A NEW CLINICAL PROTOCOL FOR CONTRAST VIDEOFLUOROSCOPIC ASSESSMENT OF DYSPHAGIA IN FREELY BEHAVING DOGS

Teresa E. Lever, PhD, Joan R. Coates, DVM, MS, Mitchell Allen, BS, Vanessa Gaiser, MHS
Columbia, MO

The current protocol for contrast videofluoroscopic assessment of dysphagia in dogs requires physical restraint in sternal or lateral recumbency to minimize head/body movement and retain positioning within the fluoroscopy field of view (Pollard et al. 2000 & 2007; Bonadio et al. 2009, Pollard 2012). Restraint is accomplished by manually holding the dog's head/body against the examination table, which results in substantial radiation exposure to individuals performing the procedure. Barium sulfate is the oral contrast agent commonly used for this test, which is administered in two forms: thin liquid barium (60% w/v) and barium-soaked kibble. Self-feeding from a bowl is encouraged but often refused by dogs, likely due to a combination of the aversive taste/smell of the contrast agent and anxiety/struggling from being restrained in an unfamiliar environment. As a result, syringe and hand feeding methods are routinely necessary, which further contributes to anxiety and struggling behaviors and causes profound head movements that significantly degrade image quality. Moreover, the majority of dogs let the liquid dribble from the mouth and/or spit the kibble out. The end result is an examination of unnatural feeding activity rather than the dog's typical feeding behaviors and swallow function.

A restraint device was recently designed to position dogs in sternal recumbency during this test (Bonadio et al. 2009). The device has a rectangular, polycarbonate frame that is open on both ends. One side panel is adjustable to accommodate dogs of different widths. After a dog assumes sternal recumbency within the device, the side panel is positioned so that it squeezes against the dog to prevent escape; the head remains unrestrained for feeding purposes. Struggling behaviors are still common in this device; therefore, head and body motion remains problematic. Furthermore, radiation exposure to individuals cannot be minimized because syringe and hand feeding methods are still required. To overcome these limitations, we have developed an innovative clinical protocol for contrast videofluoroscopic assessment of dysphagia in freely behaving dogs.

Our protocol consists of three components: 1) a custom-designed kennel that permits self-feeding from a bowl while standing unrestrained in a confined space, 2) special formulated recipes that mask the aversive taste/smell of oral contrast agents, thereby eliminating the need for force-feeding techniques in food-motivated dogs, and 3) a 12-step test protocol to quickly assess swallowing of several consistencies included in a typical canine diet (e.g., thin liquid, ground/pureed food, chunky wet food, and dry kibble), without the need for behavioral conditioning. The combined effect produces a comfortable, low stress, no struggle, self-feeding examination environment that more closely resembles a dog's daily mealtime routine. Head and body movements are sufficiently self-stabilized while the dog's muzzle is engaged in the food bowl, thereby permitting high quality videofluoroscopic and spot film imaging. Additionally, individuals performing the procedure can administer the examination hands-free, which dramatically reduces the risk of radiation exposure. To date, we have used this protocol with approximately 30 healthy and 15 dysphagic dogs of various breeds and ages from the local community and an existing research colony. Testing was performed without sedation after overnight fasting of food to further motivate participation; water was not restricted. Test items were standardized for contrast density, volume, and order of presentation. The self-feeding nature of this test prevented standardization of bolus volume within and between dogs. We expect bolus volumes during spontaneous eating and drinking may be considerably larger than bolus volumes produced by syringe and hand-feeding methods. As a result, the clinical signs of dysphagia identified in the home environment may be more readily evoked when using our self-feeding test protocol. Moreover, frame by frame analysis of the digital videos revealed several swallow measures that were not quantifiable using the current restraint protocol. We are in the process of developing a multi-center study to further refine and standardize our self-feeding protocol for ease of use in research and clinical practice. While we realize this protocol may not be suitable for all dogs, it does provide a beneficial alternative to the currently used restraint protocol, especially when testing food-motivated dogs. Future directions include adapting this protocol for research and clinical use with other companion animals, such as cats, small ruminants, and foals.

REFERENCES

Pollard et al. **Veterinary Radiology & Ultrasound** 2000;409-412. Pollard et al. **Veterinary Radiology & Ultrasound** 2007;48(3):21-226. Bonadio et al. **J Vet Intern Med** 2009;23:801-805. Pollard **ISRN Veterinary Science** 2012;15 pages.