonate
- Not the surgeon, not the anesthetist
- Agreed protocol
- Breeder/owner participation



# Neonatal Resuscitation-why?

**Cardiovascular &  
respiratory  
depression in the  
neonate!**

**From....**

**Dystocia  
C section**





# Neonatal Resuscitation

## Drugs

- Dilute epinephrine
- Dextrose
- Ceftiofur
- Vitamin K1



# Neonatal Survival

## Optimal Periparturient Care

### *Neonatal Resuscitation ABCs*

**AIRWAY**  
**BREATHING**  
**CARDIOVASCULAR**



# Neonatal Resuscitation

**A = Airway**

**Clear it!**

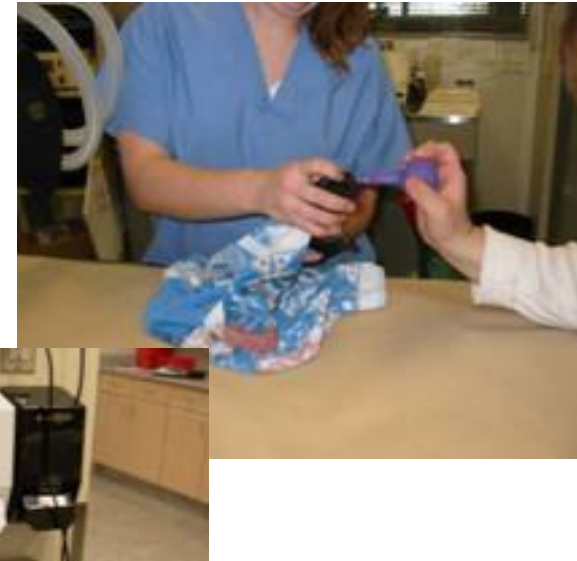


# Neonatal Resuscitation

## “A” Airway Clear?

## “B” Breathing?

- Clear airway by suction
- Do not swing!
- Dry & stimulate by brisk rubbing
- Lung expansion essential for release of surfactant





# B?? Not Breathing?

*Ventilate By Positive Pressure*

**fio2 < 40-60%**

**PPV OR PEEP**



# Neonatal Resuscitation

**B?? Not Breathing?  
Stimulate it!**

**Jen chung**

**25 g needle**

**Nasal philtrum**



# Neonatal Resuscitation

**C= Circulation  
(HR, BP)**

*MM Color?*

**Get the heart rate going!**

*Massage the thorax  
Improve ventilation*



# Neonatal Resuscitation

## *Is It Effective?*

- **Vocalization?**
- **mm color improving?**
- **Movement?**



# Neonatal Resuscitation

*Problematic case?*

**C also = COLD**

*Hypothermic?*

**Chilled neonates fail to establish adequate respiratory and heart rates**

**Use warm water bath!**



# Neonatal Resuscitation

*Problematic case?*

C also = Carbohydrates

*(Hypoglycemia )*

**Rx Dextrose**

**5-10% Dextrose**

0.5-1.0 g/kg IV or IO (access?)

2-4 ml/kg IV or IO

**2.5-5% Dextrose in LRS**

1 ml/30g SC (abscess?)

**50%Dextrose**

To mm only (aspiration?)

5-10% dextrose gavage (aspiration, trauma, ileus?)

**Keep working!** ....When to give formula?



# Neonatal Resuscitation

*Problematic case*

**No HR?**

*Rxs if ABCs fail*

- Epinephrine 0.2mg/kg  
IC (dilute)
- No atropine
- No doxapram



# Neonatal Resuscitation

## *Problematic case*

### *Lacking surfactant?*

*No studies support use of glucocorticoids to stimulate prenatal lung maturation.*

*62 days gestation (from LH surge) is the earliest time surfactant has been demonstrated to be present in all fetuses (Kutzler & Volkmann)*





# Neonatal Resuscitation

*Problematic case*

When to stop?

- 20 minutes
- Obvious congenital defect



# Neonatal Resuscitation

## POST RESUSCITATION CARE



### Environmental contamination

- Not early priority
- Clamp with mosquito forceps
- Trim .5-1.0 cm with clean scissors
- Dunk with tincture of iodine

WHY??



# Neonatal Survival

## *Sepsis*

### *Etiopathogenesis*

- Omphalitis
- Peritonitis
- Pneumonia

More later....



# Neonatal Resuscitation

## Post Resuscitation Care

Warm safe environment



# Neonatal Resuscitation

## Post Resuscitation Care

**Adequate active transfer of immunity**

- **Colostrum (conspecific)**
- **Immune serum (>100ml/kg?)**



# Neonatal Resuscitation



## POST RESUSCITATION CARE



## Nutrition

- Mom is best



# Neonatal Resuscitation

## Post Resuscitation Care

### Nutrition

- Supplement prn  
If inadequate weight gain  
If orphaned  
When warm
- Weigh neonates 1-2 times daily
- 10+% gain daily
- Tube or bottle?
- Which formula?
- How much?

Kittens 20 kcals me/100 g bw/day

Puppies 133 kcals me/kg/day during the first week of life



# Post Resuscitation Care

## *Milk Replacers*



**Esbilac: Pet-Ag Inc**  
**Puppy Milk Replacer**  
**Formula: Eukanuba**  
**Veta-Lac Powder for**  
**Puppies: Vet-A-Mix**  
**KMR**





# Neonatal Nutrition

	Cal/ml	Protein	Fat	CHO
Bitch's Milk	1.3	24	64	10
ESBILAC	1.0	24	66	10
Vet Solution	0.8	19	45	36



China Photo via Reuters

# Neonatal Resuscitation

## Post Resuscitation Care

### Physical Exam Husbandry

- Stimulate urination/defecation
- Avoid chilling or overheating
- Prevent littermate suckling
- Socialization
- Deworming at 2,4 & 6 weeks
- Vaccination



# Neonatal Sepsis

## *Predisposing factors*

- Endometritis
- Dystocia
- Formula feeding
- Ampicillin
- Low birth weight
- Stress
- Chilling
- Prolonged delivery



# Neonatal Sepsis

## *DX*

- Poor wt gain
- Failure to nurse
- Hematuria
- Diarrhea
- Vocalization
- Abdominal pain
- Sloughing extremities
- Abdominal distension



# Neonatal Sepsis:

*Rx*

- Fluids
- Warmth
- Nutrition
- Ceftiofur sodium

2.5 mg/kg SC q 12h X 5d

**Poor prognosis**



# Neonatology: Questions?



# Neonatal Resuscitation Thank You!

