TECHNIQUES

Treatment of laryngeal hemiplegia includes laryngoplasty, ventriculectomy/ventriculodectomy (sacculectomy), entriculocordectomy, occasionally arytenoidectomy, and neuromuscular-pedicle grafting.

Management of these cases and selection of the appropriate surgical technique to treat laryngeal hemiplegia should be based on the presenting complaint, the anticipated use of the horse, the owner/trainer expectations, clas of arytenoid cartilage movement, and the risk of the procedure to the horse compared with the possible gain. When considering this decision, the surgeon should recognize that some horses with laryngeal hemiplegia are able to work to capacity despite the upper airway obstruction.

Surgical Options

Ventriculectomy -This procedure involves removing the ventricle mucosa (the lining of the soft tissue structures of the larynx that are affected by RLN) to form a scar between the vocal fold, thyroid, and arytnoid cartilages. The scar tissue is believed to reduce the severity of vocal fold collapse into the airway and also reduce upper airway noise by reducing turbulent airflow over the ventricle. Veterinarians can perform ventriculectomies in standing sedated horses or those under general anesthesia. It is done through an incision under the jaw into the airway (known as a laryngotomy) or by using a laser passed through an endoscope (or "scope") up the nostril. Laryngotomy incisions are often left open to heal on their own. Laser techniques can be performed with your horse awake and standing. No incision is necessary with the laser technique since the endoscope and laser are passed up the nose to the larynx. The standing laser technique is ideal for draft breeds that may have difficulty recovering from general anesthesia.

Ventriculocordectomy -This procedure is essentially a ventriculoectomy in addition to vocal cord removal, which is mainly used to treat respiratory noise caused by vocal cord collapse. This creates a smoother laryngeal contour, which should reduce respiratory noise. Veterinarians can perform ventroculocordectomies in standing sedated horses, under general anesthesia, or using a transendoscopic laser-assisted technique. Experimental data has suggested that a longer time period (two to three months) may be required before the maximal effects are achieved in terms of reduction of respiratory noise and obstruction. Experimental data has also shown that this procedure can significantly reduce upper airway sounds and obstructions 90 days post-surgery, and clinical cases have also shown a good success rate. Research has suggested that bilateral ventriculectomy significantly reduces airway noise in horses with (severe) RLN, but not as effectively as bilateral ventriculocordectomy.

Prosthetic Laryngoplasty- This is the most common treatment and can be performed with your horse under general anesthesia or standing while sedated. Often referred to as tieback surgery, this procedure involves placing one to two sutures in the left arytenoid cartilage to abduct and hold it out of the airway The paralyzed cartilage is "tied back" into an open/abducted position through an incision in the throat latch area. The suture acts as a "prosthetic" for the paralyzed muscle. Some owners find this an attractive option, due to its relatively short rehabilitation period. One study showed that laryngoplasty was effective in reducing upper airway noise by 30 days post-surgery; however, the procedure was not as effective at minimizing noise as a ventriculocordectomy. The horse's intended use is important to consider when measuring a procedure's success rate, as nonperformance horses that have submaximal exercising oxygen requirements are generally reported to enjoy high success rates of 70-92% after laryngoplasty, while, in comparison, laryngoplasty performed in racehorses is reported to have a lower rate of success (38-59%).

Arytenoidectomy - The removal of all or a portion of the paralyzed arytenoid cartilage on one side which acts to enlarge the opening to the trachea. This procedure is ideal for horses with a failed tie-back surgery or with an infected arytenoid cartilage. The procedure requires general anesthesia and is done through an incision into the throat; often times veterinarians place a tracheostomy tube to assist breathing that is removed after 24 to 48 hours. There is a potential increased risk of complications and decreased prognosis for returning to the previous level of competition vs. prosthetic laryngoplasty. Recent studies comparing arytenoidectomy to laryngoplasy have found that in racehorses, laryngoplasty may be more successful both in terms of airway ventilation at maximal exercise and in racing performance parameters. However, due to the high complication rate associated with laryngoplasty, more racehorses returned to racing after arytenoidectomy than after laryngoplasty.

Laryngeal reinnervation - This procedure involves transferring part(s) of a normal, innervated (supplied with nerves) muscle, or a nerve, into the non-functioning or poorly functioning cricoarytenoideus dorsalis (CAD) muscle of the larynx. Although the reinnervated CAD muscle doesn't function as well as a normal CAD muscle would, the results can be quite good during exercise. While laryngeal reinnervations have fewer complications than some other surgical techniques, the procedure's long recovery time (up to 8-12 months for reinnervation to be complete in some horses) precludes its use in many candidates. There are a few different types of laryngeal reinnervation equine surgeons can choose from including a neuromuscular pedicle graft (the common choice which uses a piece of the horse's omohyoideus muscle) and a programmed stimulator implant (which is used much less commonly as the current device is still having technical kinks worked out). The neuromuscular pedicle graft is a surgery that re-innervates the muscles that control abduction of the arytenoid cartilage. The first cervical nerve is taken from one of the neck muscles and a branch of that nerve is placed in the muscle that innervates the arytenoid cartilage. Young horses with grade 3 hemiplegia are considered good candidates; grade 3 horses will respond faster to re-innervation than grade 4 horses. Re-innervation takes six to 12 months for return to function. Horses that have had a previous tieback sustain damage to the nerve used in this procedure; therefore, they are not candidates for this surgery.