Medical Management of the Colicky Foal

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Take Home Message

Following on the information presented in the initial evaluation and the ultrasound examination of the foal, we will create an outline approach to medical interventions for the colicky foal including: pain control, fluid therapy, intestinal motility management, and nutritional support.

Introduction

Perhaps the most important issue in approaching the foal with colic is to determine the specific cause and whether the problem is or has the potential to require surgical treatment for correction. Ultrasound imaging has changed the playing field in evaluation of abdominal pain in the foal over the past two decades. Today, we are able to accurately identify alterations in content and structure of abdominal organs of the foal rapidly and easily using ultrasound, and monitor the condition over time. Abdominal radiography is occasionally useful in evaluating the contents of the foal’s abdominal cavity. Endoscopy also has its place in the evaluation of abdominal pain in the foal – from gastroscopy in the patient suspected of having gastric ulcer disease to rectal endoscopy for assessment of suspect atresia coli. Between the physical examination and diagnostic imaging, a more specific cause of the colic signs in the foal can often be identified. As with evaluation of abdominal pain in a patient of any age, the clinician’s goal is to determine whether the condition is a surgical problem or could potentially become one. This may require serial evaluations over time. The classic example is the foal with enteritis that later develops a small intestinal intussusception requiring surgical correction. Continued monitoring of the patient thus becomes an important component of the medical management of the foal with abdominal pain.

Pain Control for the Colicky Foal

The initial medical management of the colicky foal is often providing pain control.

Analgesic medications are often used as a first line approach to control abdominal pain associated with colic. Flunixin meglumine (1.1 mg/kg, IV, not more often than once daily for neonates) is commonly used as a first line medication to control mild to moderate abdominal pain in a foal. More severe pain may require medications such as alpha-2 agonists (xylazine, 0.2 to 1 mg/kg IV) to control pain and prevent secondary injury to the foal. Opiate drugs such as butorphanol (0.05 mg/kg, IV) may be used alone or in combination with an alpha-2 agonist to provide additional analgesia.

Pain associated with colonic gas distension (tympany) of the neonate with a meconium
impaction may respond to a prokinetic agent such as neostigmine (0.005-0.02 mg/kg SQ q 1 hr, usually up to 3 times). Similarly, a foal presenting with colonic fluid distension associated with the onset of rotavirus infection may respond either to neostigmine (for presumed colonic ileus) or to suppression of colon cramping with loperamide (0.1 – 0.2 mg/kg PO, q 6 hr).

Gastric distension from intestinal reflux associated with small intestinal obstruction (volvulus, duodenal stricture, intussusception) can be a cause of pain and passage of a nasogastric tube – before or after identification of the presence of a fluid-distended stomach on ultrasound – should be performed immediately in an attempt to provide pain relief for the affected foal.

**Meconium Impaction**

Meconium impaction represents a common and unique cause of colic for the neonatal foal. The clinical signs are commonly observed within the first 24 hours of age and are seen as repeated posturing to defect and protrusion of the anus. Diagnosis can be done with a digital rectal exam, but occasionally meconium impactions are more serious and may require abdominal ultrasound and/or abdominal radiography to determine the extent and severity of the impaction. Gross abdominal distension in foals showing these signs is an indication for ultrasonography to rule out other causes such as uroperitoneum (whether primary or secondary to straining with the meconium impaction), or other intestinal lesions.

Often, simple meconium impactions can be resolved with commercially available phosphate enema preparations (Fleet enemas). More proximal impactions may require soapy (Ivory liquid soap) water enemas (300-500 ml) administered using an enema bucket and a Harris flush tube. The tube is advanced carefully up the rectum using abundant lubricant jelly. Repeated enemas can cause the rectal mucosa to become edematous and friable. Oral administration of milk of magnesia (30ml per 50 kg, PO, up to QID) can be useful in hydrating proximal meconium impactions. In some cases where the meconium is quite firm, an acetylcysteine retention enema can be helpful in loosening the mucus material within the meconium impaction. Materials for an acetylcysteine retention enema include 150 ml water, 6 grams acetylcysteine powder, 20 grams sodium bicarbonate power (baking soda), and a cuffed 14-24 French foley catheter. The foley catheter is placed into the rectum (up to 6 inches) using sterile lubricant and the cuff is inflated with saline. The solution is infused into the rectum with gravity flow or using a 60 ml catheter tip syringe. A clamp is placed on the catheter to allow retention of the solution in the rectum for approximately 20-30 minutes, after which time the clamp and catheter can be removed. This timeframe should allow the solution to diffuse up the rectal lumen to aid in dissolution of the mucus within the meconium and thus aid in its breakdown and passage.

In foals that are quite painful and not nursing sufficiently, parenteral fluids may be necessary to prevent or correct dehydration and to aid in hydrating the meconium mass.

Pain control for meconium impactions is as described above, and may require repeated dosing and close observation by skilled personnel. Those patients with severe, unrelenting pain and abdominal distension are best handled at a hospital facility.

In the more severely affected foals, consideration should be given to broad-spectrum
antimicrobial therapy as colonic mucosal injury could allow for bacterial translocation and potential sepsis. Monitoring the CBC for presence of leukopenia or neutropenia is indicated.

In some neonates with severe meconium impaction, severe and repeated pain that is uncontrollable may be an indication for referral to a surgical facility.

**Fluid Therapy for the Colicky Foal**

Fluid and electrolyte therapy is often required for cardiovascular support of the colicky foal to correct deficits associated with loss of fluid into the intestinal tract and from inadequate intake. Usually, the best first choice is a balanced electrolyte crystalloid solution (Normosol, Plasmalyte). An initial loading bolus of 10-20 ml/kg may be given to correct dehydration or poor perfusion. Maintenance fluid requirements should then be considered as well as ongoing losses from gastric reflux or diarrhea fluid. For younger foals that are not nursing, the addition of 5 to 10% glucose to the fluids should be considered to provide for an initial energy source. Some caution is needed with glucose containing fluids in that, over time, they may result in hypernatremia from increased free water loss in the urine with varying degrees of hyperglycemia. Frequent monitoring of the blood glucose concentration is advised when maintaining the more critically ill neonatal foal on prolonged intravenous fluids, especially those fluids containing glucose. The duration of fluid therapy for the colicky foal will be determined by the type of lesion, and the progression of the medical condition. Some dehydrated foals with mild to moderate abdominal pain may likely respond to initial rehydration with no additional fluid requirements, whereas those with colic associated with enteritis or a surgical lesion may require more prolonged intravenous fluid therapy, especially if prolonged ileus is a component of the disease process.

Similar to adults, colloids are occasionally useful for certain conditions affecting the intestine of the foal. The neonate may require plasma for its immunoglobulin (IgG) content in an effort to correct failure of passive transfer of colostral antibodies, but plasma can also provide albumin for its colloid effects. Foals with profound enteritis with infections such as *Clostridium perfringens* or *Clostridium difficile* can lose significant amounts of plasma proteins across the intestinal mucosa and often require colloid replacement. The author prefers to use a combination of hetastarch (10 ml/kg as often as q 48 hours) along with plasma (20-40 ml/kg for a 50-kg foal) for foals with significant plasma protein losses (for example total protein concentration < 4.0 gm/dL). *Lawsonia intracellularis* infection can result in colic signs in older foals and weanlings, and similarly require colloid replacement therapy in order to reduce or prevent intestinal and peripheral edema and to provide albumin for its colloid and carrier molecule functions.

**Intestinal Motility Management**

There are occasions where prokinetic agents may be useful for the colicky foal. Improvement of gastric emptying and small intestinal motility may be helpful in improving the outcomes for foals affected with enteritis or gastroduodenal ulcer disease. The author likes to use bethanechol (0.025 mg/kg, SQ, q 6-8 hrs) to aid in gastric emptying for a variety of disorders affecting the proximal intestinal tract of the foal. Some cases of enteritis will have impaired gastric emptying that seems to respond well to bethanechol. Similarly, metoclopramide (0.1-0.2 mg/kg, IV, q 6-12 hr) can be
used either orally or parenterally in an effort to improve gastric emptying. The use of neostigmine as a prokinetic for the large intestine can aid in reducing colonic gas distension associated with meconium impaction in neonates or with fluid distension (colonic ileus) associated with the onset of rotavirus infection. In theory, the use of a prokinetic in the presence of a physical obstruction (example being duodenal stricture) would be contraindicated.

**Gastric Ulcer Prophylaxis**

Prevention of gastric ulcers is commonplace in foal medicine. Not all foals with colic will require gastric ulcer medications. There are certainly conditions that place the foal at a higher risk for the development of ulcers. The author prefers ranitidine (6.6 mg/kg, PO, TID) for an initial use medication when gastric ulcer disease is a concern. Omeprazole (4 mg/kg, PO, q 24 hr) can also be used. In some situations, the author will also use sucralfate (1 gram/50 kg, PO, q 6 hr), especially if gastroesophageal reflux is suspected.

**Nutritional Support for the Colicky Foal**

In some situations, nutritional management may need to be considered for the foal with colic. In some foals, simple restriction of suckling to short periods of time may be useful, especially when there is some component of delayed gastric emptying involved, such as the foal with enteritis, ileus, or duodenal stricture. Foals that have lost significant plasma proteins may benefit from a high-nitrogen supplement such as the enteral product (Osmolite HN, Well-Gel). These products may help maintain plasma protein concentrations and body weight in affected foals. Monitoring and adjustment of nutritional intake may be required as diarrhea can result from increased intestinal luminal osmotic load that result from the use of these high nitrogen products.