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The principle goals of the maintenance phase of anesthesia are to: 1) provide a controlled state of hypnosis (unconsciousness: anesthetic depth), muscle relaxation and analgesia in order to facilitate and complete surgery; 2) minimize or negate the neuroendocrinologic, immunologic and inflammatory effects that occur in response to surgery or pain (minimize or prevent “stress”); and 3) minimize or prevent the undesirable effects produced by recumbency, patient positioning and anesthetic drugs (e.g., thiopental induced respiratory depression; halothane or isoflurane induced hypotension). These goals imply that the drugs and drug techniques selected are chosen based upon patient attributes, physical status and the invasiveness and duration of the surgical procedure being performed. For example, the drugs and techniques selected to produce general anesthesia for the surgical repair of an

### Table 1. Total Intravenous Anesthesia (TIVA) Techniques in Horses

<table>
<thead>
<tr>
<th>Drug Combination</th>
<th>Concentration (mg/mL)</th>
<th>Infusion Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylazine</td>
<td>1</td>
<td>1-3 mL/kg/hr To effect</td>
</tr>
<tr>
<td>Guaifenesin</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Ketamine*</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Detomidine</td>
<td>0.02</td>
<td>1-3 mL/kg/hr To effect</td>
</tr>
<tr>
<td>Guaifenesin</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Ketamine*</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Medetomidine</td>
<td>0.02</td>
<td>1-3 mL/kg/hr To effect</td>
</tr>
<tr>
<td>Guaifenesin</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Ketamine*</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Romifidine</td>
<td>0.06</td>
<td>1-3 mL/kg/hr To effect</td>
</tr>
<tr>
<td>Guaifenesin</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Ketamine*</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Butorphanol (0.02 mg/kg) may be added to enhance analgesia.

*4 mg/mL Ketamine reduces infusion to 0.8 mL/kg/hr. Ketamine is generally infused at rates of 25-150 μg/kg/min following adequate muscle relaxation.
Umbilical hernia may be considerably different from those used to arthrodese a fetlock. Anesthesia can be maintained by readministering reduced doses of the same injectable drugs used to induce anesthesia, inhaled anesthetics or the infusion (total intravenous anesthesia: TIVA) of mixtures of injectable anesthetic drugs (Table 1). TIVA, is currently receiving a great deal of interest in equine anesthesia due to the availability of new rapid acting, short duration and reversible drugs which offer the veterinary surgeon greater control over anesthetic depth than previously available with injectable drugs. Most TIVA drug combinations incorporate a centrally acting muscle relaxant (guaifenesin), a dissociative anesthetic (ketamine) and alpha-2 agonist (xylazine, detomidine). The combination of these drugs provides adequate hypnosis, muscle relaxation and analgesia for most surgical procedures and their administration can be titrated to the surgeon’s requirement. Recently propofol has been used to maintain anesthesia after preanesthetic medication with detomidine (0.005 mg/kg, IV). This technique and its derivatives remain to be validated in clinical practice, but afford the opportunity for continued advances using TIVA in horses.

ANESTHETIC PROTOCOL FOR HORSES USING IV TECHNIQUES:
Intubate, Oxygen/Spontaneous Vent. (Demand valve), Fluids (Lactated Ringers)
At end of each procedure determine Total Cost

Technique 1
Premedication:
- Xylazine 0.5 mg/lb
- Butorphanol 0.01 mg/lb
Induction:
- Diazepam 0.03 mg/lb
- Ketamine 1.0 mg/lb
Maintenance:
- Ketamine/Xylazine (50/50)
  0.5 ml/100lbs
Recovery:
- Nothing: Xylazine 0.1 mg/lb if needed

Technique 2
Premedication:
- Xylazine 0.25 mg/lb
- Butorphanol 0.01 mg/lb
Induction:
- Telazol/Ketamine/Detomidine (Telazol/4ml/1ml)
Note: 3mls/1000 lbs is the induction dose
Maintenance:
- T/K/D as above (1 ml/1000lbs)
Recovery:
- Nothing: Xylazine 0.1 mg/lb if needed

Technique 3
Premedication:
- Xylazine 0.25 mg/lb
- Butorphanol 0.01 mg/lb
Induction:
- Telazol/Ketamine/Detomidine (Telazol/4ml/1ml)
Note: 3mls/1000 lbs is the induction dose
Maintenance:
- Xylazine/Guaifenesin/Ketamine to effect (Conc.: 50/2 mg/ml)
  This means add 500 mg Ketamine to a 500 ml bag of 5% GG.
Recovery:
- Nothing: Xylazine 0.1 mg/lb if needed

Technique 4
Premedication:
- Xylazine 0.5 mg/lb
- Butorphanol 0.01 mg/lb
Induction:
- Guaifenesin/Thiopental to effect (Conc.: 50/2 mg/ml)
  This means add 1 g (1000 mg) of thiopental to each 500 ml bag of 5% GG.
Recovery:
- Nothing: Xylazine 0.1 mg/lb if needed