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Evaluation of the Equine Acute Abdomen Patient in the Field: Interpretation of Historical and Clinical Findings

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Author’s Note: Please see the appendix on page 56 that list drugs, doses indications, and author's opinion.

Take Home Message

A systematic approach to gaining and recording historical information combined with the clinical examination of the horse with an acute abdomen prior to diagnosis is necessary to optimize the outcome for the horse and client.

Introduction

The gathering and correct interpretation of client provided patient history allows the clinician to formulate an appropriate initial diagnostic plan in a timely fashion. Clinical examination findings are then interpreted in relation to the historical information. In one referral center study, there was a significant association between predicted survival and outcome based on clinical impression, and this improved with increased case exposure and clinician experience.1

History

Signalment

Age is a variable affecting outcome. In one study geriatric horses had similar admission cardiovascular statuses compared to mature horses based on heart rate, packed cell volume, plasma creatinine and blood lactate concentration, yet a more serious cause of colic was underlying.2 Aged and overconditioned horses appear to be at increased risk of strangulating lipoma. Younger horses suffer from ascarid impactions and increased rates of ileocecal intussusception. Breed has been shown to affect the occurrence of enteroliths, with Arabians and miniature breeds overrepresented in one study.3 Peripartum mares have increased incidence of colon volvulus. This reinforces the need to consider signalment of the colicking horse.

Occurrence and Potential Triggers

How often and over what time period has the colic been apparent? The duration of colic signs before presentation at referral centers has been associated with survival, with increased time before referral negatively associated with prognosis.4 Is there a pattern to the pain, or does it appear random? If female, is there any relationship to actual or perceived cyclic activity?

Management Changes

The colic episode may be related to management changes. Transport, administration of medications for concurrent conditions (antimicrobials leading to antimicrobial associated colitis,
anti-inflammatory leading to right dorsal colitis), and changes in social structure by the addition
or removal of other horses may be sufficient to precipitate colic. Feed or water changes or
changes in intake due to iatrogenic or climatic factors may precipitate increased fecal density
with secondary cecal and large colon impaction. Feeding practices also affect likelihood of colic,
with sand ingestion in some areas from feeding on the ground and hay type precipitating ileal
impaction e.g. Coastal Bermuda grass hay.

**Fecal Production**

A marked decrease in the volume or frequency of fecal production may indicate decreased
dietary intake (inappetence, inability to prehend food, competition), or prolonged intestinal
passage (motility disorders, obstructive processes, increased fecal density). Increased fecal
volume may indicate increased feed intake, and increased fecal water may result from increased
soluble carbohydrate e.g. freshly grown grass.

**Pain**

Severity and frequency of pain: is this an isolated or occasional problem, or are repeated
episodes of colic reported? The degree of pain has been found a useful variable for the
determination of survival in many prognostic models.\(^5,6\) Horses vary in their responses, so it is
useful to know if this episode is consistent with other colic episodes that may have occurred
previously, or is more or less severe. Response to analgesics: has the administration of analgesics
changed the severity of the condition? If so, what is the duration and completeness of response
to analgesics? Alpha-2 adrenergic agonists (xylazine and detomidine) have a rapid onset and
may provide visceral analgesia for prolonged periods.\(^7\) Flunixin meglumine has been shown to
provide less visceral analgesia, but may have a longer duration of action than the alpha-2
adrenergic agonists.\(^7\) A rapid resumption of colic signs suggests a more serious and perhaps
surgical lesion.

**Clinical Examination**

**Vital Signs**

Cardiovascular parameters are found to be significant predictors of mortality in multiple
studies.\(^8-10\) However, heart rate may be variably elevated due to individual tolerance to pain, and
heart rate alone cannot be relied upon to predict outcome.\(^8\) When elevated, hypovolemia must be
considered especially if signs of circulatory compromise are present. Also, the use of
medications may alter heart rate: Hyoscine-N-butylbromide (Buscopan, Boehringer Ingelheim)
leads to a profound transient increase in heart rate, this not being the result of progression of
gastrointestinal pathology, rather the release of vagal inhibition of heart rate. Normal heart rate
may be present in the face of significant gastrointestinal compromise.

Pulse quality can be assessed peripherally at the distal extremities or the facial artery along the
mandible. Poor pulse pressure is suggestive of shock, hypovolemic or distributive shock, or
cardiac compromise.\(^11\) A bounding pulse may indicate the early hyperdynamic phase of
endotoxemia.
Respiratory rate and effort: if elevated, this may indicate pain, acid-base disturbances, impediment to the diaphragmatic excursion due to visceral distension or pleural space disease.

*Mucous Membranes*

Color of mucous membranes has been anecdotally considered a reliable prognostic indicator, with some retrospective studies agreeing. However, this is not a uniform finding in all referral center studies. Pale mucous membranes are thought to indicate hypovolemia or hemorrhagic shock, bright red indicating a hyperdynamic state during the early stages of endotoxemia, with the presence of a toxic line (dark blue/purple gingival margin) suggestive of intestinal devitalization and bacterial translocation.

Capillary refill time has also been associated with likelihood of survival, a shorter time being a favorable indicator. Capillary refill time was not shown in one study to be a reliable discriminator between the requirement for medical or surgical management.

*Abdominal Size*

In one computer model derived from 219 colic horses, abdominal distension was the most discriminating deciding variable between medical and surgical management, followed by rectal findings and peritoneal fluid color. Along with the variables of rectal examination findings, abdominal fluid composition and intractable pain, abdominal distention was identified in one study most likely to differentiate between medical and surgical lesions.

*Abdominal Sounds (Borborygmi)*

Increased intestinal activity is seen with conditions that irritate the intestinal tract e.g. colitis, and outcome from these is usually good. Alternatively, decreased intestinal activity where gut sounds are reduced or nonexistent may indicate a more serious situation. Hypoperistalsis may be caused by sudden feed changes, carbohydrate overload, or infectious agents. When intestinal sounds are decreased, fecal production scant and signs of acute pain present a less favorable prognosis is expected.

*Oral Examination*

In one study, decreased dental examinations and treatment were associated with increased risk of colonic distention and impaction. Therefore, the presence of incompletely maintained teeth may prompt consideration of a medical rather than surgical lesion.

*Signs of Trauma*

Duration and severity of pain, perhaps unobserved by the owner, can be deduced from skin abrasions, concurrent musculoskeletal injuries and condition of housing.

*Nasogastric Intubation*
Character and amount of nasogastric reflux, and the response of the horse to passage of the fluid allowing gastric decompression yields valuable information. The presence of high volume net nasogastric reflux is not normal.

Amount, timing relative to the occurrence of colic, and character of reflux should be noted. A small intestinal problem is implied by the presence of significant amounts of fluid. The proximal small intestine when obstructed yields a high volume of reflux early following the time of colic onset. Duodenitis-proximal jejunitis (anterior enteritis) yields malodorous sometimes hemorrhagic fluid. Physical obstructions yield relatively fresh feed and intestinal fluids. Lower small intestinal lesions are much less likely to reflux until the later stages of the disease process. Colonic distension may result in reflux by causing duodenal compression.

Response to gastric decompression yields valuable information as to the character of the suspected lesion. A horse with a small intestinal functional ileus (anterior enteritis) will experience a relief of pain and a decrease in heart rate following decompression. Physical obstructive lesions are most likely to have little to no response to successful gastric decompression, with increasing amounts of small intestinal distention and reflux as the horse is hydrated.

Rectal Examination

During rectal examination, the presence or absence and consistency of feces can be assessed, and the placement and character of the viscera can be noted. In addition to the intestinal tract, the spleen, left kidney and uterus can be assessed. Intestinal distension and displacement most often allows a presumptive diagnosis of small or large intestinal involvement. Careful palpation of serosal surfaces often allows further characterization and assessment. A rough, gritty texture is consistent with visceral rupture and resulting peritonitis.

Concurrent Conditions

Colic may be the result of another disease process. Fecal consistency aberrations suggest nutritional imbalances, the presence of infectious enteric agents, or increases in fecal density. Infectious and inflammatory conditions outside but adjacent to the peritoneal cavity can produce signs consistent with an intestinal lesion. Rhabdomyolysis, pneumonia, pleuritis, nephritis and nephrolithiasis can all cause significant signs of abdominal pain that may be indistinguishable from that originating from the gastrointestinal tract.

Ancillary Aids

Ultrasonography

The most readily available diagnostic aid in addition to the clinical examination in a field situation is ultrasonography. Rapid assessment can be made of gastrointestinal wall thickness, small intestinal diameter, content and motility, stomach size, quantity and nature of peritoneal fluid, and position of the viscera and intestinal tract. In one study comparing surgical and necropsy findings, detection of abnormal small intestine that lacked motility was highly sensitive and specific, with high positive and negative predictive values for small-intestine strangulation.
With respect to large colon lesions, ultrasonography using a ventral abdominal window was moderately sensitive and highly specific for diagnosing large-colon torsion.20

Peritoneal Fluid

Analysis of peritoneal fluid is a useful ancillary diagnostic procedure. However, in a field situation the ability to gain all the information contained in a sample in a timely fashion is not possible. Therefore, the gross appearance is the most valuable indicator of the presence of devitalized intestine and is most likely to aid the clinician in the determination of the need for surgery. Serial evaluation of abdominal fluid color, specific gravity and lactate has a high positive predictive value for type of intestinal lesion21,22 whereas patient age and abdominal fluid color has a high positive predictive value for clinical outcome.21

Volume: at the time of sample collection the relative volume of peritoneal fluid can be inferred by the flow rate at collection. However, as fluid can be isolated in several pockets within the peritoneal cavity this is an unreliable indicator.

Color: normal fluid is clear and pale yellow/straw-colored. It does not clot in a plain tube. Yellow fluid that is slightly turbid suggests a medical colic, with dehydration or elevated bilirubin. Pink/orange fluid indicates hemolysis or hemorrhage consistent with compromised or devitalized intestine and increases the likelihood of need for surgical intervention.15 Hemolysis may be distinguished from iatrogenic hemorrhage by centrifugation or allowing time for the red blood cells to settle as iatrogenic hemorrhage will form a pellet of red cells with a clear supernatant. Compromised vascular supply to the intestine however will result in fluid that does not settle but instead remains uniformly pink/orange. Bloody to brown fluid indicates advanced ischemia, the presence of ingesta indicates rupture or enterocentesis has occurred.

Protein concentration: increased protein concentrations occur with peritonitis and surgical lesions where inflammation and vascular compromise of the intestine has occurred. It can readily be assessed with a hand-held refractometer.

Smell may indicate the presence of intestinal content (rupture or enterocentesis) or urine. In cases of peritonitis, along with gross appearance the presence of bacteria may be inferred.

The limitations of this type of gross analysis must be communicated to the client, as the information provided complements but does not replace that gained during a complete clinical examination. Furthermore, changes in the peritoneal fluid may considerably lag ongoing pathologic processes and not accurately reflect the true severity of the disease condition it is considered to reflect.

Regardless of the clinical examination findings other indications for surgery, in particular unremitting pain may become apparent before laboratory data is available. In these cases, referral for further evaluation or surgery should be undertaken immediately to expedite management of the case.
References

