Anesthesia for the Horse with Colic

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KEYWORDS

• Anesthesia • Colic • Endotoxemia • Equine • Exploratory laparotomy • Horse

KEY POINTS

- Hemodynamic, acid-base, and electrolyte disturbances should be corrected to the greatest extent possible before anesthetic induction; early goal-directed therapy, a concept shown to reduce mortality in septic humans that involves resuscitation to achieve specific macrovascular and microvascular end points, may be important in horses with colic.
- The optimal fluid type (isotonic crystalloids, hypertonic crystalloids, colloids) for resuscitation is still controversial, and it is likely that a combination that provides the advantages of each should be used.
- Horses with severe colonic gas distension, which can lead to life-threatening hypoxemia and cardiovascular impairment, may benefit from colonic gas decompression before anesthetic induction.
- Cardiovascular depression under general anesthesia should be treated by minimizing inhalant requirements via a balanced anesthetic technique and by administering antiendotoxemic therapies, intravenous fluids, positive inotropic drugs and, possibly, vasopressors.
- The anesthetist must attempt to strike a balance between maintaining cardiovascular function, which is depressed by positive-pressure ventilation, and instituting ventilatory strategies that maintain arterial partial pressure of oxygen greater than 60 mm Hg. Alveolar recruiting maneuvers combined with positive end-expiratory pressure instituted soon after induction may improve oxygenation in horses with venous admixture.
- Analgesia is of paramount importance and may decrease morbidity. Options include nonsteroidal anti-inflammatory drugs, opioids, α_2-agonists, ketamine, and lidocaine. Ketamine may have beneficial immunomodulatory properties, and strong evidence exists for lidocaine's promotility and anti-inflammatory/immunomodulatory effects.

INTRODUCTION

Horses requiring surgery for colic caused by acute disease of the gastrointestinal (GI) tract can be some of the most intensive anesthetic patients encountered; this holds especially true for horses in which intestinal ischemia has resulted in endotoxemia

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or horses with severe abdominal distension. Surgical patients with colic are not only critically ill, with multiple hemodynamic, blood gas, acid-base, and electrolyte disturbances, but can also be in extreme pain and, therefore, anxious, fractious, and potentially dangerous. These animals usually cannot be completely stabilized before inducing general anesthesia, predisposing them to multiple anesthetic complications; recovery of patients with colic that survive anesthesia and surgery can also be fraught with problems. Many individuals may be involved in a colic case, and the atmosphere can rapidly become loud and hectic if order is not maintained; furthermore, the anesthetist must work quickly because the time between the onset of intestinal ischemia and surgical correction is critical and must be minimized. These factors can create the potential for anesthetic errors to occur.

The ways in which veterinarians manage these sickest of equine anesthetic patients is, unfortunately, still largely empiric rather than evidence-based, because of a relative paucity of randomized, controlled, clinical trials and meta-analyses of these trials. This situation has arisen mostly because of the smaller number of clinical patients available to us and the expense involved in conducting such studies in our profession. However, exciting new information arises every year. This update on anesthesia for colic addresses how to provide the safest anesthesia and most effective analgesia for this high-risk surgical population, focusing on new developments in these areas.

PREANESTHETIC PREPARATION

Preparation of the Clinic

Preparation for these horses should begin before they ever enter the hospital. An induction station or room can be designated as an emergency area that can be used for patients with colic and, if possible, should be distinct from the area used for orthopedic cases to prevent contamination. This area can be set up ahead of time with everything needed for anesthetizing patients with colic, saving valuable time (**Fig. 1**). The anesthesia machine should undergo a complete checkout procedure daily before it is used for any cases, with certain steps repeated for each case. The Food and Drug Administration (FDA) developed a pre-use checkout procedure in 1986 that was modified in 1993.[1] However, some steps will not apply to all equine anesthesia machines.

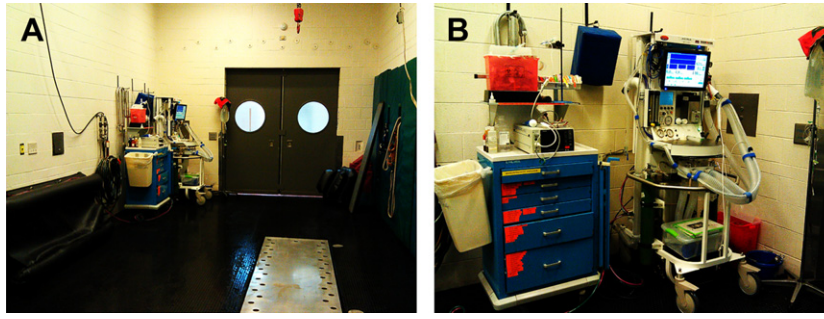

Fig. 1. (*A*) Induction room prepared ahead of time for a horse with colic. (*B*) Close-up view of the upper left-hand corner of (*A*) showing anesthesia machine/ventilator; roller cabinet with multiple labeled drawers for supplies and monitoring equipment (ie, electrocardiograph, arterial blood pressure transducer setup) on top; and fluid pole with intravenous fluids and bag of dobutamine attached.