Transarterial Coil Embolization for Prevention of Hemorrhage from Guttural Pouch Mycosis in Horses

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Many complications have been reported using the current surgical technique for occlusion of the affected arteries in horses with guttural pouch mycosis. The coil embolization technique provided an effective means of prevention of hemorrhage as a one-step procedure. All lesions healed without further treatment and no complications were encountered. Authors’ address: Dept. of Clinical Sciences, Ohio State University, 601 Vernon L. Tharp, Columbus, OH 43210 (Léveillé, Hardy, Robertson, and Beard) and École Nationale Vétérinaire de Lyon, 1 avenue Bourgelat, BP 83, 69280 Marcy l’Étoile, France. © 1999 AAEP.

1. Introduction
Epistaxis is the most common clinical sign of guttural pouch mycosis and approximately half of the affected horses die of fatal hemorrhage if untreated. Hemorrhage may originate from erosion of the internal carotid (ICA), external carotid (ECA), and maxillary (MA) arteries. Successful treatment requires arterial occlusion proximal and distal to the lesion, to prevent normograde and retrograde flow. A balloon-tipped catheter technique is currently recommended for this purpose. However, anatomical variations in vascular anatomy, as well as complications occurring when multiple vascular occlusions are necessary, have made this technique less than ideal. The purpose of this study was to develop a method for preventing guttural pouch fatal hemorrhage using embolization coils to occlude the ICA, ECA and MA.

2. Material and Methods
A pilot study was performed in 2 horses to familiarize ourselves with the technique. Ten adult, clinically healthy horses with no previous history or clinical signs of respiratory, neurologic or ophthamologic problems were studied. Four adult horses (all geldings, age 3 to 13 year old) were presented for evaluation of epistaxis (4 horses) and dysphagia (1 horse). Duration of signs varied from 3 days to 3 mo. Physical examination revealed dysphagia and Horner’s syndrome in 1 horse. Endoscopy revealed laryngeal hemiplegia (3 horses), dorsal pharyngeal recess fistula (2 horses), and dorsal displacement of the soft palate (2 horses). Guttural pouch endoscopy revealed raised diphteric plaques in all horses located in the dorsal aspect of the medial compartment (all horses), the stylohyoid bone (all horses), the lateral compartment (2 horses),
and the median septum (3 horses). In 2 horses, the median septum was completely eroded, resulting in large communications between the 2 guttural pouches and with the pharyngeal recess. All horses had normal fundoscopic examinations. Transarterial embolization was recommended. In preparation for the surgery, peri-operative antibiotics and phenylbutazone were given, and in 1 horse, 6 liters of fresh whole blood were transfused.

Under general anesthesia, an 8-cm skin incision was made on the proximal third of the left jugular groove and the common carotid artery (CCA) isolated. Under fluoroscopic guidance, using an introducer system, a 6F angiographic catheter was introduced into the CCA and directed into the ICA. An angiogram was obtained to identify the anatomical position and the diameter of the artery; embolization coils of various sizes were delivered using a 0.038 guidewire. These coils were placed in the rostral and caudal ICA, and in the caudal MA and rostral ECA to occlude the common sites of mycotic lesions. Each of the four arterial occlusions was confirmed by angiography. The CCA puncture site, muscle planes, subcutaneous tissue and skin were closed in a routine manner. Horses were monitored daily for neurological signs, blindness, and incisional complications. Euthanasia was performed one (n = 2), two (n = 2), four (n = 2), eight (n = 2), and twelve (n = 2) weeks after the embolization procedure. Before euthanasia, an endoscopy of the guttural pouches and an ophthalmoscopic examination were performed, and an angiography of the CCA, ICA, and ECA was repeated to verify occlusion. At necropsy, the ECA and ICA and MA were removed from each horse. Three equally-spaced sections of each vessel were evaluated for confirmation of occlusion of the vessel or for signs of recanalization of the vessel. All affected horses underwent transarterial coil embolization of the rostral and caudal ICA, caudal MA, and rostral ECA, as previously described. In one horse, an aberrant branch of the ECA, which was actively bleeding, was also occluded.

3. Results

In all normal horses, complete occlusion of the ICA, ECA, and MA was immediately achieved and confirmed at the premortem angiographic reevaluation. Coils varying in size from 5 cm length/5 mm diameter to 8 cm length/12 mm diameter were used. Mean procedure time was 1 hour 5 minutes (minimum 32 min, maximum 1 h 30 min). One horse developed left laryngeal hemiplegia. Ophthalmoscopic abnormalities were not observed. At necropsy, the coils were positioned as intended. Histologically, all horses had partly mature thrombi filling at the arteries at the sites of embolization. Recanalization of the thrombus was observed in arteries examined more than one month after the embolization. The first horse of the pilot study developed severe ataxia, facial hemiparesis, and blindness, and was euthanized within 24 hours. Postmortem examination revealed emboli in the cerebral arterial circle.

In affected horses, no further episodes of epistaxis were noted and all surgical incisions healed uneventfully. By day 60, all mycotic plaques had resolved without further treatment. Two of 3 horses with laryngeal hemiplegia had improved laryngeal function. One horse with long-standing (3 months) duration of clinical signs before intervention had persistent laryngeal paralysis and mild dysphagia. In all horses, ophthalmic complications were not observed.

4. Discussion/conclusion

An improved method for the treatment of horses affected with guttural pouch mycosis was felt to be needed because of complications reported with the balloon-tipped catheter techniques, particularly when occlusion of multiple sites is required. Recently, anatomical variations in the origin and direction of the internal carotid and occipital artery have been described. In one case, this resulted in faulty catheter placement and death of the horse. Pre-embolization angiography allows correct identification of the affected vessels, and subsequently correct coil placement, thus preventing such complications. Complications encountered in the first horse of the preliminary study were due to dislodgment of a clot at the time of angiography, creating cerebral emboli. Complications associated with arterial angiography can be minimized with familiarization of fundamental skills and careful manipulations of the catheters and embolization material. The use of embolization coils in normal horses provides a rapid, effective and less invasive method for ICA, ECA, and MA occlusion. It has the advantage of correctly identifying the anatomical location of affected vessels and correct positioning of the embolization coils. In affected horses, the technique was possible despite active bleeding, and enabled us to identify and correctly occlude all sources of hemorrhage.

References


EmboliCoils, Cook Incorporated, Bloomington, IN 47403-4500