Case File: Lethal White?

Signalment and History
- American Paint Horse foal (1-day-old) was born from an undetected & unexpected pregnancy; the only candidate sire was a son of the mare
- Foaling occurred between 5:00 pm and 8:00 pm on Day 0, and was unobserved
- Foal exhibited signs of neonatal asphyxia, including difficulty finding the teat and inconsistent milk intake
- Meconium had not passed; rDVM administered enemas; placenta had passed with delay — aspect: dark brown and extremely heavy, suggestive for placental pathology
- The foal stopped suckling the next morning and was referred to CSU later that afternoon

Physical Exam
- Severely obtunded and dehydrated
- T=102.4˚, P=86, R=60; (mildly) icteric mucous membranes, 3+ CRT
- Lung auscultation: costo-abdominal breathing, no crackles/wheeze
- GI: absent-to-no GI sounds; straining to defecate; passed dark, foul-smelling diarrhea; no abdominal distention

Findings
- Neutropenia = 2.2 (2.9 – 10.2 x10^3/ul)
- Lymphopenia = 0.5 (0.6 – 5.0 x10^3/ul)
- PCV = 51% TP = 6.1 g/dl
- Glucose = 71
• IgG: >800 mg/dl
• Creatinine 7.0 (0.4 – 3.6 MG/DL)
• Globulin 1.8 (2.5 – 4.5 GM/DL)
• Bilirubin 5.9 (0.5 – 4.4 MG/DL)
• SDH 12 (0.6 – 3.8 IU/L)
• Abdominal ultrasound revealed
  o Small intestine: decreased motility, moderately dilated loops
  o Large intestine: no motility; “balls” of meconium

**Summary of Problems**

- Obtunded
- Hypovolemia
- Tenesmus
- Leukopenia
- Azotemia
- Icterus
- Dilated loops of small intestine with decreased motility
- No large intestinal motility and evidence of meconium retention

**Differential Diagnoses**

- Neonatal Asphyxia Syndrome (NAS) causing significant meconium impaction/retention
- Clostridial diarrhea
- Sepsis
- Overo Lethal White Syndrome (OLWS) with agangliosis
Discussion Points

Definitions:
Overo Lethal White-syndrome is a congenital, genetic anomaly that shows with a lack of myenteric plexi (between the longitudinal and circular intestinal musculature) in the gastro-intestinal tract starting at the ileum and continuing caudally.

Neonatal asphyxia (NA) is a congenital problem in new-born foals which is caused by a period of hypoxemia leading to an undersupply of vital tissues: CNS, but also lung- and GI-parenchyma. NA is either caused by a placental insufficiency or by a dystokia. NA comes in a wide range of clinical presentations and severities.

Isn't it just a Lethal White? Or could it be Neonatal Asphyxia?

<table>
<thead>
<tr>
<th>OLWS</th>
<th>Neonatal Asphyxia (NA)</th>
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<tbody>
<tr>
<td>White foal out of a frame overo mare</td>
<td>Suspected because of foal’s presentation, significant azotemia and appearance of placenta</td>
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<tr>
<td>Meconium stasis</td>
<td>Signs of encephalopathy</td>
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<td></td>
<td>NA is commonly associated with decreased GI motility (and meconium stasis)</td>
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Common Lethal White Myths – None of the following statements is actually true!
- Myth #1: All overo horses are carriers of lethal allele
- Myth #2: Registered Tobianos, solid-colored horses, or Paint crosses cannot carry the lethal allele
- Myth #3: All totally white foals born to two overo parents are lethal whites
- Myth #4: Lethal white foals are always totally white in color

Overo Lethal White Syndrome
- The lack of myenteric innervation results in a complete absence of normal propulsive intestinal movement (peristalsis).
- In addition, the colon development is impaired and foals may be born with narrowed or absent portions of the small colon.
- The intestines proximal to the stenotic segment are usually distended with gas and meconium.

Treatment Plan and Results
- As the clinical picture could have been caused by neonatal asphyxia and the fact that at presentation signs of colic were not apparent, the treatment plan for this foal included stabilization, parenteral nutritional and fluid support
- After 3 hours of support, colic signs became apparent
  - Were colic signs due to meconium retention or because of OLWS-agangliosis?
While surgical intervention became necessary; however, because of a dubious prognosis and cost-intensive aftercare (even in the best-case scenario—asphyxia and meconium retention) in a suspicious case of OLW, the owner opted for euthanasia.

Necropsy
  - **Gross findings:** Caecum and large intestine were completely filled with meconium, ingesta-filled stomach and small intestine, unable to pass into the caecum.
  - **Histopathology:** Foal had complete agangliosis of the large intestines (see below—compatible with Overo Lethal White Syndrome). Note: agangliosis starts in the ileum and extends through the entire large intestinal tract; duodenum and jejunum usually have a normal myenteric plexi—frequency.

Genetic Testing Is Available
  - Veterinary Genetics Lab at UC Davis: Hair Sample
  - Result = O/O
  - Interpretation: Only the altered sequence in the EDNRB gene detected. This result has only been obtained with samples from lethal white overo foals.

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VTH Equine News

Call for Clinical Study Participants

EEG Equipment Validation
For validation purposes of our newly purchased EEG equipment, we are looking to enroll horses with a presumed diagnosis of Seizures/Epilepsy in a study that includes a routine work-up with a neurological examination, a CT-exam of the head, CSF analysis, and routine blood work. Prior to the CT exam, but while under general anesthesia, EEG-data will be collected (free of charge). A $700 refund will be deducted from the total hospital invoice for each patient enrolled in this study.

For more information, please call or email:
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Bladder Stone Removal
We are looking for geldings with bladder stones in order to develop a novel technique for stone removal via perineal urethrostomy. The technique is safe and significantly less expensive than traditional approaches for removal under general anesthesia. The cost for removal will range from $1,200–1,500. Any size stone will qualify. For more information, please contact:

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