

# Case Report: Esophageal Obstruction and Perforation in a Pekingese Dog Caused by a Matzah Ball

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## ABSTRACT

This case report describes a 6-year-old, castrated male, Pekingese dog diagnosed with a distal esophageal obstruction caused by the ingestion of a matzah ball and the life-threatening complications that may occur from the ingestion of a whole matzah ball. The dog was treated conservatively for two days with no clinical improvement. He was then referred to the Hebrew University Veterinary Teaching Hospital where thoracic radiographs detected a 3.5 cm soft tissue opacity in the distal thoracic esophagus. Esophagoscopy confirmed the suspicion of esophageal obstruction, however attempts to dislodge the matzah ball were unsuccessful. Thoracic exploratory surgery was performed detecting a right sided thoracic esophageal perforation with a few pieces of the matzah ball in the thoracic cavity. The owner elected euthanasia.

**Keywords:** Matzah Ball; Esophageal Foreign Body; Endoscopy; Esophagus; Esophageal Obstruction; Esophageal Perforation.

## INTRODUCTION

Esophageal foreign body obstruction is considered an emergency due to the potential for serious and life-threatening complications (1). The incidence is quite variable between different studies: one paper described esophageal foreign bodies as a relatively uncommon emergency presentation during a 5-year period (2) while other studies described esophageal foreign bodies entrapment as fairly common (1, 3). The most common foreign bodies reported in dogs are bones. However, fishhooks, dental chews and balls were also mentioned (2, 3, 4, 5). Esophageal obstructive foreign bodies most commonly lodge in the distal portion of the esophagus (2, 4). Diagnosis is usually made with survey thoracic or cervical radiographs and confirmed by esophagoscopy (4). Small or non-radiopaque foreign bodies' material may be difficult to view (2, 6).

A matzah ball is a soup dumpling made from a mixture of matzah meal, eggs, water and fat (oil, margarine or chicken fat) and is served during the Jewish holiday of Passover. This

case report describes a 2-day duration of complete esophageal obstruction in a Pekingese dog caused by a matzah ball, an unusual esophageal foreign body, leading to a prolonged pressure necrosis and esophageal perforation which necessitated euthanasia.

## CASE REPORT

A 6-year-old, castrated male, Pekingese dog was presented to the referring veterinarian with a complaint of apathy, anorexia and frequent regurgitation which began a day before presentation following the consumption of a matzah ball. The dog had been vaccinated against rabies and canine distemper, adenovirus type 1, leptospirosis, parvovirus and parainfluenza (DHLPP) but was not dewormed or prophylactically treated against *Spirocerca lupi*. Five months prior to presentation the dog had dental prophylaxis.

The referring veterinarian provided supportive care including intravenous 0.9% Sodium Chloride (normal saline solution), ampicillin (Penibrin, Sandoz GmbH, Kundl,

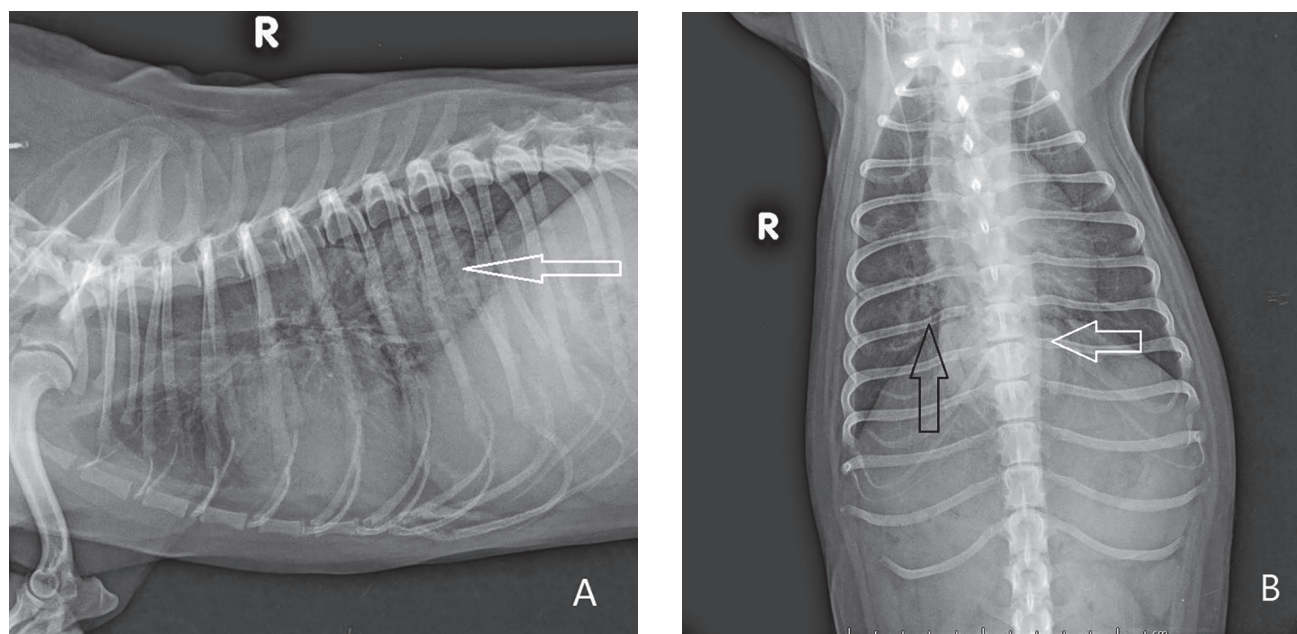
Austria, 20 mg/kg, subcutaneously) and metoclopramide (Pramin, Rafa laboratories, Jerusalem, Israel, 0.5 mg/kg, subcutaneously) due to suspected gastritis. Blood work revealed elevated hematocrit (65%; reference interval [RI] 37%-55%), leukocytosis ( $31.25 \times 10^3/\mu\text{L}$ ; RI  $8-17 \times 10^3/\mu\text{L}$ ), neutrophilia ( $29.3 \times 10^3/\mu\text{L}$ ; RI  $3.6-13.1 \times 10^3/\mu\text{L}$ ), lymphopenia ( $0.63 \times 10^3/\mu\text{L}$ ; RI  $0.72-4.1 \times 10^3/\mu\text{L}$ ). Biochemistry profile revealed an elevated urea (94.9 mg/dL; RI 10.7-53.5 mg/dL). The dog was discharged but was returned to the referring veterinarian the following day due to a lack of improvement. The veterinarian administered intravenous saline and referred the dog to the emergency department at the Hebrew University Veterinary Teaching Hospital, Koret School of Veterinary Medicine.

On presentation, physical examination revealed depressed mentation, approximately 8% dehydration, pale mucous membranes, weak femoral pulse, tachypnea (44 breaths per minute; RI 18-34 breaths per minute), tachycardia (200 beats per minute; RI 70-120 beats per minute) and an elevated temperature ( $39.9^\circ\text{C}$ ; RI  $38-39.2^\circ\text{C}$ ). Thoracic auscultation was within normal limits. Abdominal palpation was within normal limits with dry feces palpated in the distal colon. The physical examination's findings, the clinical signs and the complete blood count results suggested the dog was in septic

shock. During intravenous catheterization, the dog suffered an episode of asystole which necessitated intubation followed by a short course of cardiopulmonary resuscitation and the administration of one dose of adrenaline (Adrenalin S.A.L.F, S.A.L.F S.p.A, Bergamo, Italy, 0.01 mg/kg, intravenously). The dog then returned to its previous heart rate. Additional blood work detected hypoglycemia (45 mg/dL; RI 60-147 mg/dL) and elevated creatinine (4.03 mg/dL; RI 0.3-1.2 mg/dL).

Focused assessment with sonography in trauma of the abdominal and thoracic cavities ("FAST") did not demonstrate either free peritoneal and pleural fluids. Right lateral and dorsoventral thoracic radiographs performed detected a 3.5 cm soft tissue opacity in the caudal thoracic esophagus and a severe distension of the entire thoracic esophagus with fluid and gas, raising the suspicion of esophageal obstruction (Figure 1). An alveolar pattern was noted in the right middle and caudal lung lobes (Figure 1), compatible with aspiration pneumonia or non-cardiogenic pulmonary edema.

The differential diagnoses for the radiographic findings were an obstructive esophageal foreign body, *Spircerca lupi* related mass, an esophageal neoplasm, an esophageal abscess,



**Figure 1:** (A) Right lateral thoracic radiograph of a 6 year old Pekingese dog demonstrating a soft tissue opacity in the caudal thoracic esophagus (white arrow). The thoracic esophagus is distended with fluids and gas cranial to the obstruction. (B) Dorsoventral thoracic radiograph of the same dog with a soft tissue opacity visible between the heart and diaphragm (white arrow). An alveolar pattern is visible in the right middle and caudal lung lobes (black arrow).

aortic aneurysm, diaphragmatic rupture and paraesophageal hernia (7).

The dog was stabilized with continuous intravenous crystalloid fluid (Lactated Ringer solution, 20 ml/kg bolus and then 5 ml/kg/hour, intravenously), oxygen administration (1 L/10 kg/minute, intranasally), dextrose (1 ml/kg diluted in a 1:1 ratio as a bolus, intravenously), Maropitant (Cerenia, Fareva, Amboise, France, 1 mg/kg, subcutaneously), amoxicillin and clavulanic acid (Clavenir, Laboratoty Reig Jofre, S.A, Spain, 15 mg/kg, intravenously) and Metronidazole (Metronidazole, B. Braun, Melsungen, Germany, 10 mg/kg, intravenously). Butorphanol (Butomidor, Richter Pharma, Wels, Austria, 0.5 mg/kg, intravenously) was administered as pre-medication followed by induction with Midazolam (Midolam, Rafa Laboratories, Jerusalem, Israel, 0.2 mg/kg, intravenously) and Propofol (Lipuro, B. Braun, Melsungen, Germany, 1.5 mg/kg, intravenously). The dog was intubated (4.5 mm cuffed tracheal tube) and maintenance was performed with Isoflurane (Isoflurane, USP Terrel, Piramal Critical Care Inc., Bethlehem, Pennsylvania, USA).

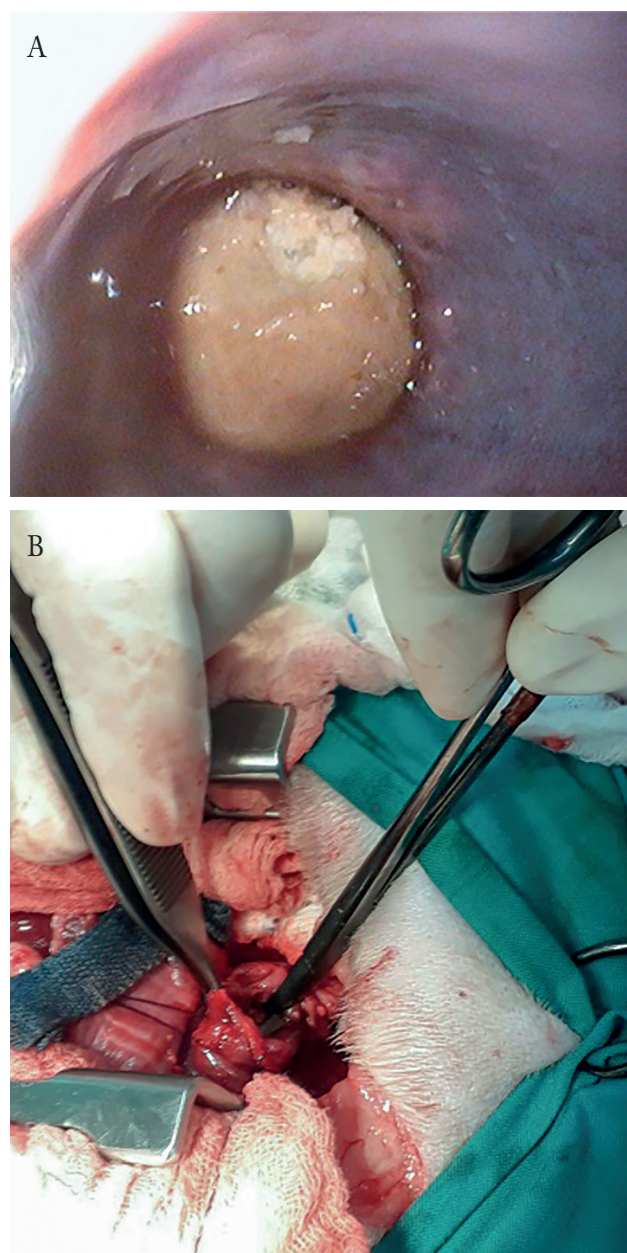
Esophagoscopy was performed using a 7.8 mm in diameter, 140 cm long endoscope (Karl Storz GmbH, Tuttlingen, Germany). A matzah ball was visualized in the caudal thoracic esophagus completely obstructing the esophageal lumen (Figure 2A). Removal of the matzah ball using an endoscopic snare and basket was not possible due to the solid consistency of the matzah ball and the esophagoscopy was discontinued when a pre-existing esophageal perforation was detected. The dog was then transferred to the operating theatre for thoracic exploratory surgery in which a complete right-sided esophageal perforation was found with considerable mucosal damage around the perforation (Figure 2B) along with spillage of esophageal content into the thoracic cavity.

The owner elected to euthanize the dog due to financial constraints and concerns for major complications. A post-mortem evaluation was not permitted.

## DISCUSSION

Esophageal foreign bodies are a well-recognized presentations in small animal practice (8). Clinical signs vary with the size and the location of the entrapment and may include restlessness, hypersalivation, regurgitation, retching, respiratory distress (3) and death (2). One study observing prognostic indicators in 223 dogs with esophageal foreign bodies

found a significant correlation between the duration of the foreign body entrapment in the esophagus and the prognosis (3). Another study demonstrated an increased complications rate in esophageal foreign bodies of more than 3 day's duration (6). The dog in this case report arrived at the hospital two days after consumption of the esophageal foreign body. Esophagoscopy detected an esophageal perforation,



**Figure 2.** (A) Image taken during esophagoscopy of a 6 year old Pekingese dog. A complete esophageal obstruction caused by the matzah ball was demonstrated. (B) Image taken during thoracic exploratory surgery of the same dog. A large esophageal perforation was demonstrated.



caused by prolonged pressure necrosis, leading to leakage of esophageal content to the mediastinum. Radiographs were indicative of aspiration pneumonia. These processes were probably the cause for septic shock and asystole. Asystole was probably a direct result of the myocardial ischemia and necrosis (9, 10).

There is limited information available regarding the radiographic findings in dogs with confirmed esophageal foreign bodies (2). Findings may include a radiopaque foreign body, esophageal dilation (gas/ingesta) cranial to the obstruction, small areas of gas accumulation around the foreign body, displacement of surrounding organs, especially ventral and rightward displacement of the trachea and signs of secondary complications such as aspiration pneumonia. Radiolucent foreign bodies may require non-ionic contrast medium administration for the diagnosis (11, 12). As the most common esophageal foreign body is osseous, cervical and thoracic survey radiographs are often sufficient for the diagnosis of an esophageal foreign body (2). Foreign bodies may be overlooked due to their movement by the time of imaging, incompleteness of the radiographic examination and a radiolucent composition.

Radiographs taken in this case report were performed more than two days post-ingestion of the foreign body. The foreign body itself was visible due to the presence of air in the esophagus and its soft tissue opacity. Data comparing the visibility of esophageal foreign bodies in orthogonal radiographs is lacking although one study comparing the right and left lateral views of caudal esophageal soft tissue masses found no significant radiographic differences between these two views. The same study claims that esophageal foreign bodies were significantly more frequently seen in dorsoventral (DV) and ventrodorsal (VD) views rather than in lateral views and in some cases, the esophageal mass may be visible only in DV or VD views (7). It is the author's experience that right and left thoracic views may demonstrate esophageal foreign bodies quite differently, probably due to the different distribution of the esophageal fluid and gas. Right and left lateral views are recommended in order to visualize sharp edges of the esophageal foreign body which may stifle endoscopic retrieval. A DV radiograph of the chest is also recommended as the surrounding inflated lung may improve visibility of the caudal esophageal area (7). Radiographs should be performed as close as possible to the time of esophagoscopy as one study found that endoscopic and radiographic localization of the

esophageal foreign body were not in agreement in 32% of cases (2).

The dog in this case was not prophylactically treated against *Spirocerca lupi* and one of the differential diagnoses was an esophageal mass caused by *Spirocerca lupi*. Spirocercosis may cause esophageal obstruction, perforation and subsequent pyothorax (13, 14). However, the amount of air surrounding the foreign body, the clarity in which the cranial border of the foreign body was seen in the lateral radiograph, the absence of thoracic vertebral spondylitis, which is an almost invariable finding in spirocercosis (13) and the acute onset of the clinical signs indicated that spirocercosis was not the first differential diagnosis in this case.

## SUMMARY

This case report describes the life-threatening complications that may occur from the ingestion of a whole matzah ball, which is an unusual foreign body. The prolonged entrapment of the matzah ball in the distal esophagus caused perforation due to the continuous pressure necrosis. The radiographic findings supported the diagnosis of an esophageal foreign body which was confirmed by esophagoscopy. Clinicians should be aware of this type of an unusual foreign body when treating dogs with gastrointestinal clinical signs during Passover.

## REFERENCES

1. Burton, A.G., Talbot, C.T. and Kent, M.S.: Risk factors for death in dogs treated for esophageal foreign body obstruction: A retrospective cohort study of 222 cases (1998-2017). *J. Vet. Inter. Med.* 31:1686-1690, 2017.
2. Thompson, H.C., Cortes, Y., Gannon, K., Bailey, D. and Freer, S.: Esophageal foreign bodies in dogs: 34 cases (2004-2009). *J. Vet. Emerg. Crit. Care.* 22:253-261, 2012.
3. Brisson, B. A., Wainberg, S. H., Malek, S., Reabel, S., Defarges, A. and Sears, W.C.: Risk factors and prognostic indicators for surgical outcome of dogs with esophageal foreign body obstructions. *J. Am. Vet. Med. Assoc.* 252:301-308, 2018.
4. Leib, M.S. and Sartor, L.L.: Esophageal foreign body obstruction caused by a dental chew treat in 31 dogs (2000-2006). *J. Am. Vet. Med. Assoc.* 232:1021-1025, 2008.
5. Binvel, M., Poujol, L., Peyron, C., Dunie-Merigot, A. and Bernardin, F.: Endoscopic and surgical removal of oesophageal and gastric fishhook foreign bodies in 33 animals. *J. Small. Anim. Pract.* 59:45-49, 2018.
6. Gianella, P., Pfammatter, N. S. and Burgener, I. A.: Oesophageal and gastric endoscopic foreign body removal: complications and follow-up of 102 dogs. *J. Small. Anim. Pract.* 50:649-654, 2009.

7. Kirberger, R.M., Dvir, E. and van der Merwe, L.L.: The effect of positioning on the radiographic appearance of caudodorsal mediastinal masses in the dog. *Vet. Radiol. Ultrasound*. 50:630-634, 2009.
8. Keir, I., Woolford, L., Hirst, C. and Adamantos, S.: Fatal aortic oesophageal fistula following oesophageal foreign body removal in a dog. *J. Small. Anim. Pract.* 51:657-660, 2010.
9. Bulmer, B.J.: Cardiovascular dysfunction in sepsis and critical illness. *Vet. Clin. Small. Anim.* 41:717-726, 2011.
10. Moore, K.E and Murtaugh, M.J.: Pathophysiologic characteristics of hypovolemic shock. *Vet. Clin. North. Am. Small. Anim. Prac.* 31:1115-1128, 2001.
11. Wagner, W.M.: The oesophagus. In: Schwarz, T. and Johnson, V. BSAVA Manual of Canine and Feline Thoracic Imaging. British Small Animal Veterinary Association. Gloucester. pp. 200-212, 2008.
12. Gaschen, L.: The Canine and Feline Esophagus. In: Thrall D. E. Textbook of Veterinary Diagnostic Radiology. Elsevier Saunders, pp. 500-521, 2013.
13. van der Merwe, L.L., Kirberger, R.M., Clift, S., Williams, M., Keller, N. and Naidoo V.: *Spirocerca lupi* infection in the dog: A review. *Vet. J.* 176:294-309, 2008.
14. Klainbart, S., Mazaki-Tovi, M., Auerbach, N., Aizenberg, I., Bruchim, Y., Dank, G., Lavy, E., Aroch, I. and Harrus, S.: Spirocercosis-associated pyothorax in dogs. *Vet. J.* 173:209-214, 2007.