

Endoscopic Examination of Oesophagus for Obstruction with Concurrent Ventral Cervical Pyomyositis in an Asian Elephant

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Introduction

A 22-year-old, 3000 kg male Asian elephant (*Elephas maximus*) at Bandipur Tiger Reserve, Karnataka, India developed acute dullness, hyporexia and drooling in the month of September 2022. The animal caretakers reported no obvious change in diet or accidental ingestion of foreign bodies. The elephant had normal temperature and vitals but evinced pain upon palpation of the pharyngeal region. The animal showed willingness to eat by accepting oral fluids and gruel but would immediately regurgitate consumed contents, indicating a possible obstruction distal to the pharynx or proximal portion of the oesophagus. Injectable Meloxicam (Melonex, Intas Pharmaceuticals, Gujarat, India; 500 mg IM) was prescribed to manage pain.

Treatment

The following day (Day 2), elephant's condition remained unchanged and blood was collected for a complete count and chemistry panel (Table 1). Severe leucocytosis with shift to left along with elevated liver enzymes were noted. The animal was immediately catheterised intravenously and started on Dextrose Normal Saline (TruELixir Life Sciences labs., Maharashtra, India; 20 l IV), Ringers Lactate (TruELixir Life Sciences labs., Maharashtra, India; 20 l IV), Injectable Amoxycillin (Indian Genomix LAB., Hyderabad, India; 15 g IV), Meloxicam and multivitamins twice a day. 80–100 l of rectal fluids were administered daily to assist in correction of dehydration.

An ultrasound examination of the pharynx and cervical region was performed on the second

day to identify any foreign body obstruction, abscess or abnormal growths that could be obstructing the oesophagus. Although a mass like structure could be observed at the proximal cervical region distal to the pharyngeal apparatus, it could not be confirmed due to lack of sufficient detail and findings were deemed to be inconsistent. Thereafter, it was decided to perform an endoscopic examination of the oesophagus to confirm the diagnosis and possible retrieval of any foreign body.

On Day 3, the elephant was positioned in left lateral recumbency and anaesthesia induced with Inj. Etorphine HcL (Captivon 9.8 mg/ml, Wildlife Pharmaceuticals, SA; 4 mg IM) alone. Anaesthetic induction was achieved within 8 minutes and the animal displayed reduced jaw tone and comfortable respiration and vitals. The mouth was opened using a custom gag and rope restraint fastened to the lower jaw for manual traction. Vitals were monitored manually to assess anaesthetic depth. Intravenous Ringers lactate was administered continuously throughout the process along with amoxycillin, ceftriaxone and tazobactam (Intas Pharmaceuticals, Gujarat, India; 15 g IM), multivitamins and meloxicam.

A 3-m flexible endoscope (Karl Storz & Co., Germany) with light source connected to a video monitor was introduced into the oral cavity and oesophagus (Fig. 1). Endoscopy revealed hard, matted dung like fibres lodged in the proximal aspect of the oesophagus, approximately 0.5–1.0 m from the commissure. Extraction of oesophageal contents using endoscope attachments such as forceps was not possible due to the hard texture and friable nature

of the constricted dung mass. Manual removal of the oesophageal contents was carried out by hand and approximately 2 kg of hard, matted dung boluses were pulled out. Further endoscopic exam revealed presence of dung boluses in the mid-portion of the oesophagus as well. A long flexible PVC pipe with softened, lubricated edges was inserted into the oesophagus to push the blocked contents into the stomach to free the oesophageal lumen.

Once the lumen was confirmed to be free from blockage, the animal was revived using Diprenorphine HCL (Activon 12 mg/ml, Wildlife Pharmaceuticals, SA; 10 mg IV) and the elephant rose to stand without support over the next 8–10 minutes. Endoscopic findings also included erosion of the oesophageal lining and mucosa with severe inflammation and possible ulceration at the points of lodgement.

Oral feed except water was restricted for the next two days to facilitate healing and the animal was maintained on parenteral nutrition. Although the elephant appeared slightly relaxed and showed willingness to consume oral feed, it evinced pain during swallowing and regurgitated significant amounts of water almost immediately. Oral paraffin and injectable metoclopramide (Perinorm, Ipca Lab., Gujarat, India; 150 mg IV) with Neurobion (Martin Dow Ltd, Merck, Germany; 20 ml IV) were injected to facilitate improvement of potential ileus if any, owing to reduced faecal production and absent gut sounds. The elephant was maintained on 80–100 l of rectal fluids twice daily along with intravenous glucose, lactated ringers, multivitamins, Meloxicam, Amoxycillin and Ceftriaxone with Sulbactam.



Figure 1. Endoscopic evaluation of the oesophagus.

Blood parameters continued to present severe leucocytosis and insult to the muscle, liver, and kidney consistent with anorexia and oesophageal lesions (Table 1).

The animal survived for the next four days without improvement and finally succumbed to starvation and septicemia despite intensive treatment and care.

Postmortem

Postmortem examination revealed oesophageal ulceration with mucosal erosion at the point of blockage at the proximal and mid portions of the oesophagus with absence of any strictures throughout the lumen. Excision of ventro-lateral neck muscles revealed a large abscess draining close to 4–5 l of creamy purulent exudate that went unnoticed due to lack of a physical swelling at the time of examination and ultrasonography (Fig. 2). The pyomyositis like condition was restricted to the ventral portion of the neck invading musculature with possible involvement of the oesophagus and associated structures but could not be confirmed at the time due to severe tissue adhesions and necrosis.

Additionally, a complete torsion of the ilio-caecal junction (Fig. 3) was also observed which probably occurred towards the later stages of the disease, ultimately causing death of the patient. Culture of purulent exudate revealed the presence of common *Staphylococcus* spp. and *E. coli* spp. bacteria.



Figure 2. Purulent exudate seated deep within the ventral cervical musculature.

Table 1. Haematology and serum biochemistry values and references ranges of affected elephant collected during the course of treatment. Reference ranges represent minimum and maximum intervals for the Asian elephant as reported in the literature (Janyamethakul & Sripiboon 2017).

Parameter	Values (Day 2)	Values (Day 6)	Reference range
Total WBC ($10^9/l$)	100,000	77,540	7,900 – 21,800
Haemoglobin (g/dl)	15.2	17.3	9.8 – 15.2
Platelet count ($10^9/l$)	2.05	2.35	100 – 577
SGOT (U/l)	61.38	38.63	4 – 56
GGT (U/l)	8.2	8.49	4 – 35
Serum Creatinine (U/l)	3.19	4.17	0.7 – 2.2
Blood Urea (mg/dl)	27.54	12.3	3.1 – 27.2
Alkaline Phosphatase (U/l)	172.9	-	0 – 281.5
Total Protein (g/dl)	7.27	-	6.5 – 8.9
S. Sodium (meq/l)	-	156	98 – 115
S. Potassium (meq/l)	-	4.14	4.1 – 5.6
S. Chloride (meq/l)	-	110	-

Discussion

Oesophageal obstructions in elephants due to palm fronds, tubers and others have been sporadically reported in the past (Nath *et al.* 2006). Commonly presented symptoms are like those of domestic herbivores viz regurgitation, dysphagia, ptyalism and restlessness (Constable *et al.* 2016).

Owing to the anatomical challenges faced in clinical examination of this species, ultrasonography and physical palpations provide limited information of value in such cases. However, endoscopic visualisation continues to be the most preferred technique to identify any obstruction and evaluate the condition of associated soft tissues, but only a handful of endoscopic procedures on elephants to specific to oe-

sophageal obstructions have been reported in literature, especially in the Indian sub-continent (Dumonceaux 2006).

The elephant in this case suffered from pyomyositis and chronic abscess in the ventral neck region that contributed towards oesophageal dysmotility; pathogenesis of which is not fully understood presently but may be extrapolated from similar cases in other species. Since the animal continued to exhibit hypoglossal and swallowing reflexes throughout the course of disease, the affection may be localised caudal to the laryngeal and pharyngeal apparatus between proximal and mid oesophagus including adjoining nerves and musculature.

Although primary aim of treatment was confirmation of obstruction, its retrieval and facilitating oral feeding in the elephant as soon as possible, this elephant did not respond to therapy due to the presence of a large, undrained abscess surrounding the affected oesophageal region, coupled with significant ulceration to the mucosa and possible damage to adjoining nerves and musculature along with severe septicaemia preventing deglutition despite successful retrieval of the foreign body.

In cases where oesophageal obstruction or choke is suspected, aggressive fluid and maintenance therapy is recommended either per rectally or intravenously along with antibiotic

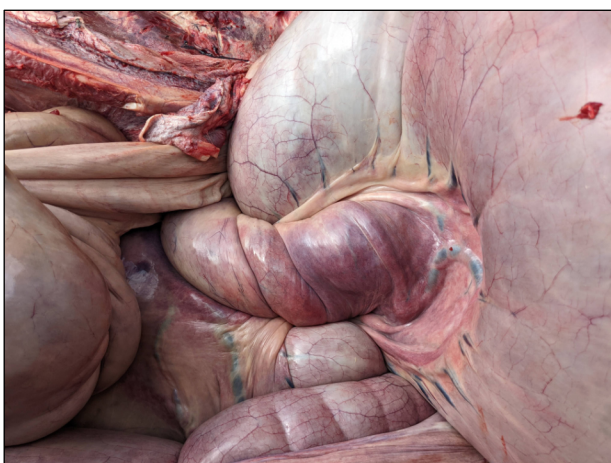


Figure 3. Ilio-caecal torsion.

and pain management (Phair *et al.* 2014). Complete evaluation of the oral cavity for any dental malocclusion, laryngeal paralysis, and endoscopic evaluation of the oesophageal lumen for ulceration and foreign body obstruction should be undertaken to arrive at a comprehensive diagnosis at the earliest.

Prognosis of oesophageal obstruction is grave in elephants, despite retrieval of the foreign body even through surgical means as reported in various literatures (Phair *et al.* 2014). However, in this case, successful retrieval of the object from the oesophageal lumen may have facilitated recovery if not for the chronic pyomyositis and abscess that significantly reduced the animal's ability at oral feeding, diminishing any chances of survival. However, at this point it was unclear if the abscess contributed to the choke or vice versa due to severity of tissue adhesions and high degree of necrosis in the affected area.

This is the first reported case of oesophageal choke in India wherein endoscopic examination, and retrieval was carried out on a captive Indian elephant. It provides a description of symptoms and disease progression along with details of the anaesthetic protocol used, supportive therapy and treatment regimen employed which may facilitate successful treatment of less severe cases of oesophageal obstructions. Oesophageal choke could be considered a fast-progressing condition with a grave prognosis in elephants, especially due to the difficulty in direct visual examination of the oral cavity, inability to palpate the lodged mass sufficiently physically and to keep up with supplementing the high energy requirement of the pachyderm which may have gone off feed (Dumonceaux 2006). Additionally, obstructed masses may significantly damage surrounding tissues until the time it has been retrieved, further complicating any decent chances at survival.

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