

## What is Your Diagnosis?

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### *Signalment*

An unknown of age, female, domestic shorthaired cat.

### *History*

The patient was showed up to the Small Animal Teaching Hospital, Chulalongkorn University due to the clinical signs of a large amount of subcutaneous emphysema. The cat has been raised as an outdoor cat, which previously has disappeared for a few days. When the cat has returned, she was come back along with the clinical signs of hypersalivation and a large amount of subcutaneous emphysema.

### *Clinical examination*

In addition to the hypersalivation and

subcutaneous emphysema which was mostly affected at the neck and thoracic areas, the patient was mildly depressed, dyspneic, and painful during the body palpation. However, by the whole body palpation, no evidence of any laceration wound has been detected. In addition, the heart sound, femoral pulse, the color of mucous membrane, and dehydration status of the cat were normal.

### *Radiographic examination*

According to the general information, clinical signs and physical examination results, the cat was assigned for further investigation by the thoracic radiography. The cat was subjected to perform both of ventrodorsal and lateral radiographic views.

What is your diagnosis?  
Please turn to next page for the answer.

### Radiographic findings

On the lateral radiographic view of the thorax (Fig 1), the cat was affected by a large amount of subcutaneous emphysema. Besides, the distinct borders of the cranial mediastinal embedding organs, for example: the serosal surface of the trachea and esophagus, and the cranial vena cava were clearly indicated (arrow). Moreover, there was evidence of the radiolucency sac at the cranial border of the cardiac

silhouette that radiographic sign was referred to the pneumopericardium (arrow head). Furthermore, the radiolucency of gas accumulation was also detected at the craniodorsal area of the abdomen (asterisk). Considering on the ventrodorsal thoracic radiograph (Fig 2), in addition to a large amount of the subcutaneous emphysema, the collapsing of the left lung lobes were easily detected (arrow).



**Figure 1** The lateral projection of the thoracic radiograph revealed the radiolucency of a large amount of subcutaneous emphysema. Moreover, the cranial mediastinal embedding structure was easily detected due to the surrounded radiolucent free air (arrow). In addition, the pneumopericardial (arrow head) and pneumoperitoneal (asterisk) were also detected.



**Figure 2** The ventrodorsal projection of the thoracic radiograph, in addition to a large amount of subcutaneous emphysema, pneumothorax characterized by the radiolucent free air in the pleural space that caused the left lung collapsing was detected (arrow).

## Radiographic diagnosis

Extra-respiratory tract gas accumulation (a large amount of subcutaneous emphysema, pneumomediastinum, pneumothorax, pneumopericardium, and pneumoretroperitoneum), and microcardia.

## Discussion

Several causes of an extra-respiratory tract gas accumulation in the cat that characterized by the subcutaneous emphysema, pneumomediastinum, pneumothorax, pneumopericardium and pneumoretroperitoneum have been reported, for example: blunt trauma (Griffiths et al., 1998), endotracheal intubation and/or positive-pressure ventilation (Brown and Holt, 1995; Mitchell et al., 2000), endoscopic examination and treatment (Zambelli, 2006), neoplasia (Greci et al., 2015) and virus infection induced necrotizing bronchopneumonia (Maes et al., 2011). Among those etiologies, it has been revealed that endotracheal intubation was the most common inciting cause (Thomas and Syring, 2013). The leakage of air could be leaked from any area which depending on the primary affected area, however, the free air could be extended into several adjacent spaces such as subcutaneous area, mediastinum, pleural cavity, pericardium, and retroperitoneum. Generally, there was a conjoined cavity from the subcutaneous tissue at the neck to the intrathoracic mediastinum and retroperitoneum by passing through the thoracic inlet and the aortic hiatus (Maes et al., 2011). However, the free air could be additionally leaked through the pleural cavity and pericardium, especially in the case of severe cases. In this patient, the cardiac silhouette revealed the microcardia, which could be caused by the cardiovascular condition such as hypovolemia or the constrictive cardiac function subsequently from the pneumopericardium. The conquer of these conditions, surgical correction could be benefit for the severe cases that affected by a large laceration of the trachea,

however, supplemental oxygen therapy combined with the free air decompression were frequently revealed as the satisfactory treatment method (Thomas and Syring, 2013).

## Reference

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