1. **Examine the umbilical cord and placenta for any abnormalities.** This is best accomplished by arranging the placenta in an "F" or "Y" shape with the horns of the placenta forming the arms and the body forming the base (see Figure 1). First examine the allantoic surface and then turn the placenta inside out to examine the chorionic surface.

   a. **Weigh the placenta**
      i. Normal is 11% of foal weight

   b. **Measure the umbilical cord length (fetal end to junction with chorioallantois)**
      i. > 85 cm is associated with placental insufficiency

   c. **Count the number of twists in the umbilical cord (normal ~4)**
      i. Note any edema, hemorrhage or urachal dilation

   d. **Indicate the attachment of the cord to the chorioallantois on the diagram below**

   e. **Note any gross lesions on the diagram below**

   f. **Collect multiple sections of placenta for ancillary testing. Critical in the diagnosis of some mycotic and bacterial infections!**
      i. **Histopathology** (10% neutral buffered formalin; 10:1 formalin to tissue ratio)
         - Both horns, 2 sites of body, cervical star, umbilical cord, amnion
         - See Figure 1
      ii. **Bacteriology/mycology via culture or PCR** (fresh)
         - Specifically cervical star as most infections are ascending in mares
      iii. **Virology and molecular techniques (PCR)** (fresh-frozen)

2. External examination of the fetus for any outward congenital malformations, meconium staining, or skin lesions

3. Estimate/verify the gestational age_____
   a. Weigh the fetus_____
   b. Measure the crown to rump length_____
   c. Note fetal characteristics____________________________________
   d. Refer to the chart on aging

4. Determine the state of preservation
   a. Fresh____, autolyzed____, mummified____, macerated____

5. Classify the fetal death
   a. Abortion____, stillbirth____, non-viable neonate (lungs partially inflated)____

6. Perform a routine necropsy and note any gross abnormalities
   a. Check the shoulder joints as hemarthrosis is an indication of dystocia

7. Collect the following tissues for ancillary testing. Remember to maximize sampling initially. Samples can always be discarded later!
   a. Histopathology and immunohistochemistry (10% neutral buffered formalin; 10:1 formalin to tissue ratio)
      i. Eyelid, tongue, thyroid, thymus, lung, heart (t-section), diaphragm, liver, kidney, adrenal gland, spleen, ileum, colon, mesenteric lymph node, skeletal muscle, half of brain, multiple sections of placenta, any lesions
      ii. IHC is available for many infectious agents
   b. Bacteriology/mycology via culture or PCR (fresh)
      i. 5 ml stomach content, lung, liver, placenta (cervical star)
      ii. Collect stomach content in a syringe with a large gauge needle
      iii. Package each specimen separately in sterile containers
   c. Virology and molecular techniques (PCR) (fresh-frozen)
      i. Lung, liver, kidney, spleen, placenta, half of brain
      ii. Package each sample separately in sterile containers
   d. Nutrition/Toxicology (fresh-frozen)
      i. Liver (2-5 grams of tissue required)
   e. Serology (refrigerated or frozen)
      i. Fetal fluids- heart blood, thoracic fluid, abdominal fluid
      ii. Collect in sterile red top tubes
## Gestational Age Estimates for Equine Fetuses

<table>
<thead>
<tr>
<th>Days Gestation</th>
<th>Fetal Weight</th>
<th>Fetal Length (cm)</th>
<th>Fetal and Placental Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>0.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>0.6-0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>0.2 gm</td>
<td>0.9-1.0</td>
<td>Eye, mouth, and limb buds visible, chorionic vesicle present only in uterine horn</td>
</tr>
<tr>
<td>35</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>1.8-2.2</td>
<td></td>
<td>Eyelids and pinnae have appeared</td>
</tr>
<tr>
<td>45</td>
<td>2.0-3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>3.0-3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>10-20 gm</td>
<td>4.0-7.5</td>
<td>Lips, nostrils, and beginning development of feet observed; eyelid partially closed. Placenta not attached but entering the body of the uterus</td>
</tr>
<tr>
<td>90</td>
<td>100-180gm</td>
<td>10-14</td>
<td>Villi of placenta present but without firm attachment, mammary nipples and hooves visible, body and horn of uterus both involved and enlarged</td>
</tr>
<tr>
<td>120</td>
<td>700-1000gm</td>
<td>15-20</td>
<td>External genitalia formed but scrotum empty, placenta attached, ergots and orbital areas prominent</td>
</tr>
<tr>
<td>150</td>
<td>1500-3000gm</td>
<td>25-37</td>
<td>May or may not have fine hair on orbital arch and tip of tail, prepuce not yet developed</td>
</tr>
<tr>
<td>180</td>
<td>3-5 kg</td>
<td>35-60</td>
<td>Hair on lips, orbital arch, nose, eyelashes, and fine hair on mane</td>
</tr>
<tr>
<td>210</td>
<td>7-10 kg</td>
<td>55-70</td>
<td>Hair on lips, nose, eyebrow, eyelids, edge of ear, tip of tail, back, and mane</td>
</tr>
<tr>
<td>240</td>
<td>12-18 kg</td>
<td>60-80</td>
<td>Hair on mane and tail, back and distal extremities</td>
</tr>
<tr>
<td>270</td>
<td>20-27 kg</td>
<td>80-90</td>
<td>Short, fine hair over entire body</td>
</tr>
<tr>
<td>300</td>
<td>25-40 kg</td>
<td>70-130</td>
<td>Body completely covered in short hair, prepuce developed, hair on mane and tail increased</td>
</tr>
<tr>
<td>330</td>
<td>30-50 kg</td>
<td>100-150</td>
<td>Complete hair coat with final color, testes descended</td>
</tr>
</tbody>
</table>

Figure 1. Normal equine fetal membranes. Black lines indicate the 7 sites to sample for histopathology.