

# Extrapulmonary Respiratory Problems

## During the First Week of Life

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# Neonatal Respiratory Problems

- Upper airway obstruction
  - Pharyngeal collapse
- Dysphagia
  - Aspiration pneumonia

## Central Respiratory Control

- Tachypnea
- Tachypnea syndromes



# Terminal C-section

- History
  - Mare
    - Metastatic melanomas
    - Admitted as a high risk pregnancy
    - Progressive abdominal distention
  - Hemoperitoneum
  - Terminal c-section during an acute bleed



# Terminal C-section

- Foal's major problems
  - Neonatal Encephalopathy – somnolent, hypotonia, seizures
    - Cluster breathing with periodic respiratory pauses
  - Neonatal Gastroenteropathy
    - Dysmotility for 6 days
  - Neonatal Nephropathy
    - Oliguria
    - High FxNa
    - Fluid retention
    - Hyponatremia
    - Low creatinine clearance
  - Other: Sepsis, coagulopathy, hyperglycemia, candidiasis

# Pharyngeal Collapse Hypotonia

- Soon after birth
  - Upper airway flutter
- At 24 hr.
  - Exaggerated respiratory effort
    - Quite lungs
  - Paradoxical respiration
  - Phenobarbital therapy
    - Increase obstruction
- Pharyngeal Collapse
  - Primary
  - Secondary

# Hypoventilation

Time	2:16a
pH	7.174
Pco2	74.4
Po2	75.8
SAT	96.2
INO2	7 lpm







# Hypoventilation

Time	2:16a	3:27a
pH	7.174	7.266
Pco2	74.4	59.0
Po2	75.8	84.4
SAT	96.2	100
INO2	7 lpm	10 lpm



# Upper Airway Abnormalities

## Transient Pharyngeal Paresis

- Hypotonic pharyngeal collapse
  - Primary
    - Peripheral neuropathy?
      - Neonatal Encephalopathy?
  - Secondary
    - Weakness/fatigue



# Primary Pharyngeal Paresis

## ○ Syndrome

- Appear normal initially
- Stressed
  - Respiratory rate and effort increase
  - Negative pressure in the pharynx
  - Pharyngeal collapse
  - Self perpetuating obstruction
- Respiratory failure followed by cardiovascular failure
- Dysphagia may be present

# Secondary Pharyngeal Paresis

- Generalized weakness
  - Critically ill
    - Generalized hypotonia
    - Fatigue
    - Recumbent
- Phenobarbital can induce
  - Cause of hypoventilation in phenobarbital treated cases
- HYPP (Hyperkalemic Periodic Paralysis)



# Endotracheal Tube Stent

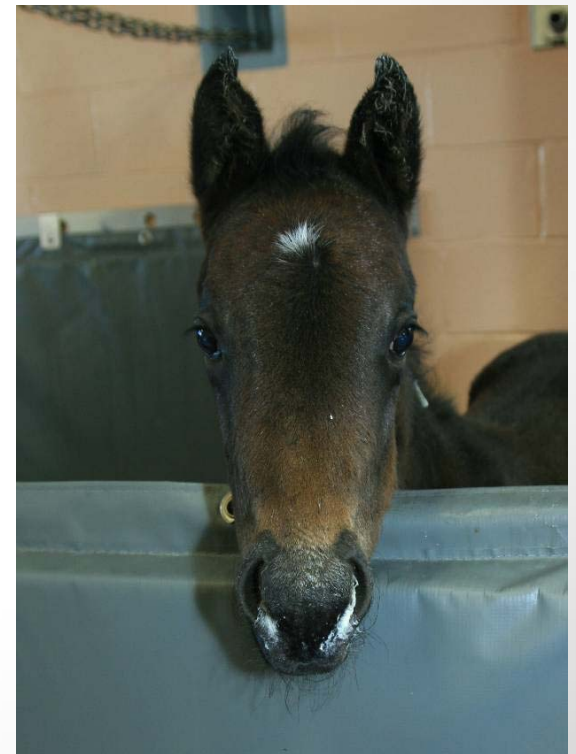


# Endotracheal Tube Stent



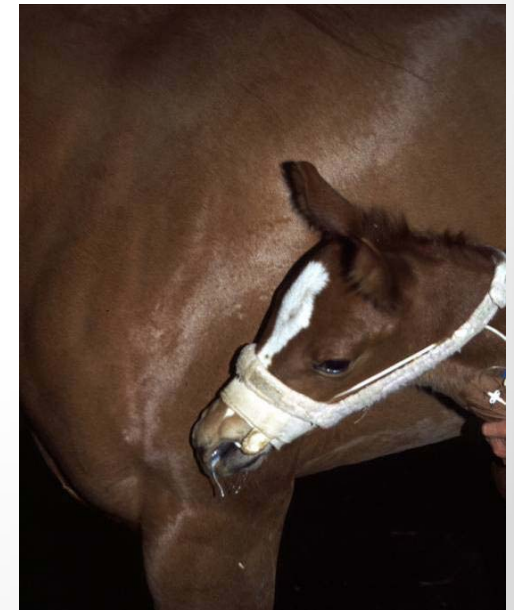
# Dysphagia

- Milk regurgitation from the nares
  - Cleft palate
    - Very rare cause of milk at nares
  - Pharyngeal dysfunction
  - Esophageal dysmotility



# Dysphagia No Aspiration

- Esophageal dysmotility
  - Failure to clear the cervical esophagus
  - Appear to nurse normally and effectively
  - Lower their head
    - Sneeze or shake head
    - Milk flow from one or both nostrils
    - Few drops to 60 ml
  - Delay of up to 5 minutes





# Dysphagia No Aspiration

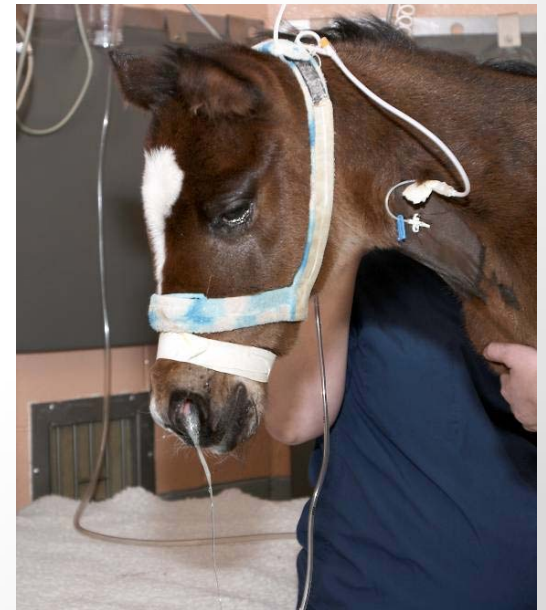
- Esophageal dysmotility
  - Transient problem
    - Once to several days
  - Etiology?
    - Neonatal Encephalopathy
    - Esophageal dysmotility
  - Aspiration rare
    - Swallowing normal
    - Guard airway
  - Aerophagia
  - Most common reason
    - For milk coming from the nostril



# Dysphagia

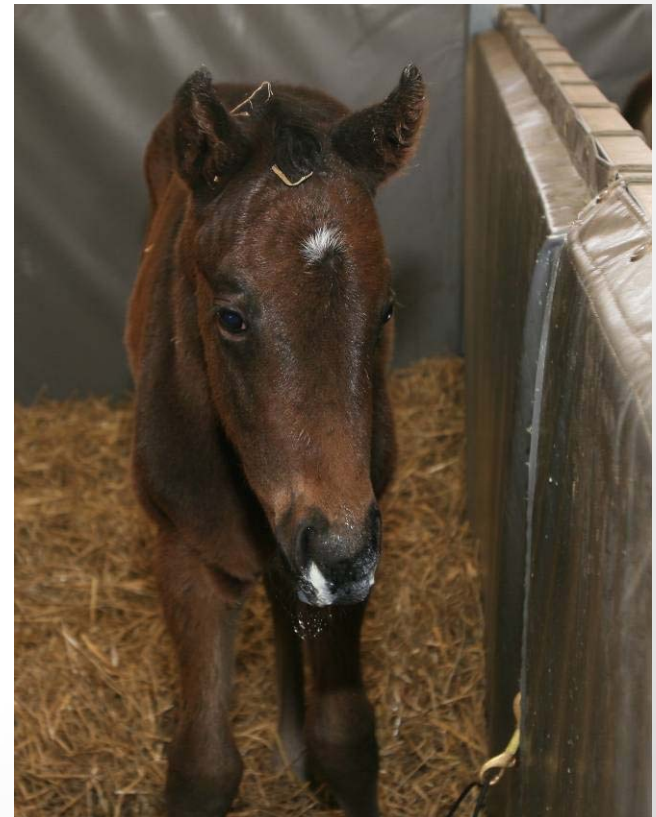
## Aspiration Pneumonia

- Dysphagia secondary to pharyngeal paresis
  - Degree of dysfunction variable
    - Upper airway obstruction
      - Pharyngeal collapse
      - With or without dysphagia
    - Mild dysphagia – milk out nose
    - Severe dysphagia – milk aspirated
    - Most severe - aspirate saliva
  - Duration variable days to months
  - Therapy – feeding management
- Congenital esophageal stricture
  - Secondary megaesophagus
  - More danger of aspiration



# Dysphagia Aspiration Pneumonia

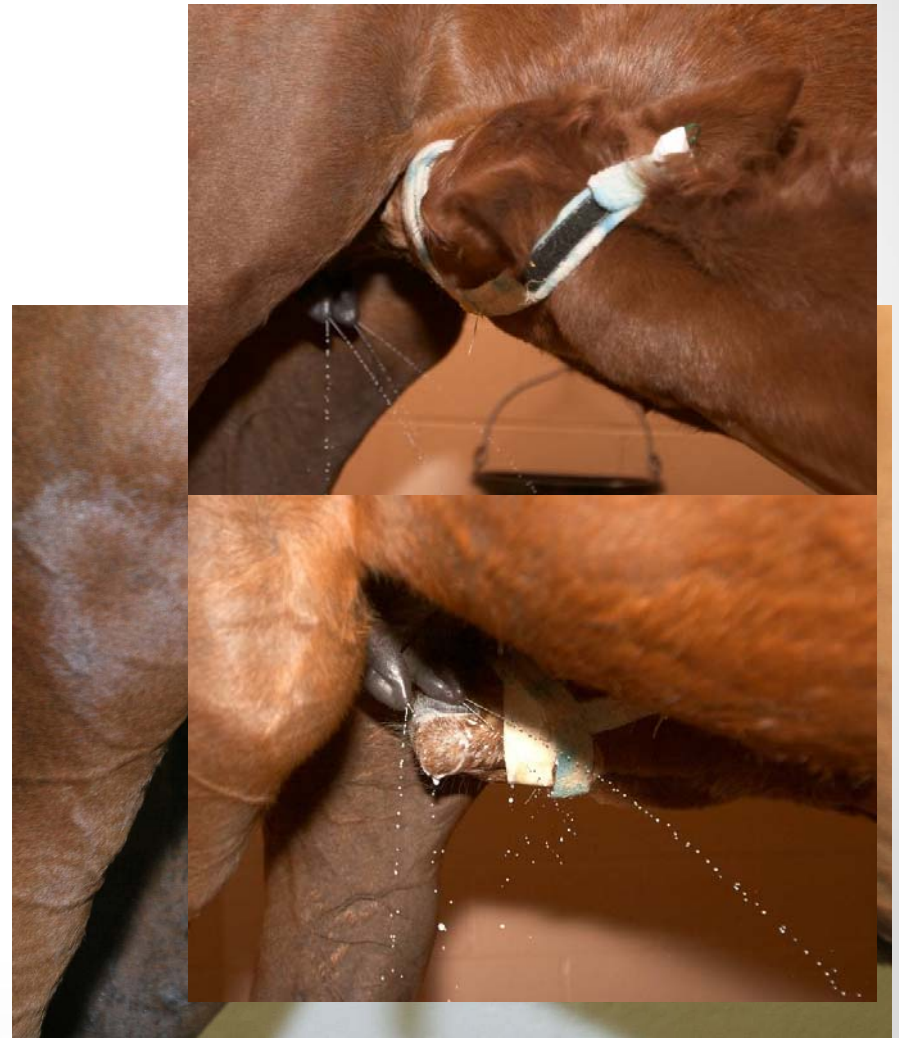
- Other reasons - older foal
  - Botulism
  - Choke
  - Primary oral candidiasis
  - Strangles



# Aspiration Pneumonia

## Normal Pharyngeal Function

- Weak foals
  - Neonatal Encephalopathy
    - Poorly coordinated swallowing
  - Prematurity
  - Fatigue
  - Heavily producing mares
- Musculoskeletal problems
  - Contracture
  - Laxity
- Fractured ribs
- Tachypnea
- Bottle feeding
  - Weak foals
  - Inexperienced caregivers
- 



# Upper Airway Abnormalities

## Upper Airway Obstruction

- Bilateral or unilateral choanal atresia
- Choanal hypoplasia
- Epiglottic cysts/malformations
- Wry nose/ facial deformities
- Guttural pouch
  - Tympany
  - Empyema
- Palate malformations
- 



# Central Respiratory Control

## Neonatal Encephalopathy

- Changes in respiratory patterns
  - Apneustic breathing
  - “Periodic breathing”
    - Cluster breathing
      - With periodic respiratory pauses
      - With apnea
    - Apnea (> 20 seconds)
      - Periods of up to 3-4 minutes
  - Ataxic breathing



# Central Respiratory Control

## Neonatal Encephalopathy

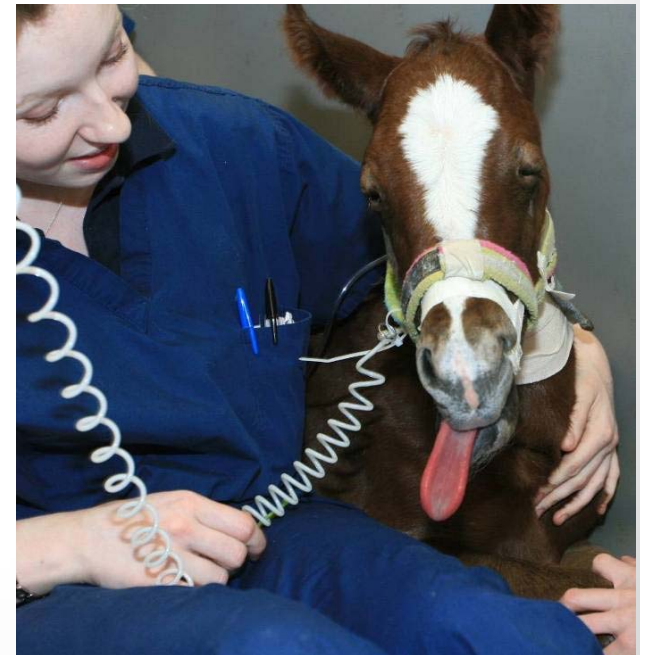
- Changes in ventilation
  - Hypoventilation
    - Respiratory acidosis
      - Central - inappropriate hypercapnia
      - Mechanical - upper airway obstruction
      - Weakness
    - Appropriate hypercapnia
      - Balancing a metabolic alkalosis
      - Normal/alkalotic pH



# Central Respiratory Control

## Neonatal Encephalopathy

- Changes in ventilation
  - Hyperventilation
    - Respiratory alkalosis
      - Abnormal central control
      - Diagnosis by exclusion
        - Hyperthermia
        - Pain, excitement
    - Appropriate hypocapnia
      - Balancing a metabolic acidosis
        - Normal /acidotic pH
      - Hypoxia
    - May not be tachypneic





# Reasons for Tachypnea

- Pulmonary disease
- Diaphragmatic hernia
- Pain
  - Contracture
  - Fractured ribs
- Distress/fear
- Hyperthermia for any reason
- Tachycardia for any reason
- Tachypnea Syndromes

# Tachypnea Syndromes

- Central hyperthermia/tachypnea
  - Temperatures as high as 42 C
  - Loss of diurnal variability
- Transient Tachypnea
  - Transient Tachypnea of the Neonate (TTN)
  - Begin Neonatal Tachypnea
- Central Hyperventilation
  - Usually have normal respiratory rates/ TV

# Case:

# Central Hyperventilation

- 48 hr old STD Filly
- Neonatal Encephalopathy (NE)
- History
  - Premature placental separation
  - Neonatal encephalopathy
  - 48 hr stood on own 1<sup>st</sup> time
- Problems
  - NE, Septic shock, anemic, etc.
  - Salmonella shedder
- 8 day hospital stay
- 



Adm

pH 7.449

Pco<sub>2</sub> 26.1

Po<sub>2</sub> 58.4

SAT 91.7

Cont 10.8

HCO<sub>3</sub> 18.3

BE -4.2

FIO<sub>2</sub> RA

Lac

	Adm	1 hr
pH	7.449	7.433
Pco <sub>2</sub>	26.1	28.8
Po <sub>2</sub>	58.4	135.6
SAT	91.7	99.4
Cont	10.8	9.4
HCO <sub>3</sub>	18.3	19.4
BE	-4.2	-3.7
FIO <sub>2</sub>	RA	5 lpm
Lac		5.7

	Adm	1 hr	4 hr	24 hr	60 hr
pH	7.449	7.433	7.471	7.452	7.474
Pco <sub>2</sub>	26.1	28.8	32.5	28.3	33.9
Po <sub>2</sub>	58.4	135.6	136.3	127.7	68.8
SAT	91.7	99.4	99.6	99.4	94.9
Cont	10.8	9.4	10.1	10.1	9.2
HCO <sub>3</sub>	18.3	19.4	23.9	20	25.1
BE	-4.2	-3.7	1	-2.9	2.1
FIO <sub>2</sub>	RA	5 lpm	5 lpm	3 lpm	RA
Lac		5.7	6.2	6.5	3.7

