

## **Equine Field Surgery and other Procedures**

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Many procedures to treat and diagnose equine patients can be performed in the field. Shorter procedures (e.g. those taking about an hour or less) are more suitable to field conditions as inhaled anesthesia and extensive monitoring equipment are not very portable. Furthermore, due to these limitations, elective procedures on healthy patients are ideal. Some procedures are logistically easier than others, but preparation and a good assistant can make some difficult procedures a task that can be accomplished. Owner requests, ability or willingness to transport horses, and financial constraints may dictate that we attempt some surgeries and other procedures in the field that we might prefer to send to a clinic or referral hospital. If the procedure is not a routine one performed by the veterinarian, it is helpful that the practitioner has good knowledge of the pertinent anatomy. This may mean not only reviewing written references, but ideally, practicing the procedure with an experienced colleague and/or on a cadaver specimen prior to performing in a live patient. Exploring the possible outcomes, demanding aspects of the procedure, and possible complications will help the veterinarian know what to expect and how to prepare. If procedures are performed in an outdoor environment where it is hard to control contamination due to dust, wind, and other factors - some procedures may be ill-advised - such as fracture repair and surgeries that enter a sterile synovial structure, the thorax, or the abdomen. Additionally, it is impractical to carry numerous specialty instruments and multiple surgery packs in an ambulatory vehicle, but keeping useful and versatile supplies will enhance the practitioner's ability to perform many field surgeries.

When planning for field procedures, the specific procedure will dictate supplies, however, there are materials that are almost always advantageous to have ready. Lighting can be low or uneven thus a good, bright headlamp is vital. Using headlamps is often much easier than trying to direct an assistant with a handheld light, and a floor light is impractical on uneven ground. Other lights that are magnetic or that have bases that are flexible for self-retention can be used in some situations but are not as versatile and in some cases not as portable as a head lamp. These lights can be purchased for very little online or in hardware or camping supply stores and often can be found in varieties that are very bright and have adjustable headbands and/or adjustable mounts. Drapes are necessary for many procedures – I prefer plastic drapes or table covers as they are impermeable to saline and body fluids, and often come in large sizes to give a larger sterile field. Towels have many uses from - padding horse's head and the veterinarian's knees, to clean up and non sterile draping. Asking owners to provide a supply of old, clean towels can reduce the amount the veterinarian has to pack in their vehicle. Sheets and tarps are also an inexpensive way to cover ground to reduce dust and other debris. Ropes and other materials for restraint and keeping the patient in the correct recumbency should be available. A small table or stool for surgical instruments and other supplies is often beneficial and can be used in many situations;

types that fold to allow for easy storage in a vehicle can be found. Self-retaining retractors are very helpful for a variety of procedures and are not always included in a basic surgery pack. These can be easily sterilized separately and brought along for certain procedures, or added to a pack. Small to medium Gelpi or Weitlaner retractors are probably the most useful. A pair or two of Ferris-Smith rongeurs are very useful for grasping in small incisions, taking biopsies, and a variety of other uses. A trephine is beneficial for some procedures – such creating access for biopsy of masses or sampling of fluid in sinuses, scoping of sinuses, and lavage after head trauma; I prefer the Michele trephine. A Foley catheter of appropriate sized can be inserted into the opening made by a Michele trephine.

Surgical sites should be clipped and prepped routinely. A pair of cordless clippers are ideal, but corded clippers are suitable in areas where electricity is accessible. If the patient is to be anesthetized, as much of the preparation that can be done before anesthesia should be performed with the horse standing to save anesthetic time. Limb preparations can be covered by a simple clean bandage to keep it clean during induction. Preoperative medication should include prophylactic antibiotics, anti-inflammatories, and analgesia. Tetanus vaccination should be performed if the horse has not recently had a booster.

Suture material used for field surgeries will vary by procedure and tissue, but absorbable sutures can be useful for skin incisions. Monocryl or similar suture (poliglecaprone 25 or PGCL) will start to fall out of skin incisions in 3-4 weeks. At about 2 weeks only about 40% of the original tensile strength remains and then about 12% at 21 days. In cases where suture removal is undesirable or inconvenient, this makes it ideal for skin closure. Skin staples are fast to apply, and reduce surgical time, especially if the incision is long. I like staples for procedures on the head and neck as removal may be easier than areas under the abdomen or on limbs. However, they may necessitate an additional visit by the veterinarian if the owner or trainer is not capable of removing them.

Local blocks can prolong the time that the patient is in a surgical plane. There are many methods described to provide analgesia by local blocks - from simple line or ring blocks to other regional blocks – the injection and regional anesthesia reference by Moyer et al is a great reference and is easy to take on the road for a quick reference if needed. In sinus, nasal, and endoscopic upper airway procedures, coating the area with lidocaine can provide good anesthesia of the mucous membranes. We use 4% lidocaine for some procedures, but 2% lidocaine works as well. For procedures requiring access via the nasal passages of a scope, tube, or instruments, 30-60 ml of lidocaine injected into the nasal passages often greatly increases the horse's compliance with the procedure. Caudal epidural blocks are easy to perform and work well for standing procedures involving the perineal and surrounding area. A total volume of 5-6 ml is the maximum volume recommended, as with higher volumes the epidural block may affect the hind limbs. Xylazine at - 0.17 mg/kg with lidocaine added to increase the volume to 5-6 ml works well for several hours.

Regional limb perfusions (RLPs) have changed treatment of distal limb wounds and septic synovial structures. While simple and technically easy to perform, the benefit of RLPs cannot be overstated. A wide rubber or pneumatic tourniquet is more effective than a narrow tourniquet. Dosing recommendations vary, but generally, a third of the systemic dose of antibiotic is used for the RLP. The tourniquet is placed above the area of interested and a vein is accessed with a

butterfly catheter or a short catheter with an extension set. The cephalic or saphenous vein are easiest to access in the upper part of the limb, but for distal limb the palmar/plantar veins are often used. Catheters used are usually 19-25 gauge; the larger the size, the easier and quicker the administration of the perfusate is, but care must be taken to preserve the vessel with larger catheters, especially if multiple attempts at the vessel have to be made. The antibiotic along with ~10 ml of mepivacaine or lidocaine and 30-40 ml of saline or LRS is administered, the catheter removed, and gauze with an elastic wrap to apply pressure to the site of catheter removal is temporarily placed on the limb. The tourniquet is left on for 25-30 min and then removed.

Procedures that can be performed in the field include, but are not limited to: regional limb perfusions, tracheotomy, strap myectomy, sinus trephination, annular ligament desmotomy, subpalpebral lavage system placement, enucleation, nasolacrimal duct flush, umbilical hernia repair, transphyseal bridging, palmar digital neurectomy, deep digital flexor tenotomy, inferior check ligament desmotomy, castration, cryptorchid testicle removal, medial patellar ligament fenestration or desmotomy, lateral digital extensor tenectomy, semitendinosus tenectomy, wiring of incisor and mandible/maxilla fractures. With preparation, these procedures and more can be successfully performed in a field setting if desired.

#### References

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