Sticking it to perforating injuries

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Alasdair Hotston Moore discusses, in the first of a two-part article, surgery for potentially life-threatening cases affecting the pharynx and oesophagus

THE pharynx is a relatively common and important site of perforating stick injuries in dogs.

Typically, this is a trauma encountered in medium-sized and active dogs, notably collies and similar breeds. The stick may perforate the mouth, pharynx or oesophagus. Oesophageal perforations are less common, but are recognised as having a significantly poorer prognosis.

The animal is usually known to have been playing with or carrying a stick at the time the injury occurred, and presenting signs are pain, ptyalism with blood and cervical swelling. Shock can rapidly follow.

In dogs managed conservatively, the presence of foreign body fragments in the soft tissues can cause the late complication of abscessation and discharging sinuses.

Pharyngeal stick injuries cause significant acute morbidity and even mortality. An important step in management is clarifying the injury site (mouth, pharynx or oesophagus) so that appropriate treatment is performed. Oral injuries can be dramatic (see Figure 1), but are rarely life threatening. Rostral and pharyngeal injury areas are also rarely problematic, although they have the potential for bulbar, retrobulbar or masseteric complications.

Lateral (Figure 2) and dorsal penetrations of the pharynx, along with oesophageal penetrations, carry the greatest risk of life-threatening complications.

In affected dogs, the stick typically penetrates the pharynx close to the tonsillar crypt or in the dorsal cricopharynx. Because of the site of these injuries, the tear may not be obvious on oral examination in conscious or anaesthetised patients, even on endoscopic examination under anaesthesia. This is because the mucosa tear is often within a tissue fold, or in the cricopharynx, which does not distend during endoscopy.

Oesophageal perforations can never be detected on oral examination, but are usually apparent on flexible endoscopy (Figure 3). However, full-thickness mucosal perforations will invariably allow air to enter the soft tissues around the larynx and in the neck. For this reason, neck radiography is advised in all suspected pharyngeal stick injury cases, and surgery is recommended if soft tissue emphysema is detected in the neck on radiography (Figures 4 and 5).

In dogs with emphysema, thoracic radiographs are also required to assess for pneumomediastinum or pneumothorax, and pleural effusion that rapidly develops after oesophageal perforation. In most animals, these initial radiographs (lateral projections are the most useful) can be performed without general anaesthesia. The author usually performs these radiographs soon after presentation (before anaesthesia for oral examination or endoscopy), as they are such a useful part of the decisionmaking process. The foreign body itself is rarely seen on these radiographs, as they are of soft tissue density.

Closure

Attempts to close pharyngeal or oesophageal mucosa tears through the mouth are of limited value: access makes effective closure difficult; the tissues cannot be explored for the presence of foreign material and drainage cannot be achieved. For this reason, early exploration through a cranial midline cervical approach is recommended. Early treatment is recommended, since the development of complications such as shock, cellulitis or pyothorax significantly worsens the prognosis. Therefore, once the patient has been stabilised with fluid therapy and analgesia, together with the initiation of broad-spectrum intravenous antibiotic therapy, the patient should be anaesthetised for endoscopic examination and surgery. Where available, flexible endoscopy is useful to search for the perforation (with the caveat noted above: dorsal pharyngeal perforations, in particular, may not be seen) and to place a percutaneous endoscopic gastrotomy (PEG) tube for postoperative nutrition.

The purposes of exploratory surgery in animals with pharyngeal or oesophageal perforation are to explore the area, identify any remaining stick fragments, lavage the tissues, find and close the tear and place a wound drain. With the animal in dorsal recumbency and the neck extended over a sandbag, a midline approach through the skin and platysma muscle is made.

Since most tears are in the pharynx or proximal oesophagus, this incision starts over the larynx. In some cases, it may require extension to the manubrium, and the patient should be prepared to allow this. Emphysema within the soft tissues is often apparent during the early stages of

dissection, and can be followed towards the tract created by stick penetration.

Dissection largely proceeds by blunt dissection, between the planes alongside the larynx and trachea, once the sternothyroid muscles have been separated on the midline. The surgeon must be familiar with the position of the vital structures (oesophagus, vagosympathetic trunk, carotid arteries and recurrent laryngeal nerves), but the use of blunt dissection and carefully placed selfretaining retractors minimises the risk of damage to these structures.

The surgeon should aim to find the tract within the soft tissues (where the tissue planes have been separated and where inflammatory fluid rapidly accumulates). Once this has been found, it can be followed rostrally to find the perforation (often a finger can be passed through this and the endotracheal tube within the pharynx then felt).

The perforation is in the dorsal pharynx (cricopharynx) in many dogs, and cannot be seen until the larynx is rotated by the surgeon. An assistant is almost essential to maintain exposure at this point, but transaction of musculature should not be required. If the perforation cannot be found in this way, it may be helpful to try to place a probe into the tear per os.

Once the tear has been identified, the edges of the mucosa are closed, usually with simple interrupted sutures.

Grasping the torn edges with Alliss tissue forceps is helpful to achieve exposure, although it transgresses the rules of careful tissue handling. Preplacing the sutures can also be helpful.

The tract can be explored caudally to identify its full extent, and to allow any foreign body fragments to be retrieved. These can be surprisingly large (Figures 6 and 7). The tract is lavaged copiously and a drain is placed. The author prefers to use active suction (“grenade” drains). Although they are more expensive than passive drains, they are well tolerated by the patient and considerably reduce the problems associated with fluid drainage from the drain site. The deeper layers of soft tissue are not sutured, to reduce the risk of iatrogenic damage to neurovascular structures, with continuous sutures in the sternothyroid muscles, subcuticular tissue and skin.

It is logical to place a surgical gastrotomy or PEG tube, and maintain the patient nil per os for seven to 10 days after surgery. Patients with oesophageal perforation are at particular risk of mediastinitis and pyothorax. Repeated radiographs in the postoperative period may be useful to monitor for the development of this complication. The value of surgical exploration of the thorax is uncertain in these cases, but a chest drain should be placed if pleural effusion develops. Nonetheless, the prognosis in animals that develop pyothorax is poor.

This management method is associated with an excellent survival rate and minimal long-term complications in dogs presenting acutely with pharyngeal perforations, although the outlook is still uncertain for oesophageal perforation (see Doran, Wright and Hotston Moore, 2008).

This article has concentrated on the acute presentation of this injury. Cases managed conservatively may then present subacutely with a cervical abscess, cervical swelling or discharging sinuses after weeks or months. These problems will be the subject of a second article.

Reference

- Doran I, Wright C A and Hotston Moore A (2008). Acute oropharyngeal and esophageal stick injury in 41 dogs, *Veterinary Surgery* **37**: 781-785.