Case Report

Diagnostic investigation and surgical management of an oesophageal mural inclusion cyst in a pony yearling

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Summary

The purpose of this paper is to provide a concise illustrative description of the diagnostic techniques and surgical treatment of an oesophageal mural inclusion cyst in a pony.

Introduction

Dysphagia is a common presenting syndrome in equine practice. The diagnostic work-up for dysphagia is well described (Stick 1982, 2006; Greet 1989; Hillyer 1995). There is a wide list of differential diagnoses. Initially in the diagnostic work-up the differentiation between oral dysphagia including disorders of prehension, pharyngeal dysphagia and oesophageal dysphagia must be established. History, clinical examination, radiography, ultrasonography and endoscopy are the conventional ancillary diagnostic aids that further reduce the differential list and in more complex cases computed tomography and magnetic resonance imaging might play an important role.

When the lesion involves the oesophagus and requires surgery then the surgical principles for operating on the oesophagus and the limitations of tolerance that the oesophagus displays must be understood (Craig *et al.* 1989). Fortunately many of these diagnostic and surgical principles have been described by a large contribution to the literature from Stick (1982, 2006). The object of this paper is to describe in detail the diagnostics and surgical management of an oesophageal inclusion cyst in a yearling.

Case details

Case history and clinical findings

A 1-year-old Dartmoor filly was referred with a 9 week history of nasal reflux of food material. Initially this had been infrequent; however, the bouts became more and more frequent during this period. The owners also stated that they had noticed a 'thickening' of the tissues around the throat during the last 4 weeks. Clinical evaluation revealed the vital signs to be within normal limits and the pony was bright and alert in demeanour and reportedly had a good appetite. The body condition was normal for the type and age of pony. A poorly delineated swelling was visible in the ventral pharyngeal/cranioventral cervical region and with deep palpation its borders could just be demarcated. The swelling was centred to the right of midline and was around 12–14 cm from craniodorsal to caudoventral (**Fig 1**). The submandibular lymph nodes were of normal size. A nasogastric tube was passed and no obstruction was found. During nasogastric intubation it was noticed that the filly had a right sided oesophagus.

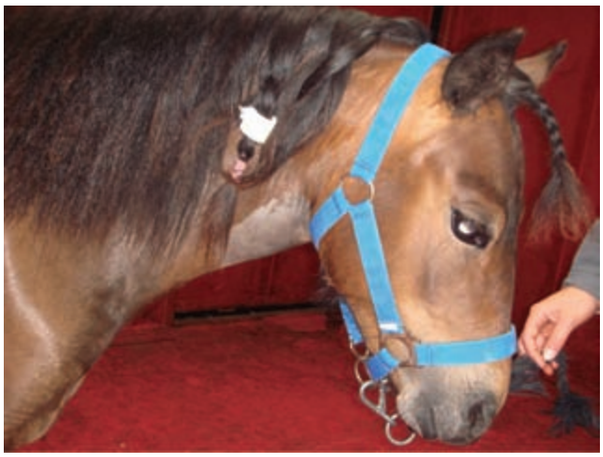

Fig 1: Subtle external swelling visible on right hand side in cranial cervical area (the clipped area).

Diagnostic evaluation

Resting endoscopy without sedation revealed a normal nasopharynx but the most cranial portion of the

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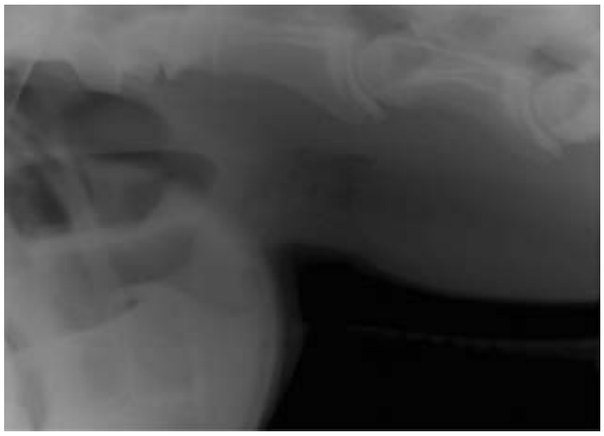

Fig 2: Plain cranial cervical radiograph showing the mass protruding ventrally ventral to the third and fourth cervical vertebrae. The cranial limit of the mass is also visible.

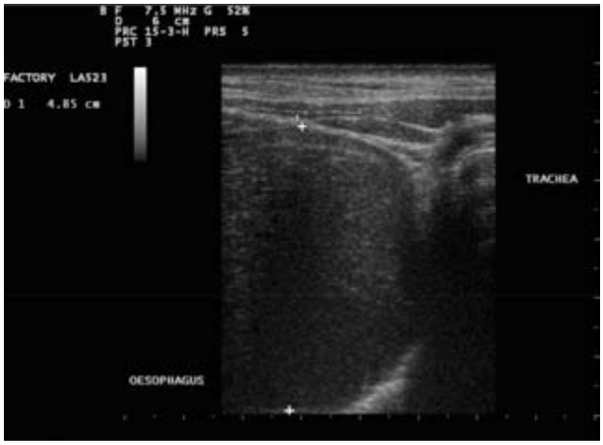

Fig 3: Ultrasonogram taken from the ventral aspect of the cranial cervical region. The cyst is on the left side of the image and has been demarcated between the 2 crosses and measured. The trachea is on the right side of the image.

oesophagus was abnormal in that the normal longitudinal striations were absent and had been replaced with transverse crimped striations such as are seen in cases of oesophageal diverticulum (Freeman 2005). It was difficult to convincingly demonstrate narrowing within the oesophagus at the site of the mass. The pony was then grazed for 5 min and endoscopy was repeated. Masticated grass could be seen refluxing from the oesophagus into the nasopharynx and occupying both piriform recesses. Ingesta was visible within the lumen of the cranial oesophagus and the assumption was made that this was being refluxed as a result of cranial oesophageal obstruction. Plain radiographs showed a well defined mass at the cranial ventral cervical region (**Fig 2**). The pony was placed in a stable with a wet feed; however, having been in the stable for just 1 h she developed choke. She was starved overnight and the following day ultrasonography was performed on the mass (**Fig 3**). The pony was also fed during the ultrasound examination to see if any ingesta entered the mass; however, this was not observed. A liquid barium swallow was performed and subsequently a barium meal was fed, the latter showed the true extent of the filling defect created by the cervical mass (**Fig 4**). The filling defect was very similar to a previously published radiograph (Stick 2006).

As a result of the diagnostic work-up we believed that this was an oesophageal inclusion cyst and advised surgical exploration and excision. Also, for this reason, it was elected not to aspirate or biopsy the mass.

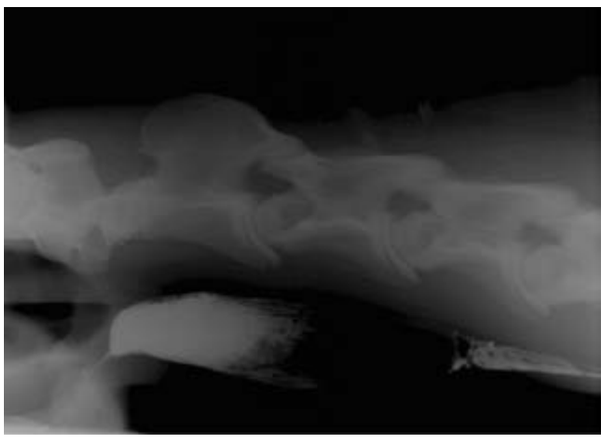

Fig 4: Contrast study using a barium meal fed to the pony. The mass is now more clearly outlined by the large filling defect ventral to the third cervical vertebra.

Surgical evaluation and treatment

The pony was starved overnight and a nasogastric tube placed immediately before induction and anaesthetised using a routine protocol. The pony was placed in dorsal recumbency and a 15 cm midline skin incision was made. The *sternohyoideus* muscle was split in routine fashion. The fascia on the right side of the trachea was bluntly separated and with the aid of palpation of the nasogastric tube proximal and distal to the mass, and the presence of the mass itself, the oesophagus was identified and an appropriate plane of dissection established (**Fig 5**). The trachea was retracted to the left side. The muscular layer of the oesophagus was sharply incised over the mass and the cream coloured tissue of the mass became visible (**Fig 6**). This was quite thin and all sharp dissection was stopped at this point and the cyst bluntly dissected out. The caudal part of the mass was enveloped in a bright white fibrous layer, which the authors (N.S.W. and L.K.M.) believed to be one of the fibrous layers previously described (Robertson 2007); however, in reality, this was a large pouch of oesophageal mucosa which had enveloped the caudal border of the mass and had extended to the ventral aspect of the mass. Dissection passed through this layer and, therefore, inadvertently into

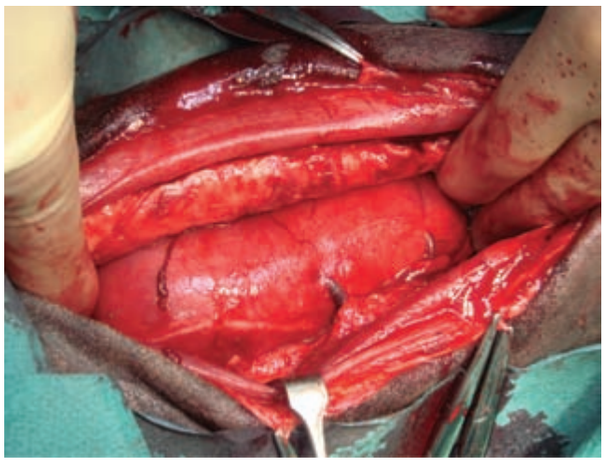

Fig 5:* Sternohyoideus *muscle has been divided, trachea retracted to the top of the figure. The oesophageal musculature is exposed and bulges up into the surgical field due to the presence of the cyst.

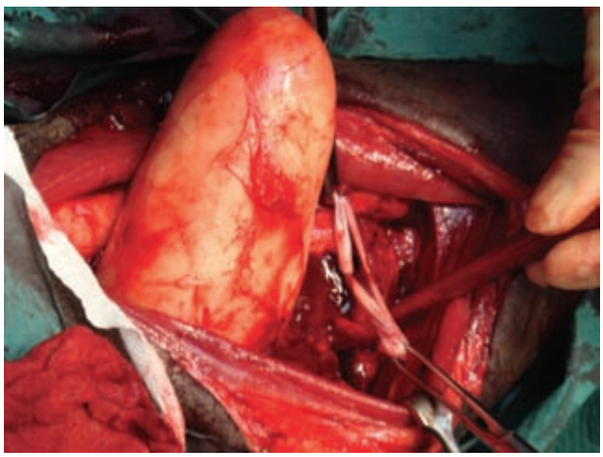

Fig 7: The cyst is being removed. Note the opened oesophageal mucosa to the right of the figure held in the Allis tissue forceps.

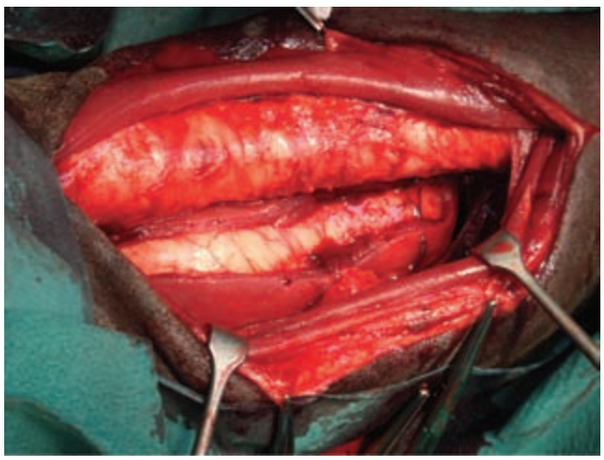

Fig 6: A longitudinal incision has been made through the oesophageal musculature and the cream coloured wall of the cyst has been exposed.

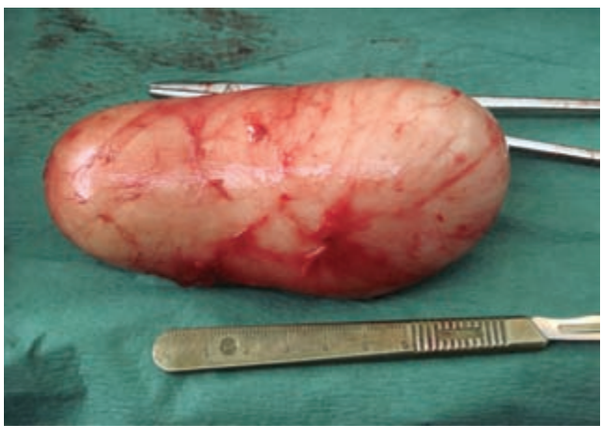

Fig 8: The excised inclusion cyst.

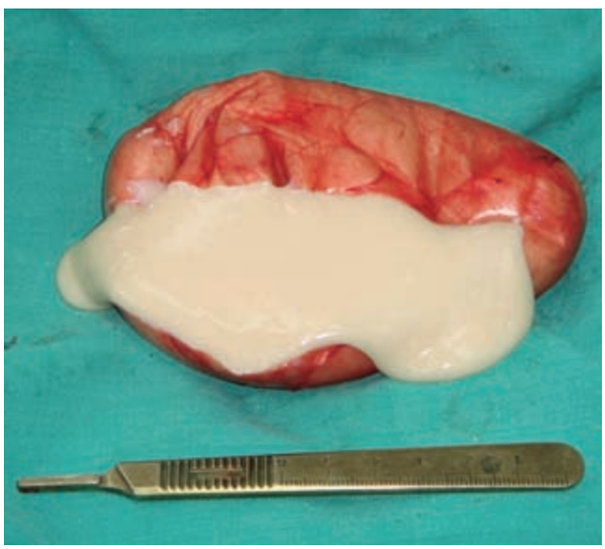

Fig 9: The contents of the inclusion cyst.

the oesophageal lumen. This was repaired with an inverting suture using 3/0 PDS and finishing with an Aberdeen loop to lie the knot within the oesophageal lumen and the surgical site lavaged assiduously. Blunt dissection of the mass proceeded easily and the cyst could then be removed from the oesophageal musculature without encountering any further mucosa (**Figs 7** and **8**). The oesophageal musculature was closed with 3/0 PDS using interrupted cruciate sutures and the same material was used, in a simple continuous manner to re-appose the sternohyoid muscle. The subcutaneous tissues and the skin were closed in routine fashion and a Primapore dressing[1] applied.

The cyst was incised after surgery (**Fig 9**). Samples were sent for histopathology, which revealed normal oesophageal squamous epithelium over a *lamina propria*,

and a deeper *muscularis* layer; there was marked thinning of the tissues in one area.

Post operative regime

The oesophagus can be a difficult structure to manage surgically and therefore a strict management plan was implemented. The pony was starved for 48 h and then fed every 2–3 h with soaked high fibre low energy complete cubes (Economy Cubes)[2] for one week. She was then fed 4 times a day with the same feed for 6 weeks. Throughout this period she was fed at shoulder height, fibre feeds such as hay were not permitted and she was kept away from all edible bedding. No turnout was permitted until 6 weeks post operatively. The pony received 6.6 mg/kg bwt of Gentamicin[3] i.v. once daily and 22000 iu/kg bwt of Benzyl Penicillin[4] i.m. twice daily starting 45 min before surgery. Both antibiotics were continued for 4 days after surgery. The filly also received 2.2 mg/kg bwt of phenylbutazone[5] i.v. twice daily for 3 days commencing on the day of surgery.

Follow-up

The follow-up period after the surgery is 18 months. The incision healed by first intention and the cosmetic outcome was good. Clinically oesophageal function was normal immediately post operatively and the owner and attending practitioner report the pony to be clinically normal. The subject has grown well and competed successfully in show classes.

Discussion

The largest case series of oesophageal inclusion cysts describes 3 cases (Sams *et al.* 1993). Yearlings predominate in this short series. Three further cases were identified by Stick (2006). Individual case reports are also described (Scott *et al*. 1977; Stick *et al*. 1977). Grossly and histologically the cysts resemble an isolated pouch of oesophageal mucosa, which may occur during the embryological development of the alimentary tract. The heritability of this condition has not been studied.

Important differential diagnoses for this condition are the group of cystic lesions that have been described adjacent to the equine nasopharynx and a comprehensive review of these has recently been described (Robertson 2007). Isolated cases describing branchial cysts (Hance *et al*. 1992; David *et al*. 2008) oesophageal/tracheal duplication cyst (Peek *et al*. 1995) and a thyroglossal duct cyst (Kelmer *et al.* 2007) have also been reported.

Surgical techniques of the cervical oesophagus are usually most effectively performed via a ventral midline approach. Although a left ventrolateral approach just ventral to the left jugular vein is useful for oesophagostomy and approaching the caudal quadrant of the cervical oesophagus because of the increasing ventral muscle bulk at this site. Insertion of a nasogastric tube prior to anaesthetic induction is important as insertion can be particularly difficult after induction. The oesophagus readily separates into 2 layers and the mucosal/submucosal layer provides the greater tensile strength and most holding power during closure. Resection techniques are difficult and a limit of 4 cm has been put on the length of oesophagus that may be resected (Stick 1982).

Thoracic imaging to define the presence and degree of aspiration pneumonia was not undertaken. However, the authors recommend that such diagnostic investigations be undertaken particularly to assist in the preanaesthetic assessment.

Alternative treatment options described for cystic lesions in the nasopharyngeal region are marsupialisation, iodine sclerotherapy (Slovis *et al*. 2001) and OK-432 injections (David *et al*. 2008).

Sams *et al*. (1993) were concerned with some of the complications of excision as a surgical treatment. They encountered one case of iatrogenic recurrent laryngeal nerve damage, where they entered one cyst inadvertently and also entered the oesophageal lumen in one horse. They also felt that marsupialisation was a good technique and avoided some of these complications although they also felt that cyst rupture during iodine sclerotherapy as part of marsupialisation could also cause damage to the adjacent neurovascular structures. We noticed that the cyst was very thin walled and switching to blunt dissection as soon as the cream surface of the cyst was encountered was important. This was assisted by the easy nature with which the cyst could be shelled out and therefore made surgical excision more attractive to the authors than marsupialisation. Also taking note that there may be no layers of fibrous tissue as described by Robertson (2007), rather that these layers may be pouches of oesophageal mucosa/submucosa, may reduce inadvertent entry into the oesophagus. If entry does occur within such a pouch it may be worth bearing in mind when decision making about the closure and surgical management of such a pouch that horses tolerate wide necked diverticula considerably better than a stricture. Stick (2006) describes the options of diverticulectomy or inversion to manage the redundant mucosa. The authors (N.S.W. and L.K.M.) chose inversion. There was some excess mucosa, so inversion was felt to be less likely to predispose to stricture formation than mucosal resection and reconstruction.

In conclusion, the authors hope to provide an illustrated approach that has its foundation supplied by drawing information from the major sources within the literature that may prove successful in managing cases of mural oesophageal inclusion cysts.

Manufacturers' addresses

[1]Smith and Nephew, London, UK.
[2]Baileys Horse Feeds, Braintree, Essex, UK.

[3]CP-Pharma Handelsges, Burgdorf, Germany.
[4]Intervet, Milton Keynes, Buckinghamshire, UK.
[5]Arnolds Veterinary Products, Shrewsbury, Shropshire, UK.

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as this serve to demonstrate that the possibility of successful treatment exists'.

We all need to think a little more about killing tumours and perhaps less about giving up and killing horses. Another teachable moment for us all.

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