How To Perform a Minimally Invasive Sinus Flush in the Equine Patient

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1. Introduction
Clinical signs of sinus disease can include nasal discharge (usually unilateral and can be malodorous), facial deformity, and respiratory noise. Sinusitis can be subdivided into two groups: primary and secondary. Primary sinusitis can be of either bacterial or viral etiology. Secondary sinusitis includes conditions such as paranasal sinus cysts, tooth root abscess, trauma such as fracture of the frontal/nasal bones, and neoplasia. An accurate diagnosis can be made using conventional imaging modalities such as radiography and nasal endoscopy. However, in certain cases, these fail to give the clinician an accurate idea regarding the extent of the lesion and the structures affected, thus necessitating further imaging modalities such as sinuscopy, nuclear scintigraphy, and computed tomography.

Lavage or flush of the sinuses has been performed for years in the diagnosis and management processes of sinus disease. It can aid in achieving an accurate diagnosis, because it removes the dense fluid within the sinus and allows for a better radiographic visualization of the different sinus compartments. This is especially helpful in the field where advanced diagnostic imaging might not be available.

In addition, it can be curative in cases of primary sinusitis as well as an adjunct to surgical intervention. Historically, this procedure has been performed using Steinmann pins or Trephinators. Although these are effective in creating an entrance into the sinus, they can cause secondary complications such as focal cellulitis and fistulation, especially when using large trephines or pins. Alternative methods for gaining entrance into the sinus cavity have been developed by equine clinicians, including using a 14- or 16-gauge needle to create a lavage portal as previously reported by Schumacher and Perkins. The purpose of this presentation is to show how to perform an effective sinus lavage using this minimally invasive technique and without using specialized equipment.

2. Materials and Methods
Materials and equipment needed for the lavage include: lidocaine or mepivicaine, a #15 blade, several 1- or 1.5-in, 14-gauge needles, a mallet, 1-l bags of Lactated Ringers Solution, a pressure bag, a primary IV set, a syringe (10–20 ml), triple antibiotic ointment, gloves, and scrub supplies. The lavage can be done through the maxillary or frontal sinus portals. Landmarks for the maxillary sinus include the medial canthus, the facial crest, and the infra-orbital foramen.
for the frontal sinus include the medial canthus, the supraorbital foramen, and midline (Fig. 4). The area can be clipped; however, this is not absolutely necessary. After the decision is made as to which portal will be used, it is scrubbed, and a small bleb with 1–2 ml of lidocaine or mepivacaine is placed subcutaneously (Fig. 5). A small stab incision (~2–3 mm) is made on the skin using a #15 blade.
(Fig. 6). After this, a 14-gauge needle is introduced into the stab incision and held firmly against the bone (Fig. 7). Using a mallet, the needle is driven into the sinus (Fig. 8), taking care to avoid bending the needle. If this happens, the bent needle is replaced with a new one. After the needle is in the sinus, a syringe is attached to the needle to aspirate any purulent material for analysis and/or culture (Fig. 9). A 1-l bag of LRS is connected to the IV set and placed within the pressure bag. The pressure bag is inflated as indicated by the manufacturer and connected to the needle (Fig. 10). Fluid should be able to flow easily and exit through either the other needle (if two were placed) and/or the appropriate nostril (Fig. 11). The sinuses are lavaged thoroughly with the desired volume of fluids. At our hospital, this is usually between 2 and 5 l. After the lavage has been completed, the needles are removed, and the stab is covered with triple antibiotic ointment. No sutures or bandages are necessary.

If another lavage is performed 24–48 h later, the entry site for the needle can be identified by “walking” the needle over the bone through the old stab incision; this avoids the need for the mallet.

3. Results and Discussion
At our hospital, this minimally invasive flushing technique is used on a regular basis with subjectively great results. This technique is especially useful in patients during the pre- and post-operative period, because it minimizes soft tissue and bony trauma that can compromise the surgical field and increase patient morbidity. The technique is very easy to learn and is tolerated well by the patient. Horses with adequate sedation and a local bleb of anesthetic do not object to the noise and pressure created by the mallet driving the needle into the sinus. It is important, for obvious reasons, that the mallet and needle are held firmly.
Techniques that use a trephine require a large incision or bony defect. By using the less-invasive sinus flush, we can eliminate or minimize problems such as incisional complications, compromise of the bone flap caused by surgery, delayed healing, and fistula formation. The entry port does not need special care post-lavage, because the defects created at the level of the skin and bone are minimal. Disadvantages of this technique include the lack of temporary catheter or tubing left in place, which might be desirable in some hospitalized cases or in cases where owners need to continue treatment at home. Also, thicker frontal, incisive, zigomatic, and lacrimal bones can potentially preclude the use of the 14-gauge needle. This obstacle is more likely in heavier breeds such as Warmbloods and draft horses. Another relative disadvantage is the need to maintain high pressures during the lavage to maintain an adequate irrigation of the sinus cavity through the needle.

In conclusion, we believe that this technique is very effective in achieving an adequate sinus lavage and should be considered by veterinarians both in hospitals and in ambulatory practices as a viable alternative to traditional techniques.

References and Footnotes

*Lidocaine 2%. Hospira, Inc. Lake Forest, IL 60045.*
*Lactated Ringers Solution. LRS Baxter. Deerfield, IL 60015.*