

Concurrent Hiatal Hernia and Megaesophagus Secondary to a Nasopharyngeal Polyp in a 6-Month-Old Cat

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ABSTRACT

Background: Nasopharyngeal polyps are benign and inflammatory masses assumed to arise from the middle ear or the eustachian tube with extension into the pharynx. The most common clinical signs associated with nasopharyngeal polyps include respiratory stertor, dyspnea, and otic discharge. Neurological signs, including head tilt, facial nerve paralysis, and ataxia, might indicate concurrent involvement of the middle or inner ear. The objective of the current report is to describe a case of a feline nasopharyngeal polyp with a concurrent hiatal hernia and megaesophagus, both spontaneously resolved after removal of the polyp.

Case: A 6-month-old female intact domestic shorthair cat was presented for evaluation of lethargy, anorexia, and upper respiratory signs, such as stridor, stertor, and dyspnea. A thoracic radiography revealed esophageal dilation caudal to the cardiac silhouette, suggestive of megaesophagus with gaseous filtration. An esophagram confirmed a hiatal hernia and megaesophagus. Computed tomography revealed a nasopharyngeal mass adjacent to the soft palate and a soft-tissue density in the right tympanic bulla. A tentative diagnosis of a nasopharyngeal polyp was made. After the ventral bulla osteotomy, the nasopharyngeal mass was removed by a gentle traction avulsion technique. Six days after the surgery, hiatal hernia and megaesophagus were spontaneously resolved. Based on histopathologic exam, the mass was found to be an inflammatory nasopharyngeal polyp. Two months after surgery, the owner reported that the patient's condition had returned to baseline with a good appetite, and the thoracic radiography was within normal limit.

Discussion: For successful treatment of a nasopharyngeal polyp, traction avulsion of the polyp with or without a ventral bulla osteotomy is recommended. However, in patients with otitis media, a ventral bulla osteotomy followed by traction avulsion of the polyp is recommended in order to reduce the rate of polyp recurrence. Common clinical signs of a nasopharyngeal polyp are stertor, stridor, dyspnea, dysphagia, and open-mouth breathing, which are identified in a chronic upper airway obstruction. A hiatal hernia secondary to a nasopharyngeal polyp has not been reported so far. However, a relationship between chronic upper airway obstruction and hiatal hernias has been proposed previously. Moreover, hiatal hernia resolved spontaneously after removal of the nasopharyngeal polyp suggests that the occurrence of the hiatal hernia was secondary to the nasopharyngeal polyp. In addition to the hiatal hernia, megaesophagus was also identified in the present case. Megaesophagus secondary to a chronic upper airway obstruction from a nasopharyngeal obstruction has been reported. However, megaesophagus is also thought to occur secondary to hiatal hernias. Therefore, in the current study, it is unclear whether the megaesophagus was solely a result of the obstructive nature of the nasopharyngeal polyp or a combination of the hiatal hernia and the nasopharyngeal polyp. In conclusion, any cat with clinical signs of an upper airway obstruction and a concurrent hiatal hernia and megaesophagus should be thoroughly investigated for a nasopharyngeal polyp, as well as other gastrointestinal and systemic causes. Furthermore, this case suggests that the prognosis for a concurrent hiatal hernia and megaesophagus is good in cats if the nasopharyngeal polyp is properly removed.

Keywords: cat, hiatal hernia, megaesophagus, nasopharyngeal polyp.

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INTRODUCTION

Nasopharyngeal polyps are benign, space-occupying, non-neoplastic, and inflammatory masses assumed to arise from the middle ear or the eustachian tube with extension into the pharynx. There are several factors believed to contribute to the formation of a nasopharyngeal polyp, including an ascending infection from the nasopharynx, a response to a prolonged upper respiratory tract infection, chronic inflammation of the middle ear, and a congenital origin [10,15,17]. The exact etiology, however, remains unclear.

Hiatal hernia is a protrusion of abdominal contents, such as the cardia or fundus of the stomach, through the esophageal hiatus into the thorax [13,14]. Hiatal hernias are often believed to stem from congenital anomalies; however, previous studies have reported that neuromuscular diseases affecting the diaphragm, as well as airway obstruction, can also contribute to development of a hiatal hernia [5,7]. Although it is assumed that many animals with hiatal hernias are asymptomatic [16], hiatal hernias have also been associated with gastroesophageal reflux, resulting in esophagitis, regurgitation, vomiting, and dysphagia.

Megaesophagus is a disorder of the esophagus characterized by esophageal dilation and hypomotility [19]. Congenital megaesophagus can result from vascular ring anomalies or esophageal dysmotility, while acquired megaesophagus can develop in association with reduced responsiveness to esophageal distention due to neural dysfunction [8].

To the author's knowledge, this is the first case report describing a feline nasopharyngeal polyp with a concurrent hiatal hernia and megaesophagus, both spontaneously resolved after removal of the polyp.

CASE

A 6-month-old female intact domestic short-hair cat, weighing 1 kg, was presented for evaluation of lethargy, anorexia, and upper respiratory signs, including stridor, stertor, and dyspnea. On initial presentation, nasal discharge and open-mouth breathing with stridor and exertional dysphagia were identified. On physical examination, the vital parameters were within normal limits. A complete blood count revealed mild anemia (hematocrit 24.7%; reference range [RR] 30.3%-52.3%). An increased aspartate aminotransferase (704 U/L; RR 12-130) level was also identified. Feline leukemia virus antigen and feline immunodeficiency

antibody kit1 (SNAP combo test) results were negative. A thoracic radiographic examination revealed fractures of the 4th and 5th ribs with adjacent left cranial lung lobe collapse. Esophageal dilation caudal to the cardiac silhouette was also identified (Figure 1A), suggestive of megaesophagus with gaseous filtration. An esophagram using iohexol² (Omnipaque[®]) confirmed a hiatal hernia and megaesophagus (Figure 1B). Despite conservative treatment, the upper respiratory signs, including stridor and stertor, remained. Therefore, computed tomography³ (CT, Aquilion Lightning 160[®]) imaging was performed to further investigate for nasopharyngeal lesions, such as a mass or stenosis. CT imaging revealed a nasopharyngeal mass adjacent to the soft palate (Figure 2A) and a soft-tissue density in the right tympanic bulla (Figure 2B). A tentative diagnosis of a nasopharyngeal polyp was made based on these clinical, radiographic, and CT findings.

The patient was premedicated with an intravenous injection of butorphanol⁴ (Butophan[®] - 0.5 mg/kg) and amoxicillin-clavulanic acid⁵ (Amocla[®] - 20 mg/kg) before induction with alfaxalone⁶ (Alfaxan[®] - 4 mg/kg). After administration of isoflurane⁷ (Isoflurane[®]), tracheal intubation was performed. During the surgery, the cat was administered normal saline⁷ (0.9% NS[®]) intravenously at a constant infusion rate of 5 mL/kg/h.

With the patient placed in the dorsal recumbent position, a skin incision was made between the ramus of the mandible and the wing of the atlas. After an incision in the platysma muscle, the digastricus muscle was bluntly dissected from the hypoglossal and styloglossal muscles. Elevating the soft tissue from the ventral side of the bulla, a pneumatic burr⁸ (MMD-100) was used to perform an osteotomy. Subsequently, the dorsal compartment of the bulla was carefully opened in the same manner, with special care to minimize damage to the promontory. Rather than finding the attachment site of the mass, only exudates were identified, which were collected for microbial culture and sensitivity testing. The entire tympanic cavity was then flushed several times with sterile saline, and the skin was closed in a routine manner. After the ventral bulla osteotomy, the nasopharyngeal mass was removed by a gentle traction avulsion technique, with retraction of the soft palate using a spay hook. Subsequently, the mass was submitted for histopathological evaluation. Slight hemorrhaging was observed from the attachment site to the soft palate, which was stopped within a few minutes. The

patient recovered uneventfully from anesthesia. On histopathology, the mass was found to be an inflammatory nasopharyngeal polyp (Figure 3). For postoperative pain management, a 5 µg/h buprenorphine transdermal patch⁹ (Norspan[®]) was applied. Furthermore, according to a previous study [2], prednisolone¹⁰ (Solondo[®]) was administered at dose of 1 mg/kg daily for 2 weeks. The day after the surgery, the patient demonstrated miosis and elevation of the third eyelid, signs consistent with Horner's syndrome, common sequelae to a ventral bulla osteotomy. On day 3, these signs were resolved. On day 6, the hiatal hernia and megaesophagus were no longer identified on thoracic radiography (Figure 4). No growth of aerobic or anaerobic bacteria were identified on the right tympanic bulla culture. The patient was reevaluated 2 months later. The owner reported that the patient's condition had returned to baseline with a good appetite, and the thoracic radiography was within normal limit. Further follow-up assessment was performed via telephone interview from the owner 6 months after surgery and the owner reported a complete recovery of the patient from the upper airway obstruction signs.

DISCUSSION

The most frequently reported clinical signs associated with nasopharyngeal polyps include respiratory stertor, dyspnea and otic discharge [4]. Neurological signs, including head tilt, facial nerve paralysis, and ataxia, have been reported to indicate concurrent involvement of the middle or inner ear [9]. Nasopharyngeal polyps are known to occur in young cats; however, polyps in older cats have also been identified [18], and no sex or breed predispositions have been reported [9]. In gross appearance, nasopharyngeal polyps present as oval, white-to-pink, pedunculated masses with stalks originating from the mucosal lining of the nasopharynx, the eustachian tube, or the tympanic bulla [11]. To differentiate nasopharyngeal polyps from neoplastic lesions or other causes of infectious otitis, histopathologic examination of polyps should be performed [3].

For effective management of a nasopharyngeal polyp, traction avulsion of the polyp with or without a ventral bulla osteotomy is recommended [9]. It is well known that a ventral bulla osteotomy dramatically decreases the likelihood of polyp recurrence, with recurrence rates of only 0%-8%, which are much

less than the 36%-41% recurrent rates reported after polyp removal by traction only. Moreover, a recent study identified a significant decrease in polyp recurrence rates in cats who receive prednisolone after polyp removal [2]. In patients without evidence of otitis media on imaging modalities like radiography or other advanced imaging techniques, traction can be an initial management strategy, since the expected recurrence rates are lower without concurrent otitis media. However, in patients with otitis media, a ventral bulla osteotomy followed by traction avulsion of the polyp is recommended [9]. A ventral bulla osteotomy is commonly performed before polyp traction in order to identify and free the attachment of the polyp to the middle ear or the eustachian tube, facilitating a more complete removal during subsequent traction. In the present case, a soft tissue density in the right tympanic bulla was confirmed on CT imaging; therefore, it was deemed necessary to perform a ventral bulla osteotomy for disconnection of the base of the polyp and to collect a sample of exudate [9]. To reduce the rate of polyp recurrence after surgery, a ventral bulla osteotomy followed by traction avulsion of the polyp was executed with oral administration of prednisolone.

Common clinical signs of a nasopharyngeal polyp, including stertor, stridor, dyspnea, dysphagia, and open-mouth breathing, are consistent with a chronic upper airway obstruction [2], with most of these signs identified in the present case. More severe clinical manifestations of a chronic upper airway obstruction include pulmonary hypertension and megaesophagus. Development of pulmonary hypertension in association with an upper airway obstruction caused by a nasopharyngeal polyp has been reported previously [12]. Megaesophagus secondary to a chronic upper airway obstruction from a nasopharyngeal obstruction caused by a polyp or stenosis has also been reported [4,5]. However, a hiatal hernia secondary to a nasopharyngeal polyp has not been reported prior to this case. Whether or not the nasopharyngeal polyp potentiated the development of the hiatal hernia is speculative; however, a relationship between chronic upper airway obstruction and hiatal hernias has been proposed [7]. Specifically, an upper airway obstruction can increase negative intrapleural and intrathoracic pressures, pulling the stomach into the thoracic cavity. This paradoxical cranial displacement of the stomach can cause stretching of the phrenicoesophageal ligament, resulting in a hiatal

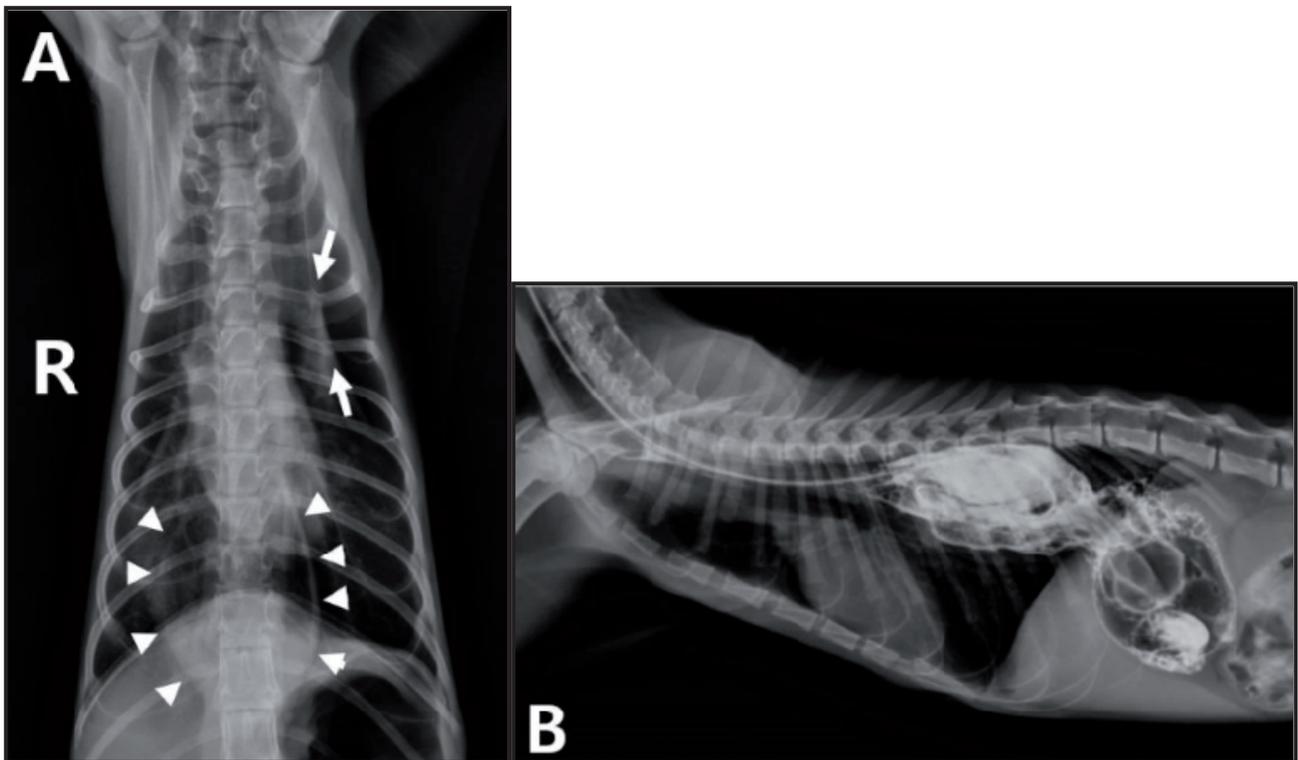


Figure 1. Throacic radiography. A- On a ventrodorsal radiographic image, 4th and 5th rib fractures (arrow) with left cranial lung lobe collapse were identified. Megaesophagus, along with gaseous filtration (arrowhead), were also identified. B- On a right lateral radiographic image of the positive-contrast esophagram, a hiatal hernia and megaesophagus were identified.

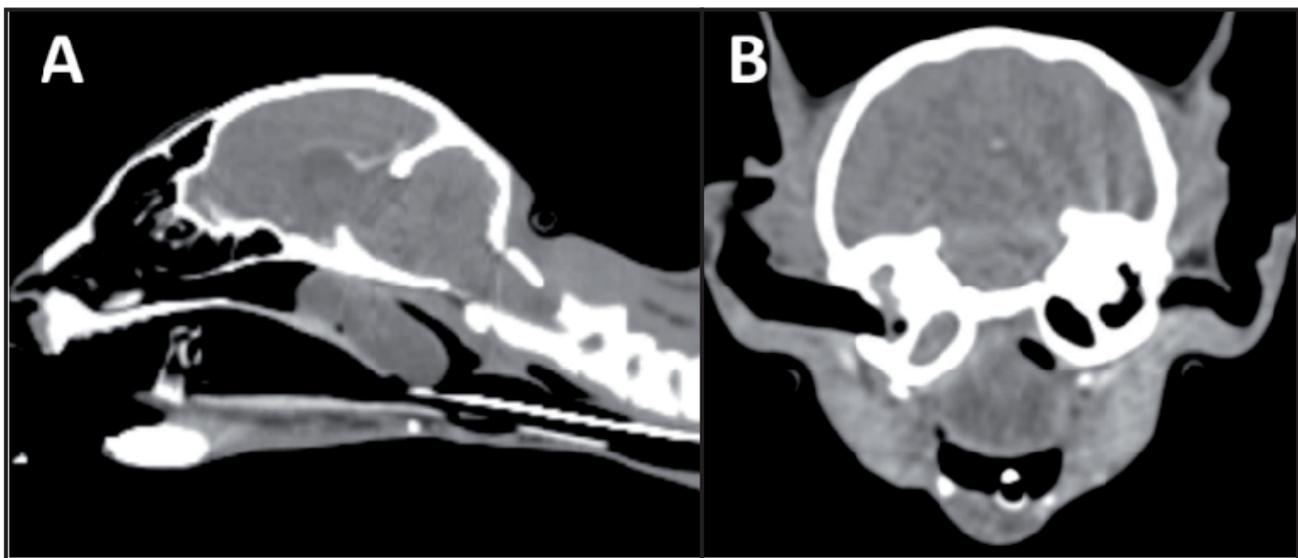


Figure 2. Postcontrast CT image. A- A space-occupying mass adjacent to the soft palate in the nasopharynx was observed on the sagittal plane. B- A soft tissue density in the right tympanic bulla was observed on the transverse plane.

hernia. In the present case, the patient's hiatal hernia had resolved spontaneously after removal of the nasopharyngeal polyp on radiography, suggesting that the occurrence of the hiatal hernia was secondary to the nasopharyngeal polyp. Moreover, this case's multiple rib fractures provide additional evidence that the hiatal hernia occurred secondary to the nasopharyngeal polyp. According to a previous study, the coexistence of multiple rib fractures with a hiatal hernia is highly

suggestive of increased intrapleural pressure, which is expected with a nasopharyngeal polyp [1]. Since the present case had no history of precipitating trauma to account for the 4th and 5th rib fractures, it is assumed that the prolonged respiratory effort induced by the nasopharyngeal polyp resulted in an abnormal thoracic bellows mechanism, leading to stress fractures of the ribs and an acquired hiatal hernia [7].

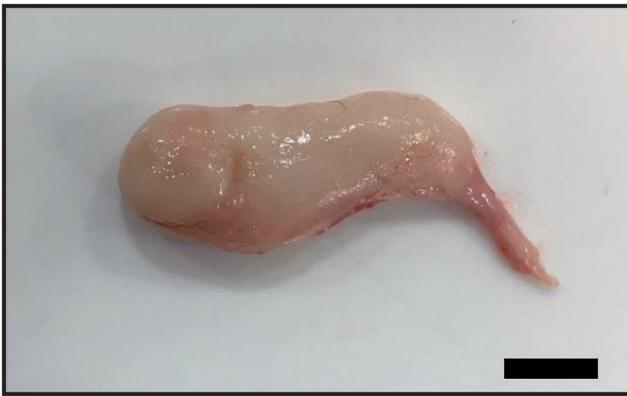


Figure 3. Gross appearance of the nasopharyngeal polyp. White-to-pink, pedunculated mass with a stalk [Bar = 1 cm].



Figure 4. On a right lateral radiographic image of the thorax after removal of nasopharyngeal polyp on day 6, the previous hiatal hernia and megaesophagus were no longer identified.

In addition to the hiatal hernia, megaesophagus was also identified in the present case. In general, megaesophagus can result from various underlying causes, including myasthenia gravis, esophagitis, dysautonomia, and hereditary or idiopathic factors. However, despite the lack of an acetylcholine receptor antibody titer in the present case, the megaesophagus was assumed to be secondary to the upper airway obstruction caused by the polyp for several reasons, including a lack of additional clinical signs associated with myasthenia gravis or dysautonomia and the spontaneous regression of the megaesophagus after removal of the polyp. On the other hand, megaesophagus is also thought to occur secondary to hiatal hernias [5]. In a previous study [16], it was proposed that a hiatal hernia weakens attachments at the hiatus, causing intermittent cranial movement of the esophageal junction. This, in turn, can cause gastroesophageal reflux, resulting in esophagitis and megaesophagus. Resolution of megaesophagus after correction of a hiatal hernia has been also reported in a previous study [6]. Thus, in the present case, it is unclear whether the megaesophagus was solely a result of the obstructive nature of the

nasopharyngeal polyp or a combination of the hiatal hernia and the nasopharyngeal polyp.

In conclusion, any cat with clinical signs of an upper airway obstruction and a concurrent hiatal hernia and megaesophagus should be thoroughly investigated for a nasopharyngeal polyp, as well as other gastrointestinal and systemic causes. Furthermore, this case suggests that the prognosis for a concurrent hiatal hernia and megaesophagus is good in cats if the nasopharyngeal obstruction is properly managed.

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Declaration of interest. The author reports no conflicts of interest. The author alone is responsible for the content and writing of paper.

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