Iran J Vet Surg 2022; 17(2); Serial No: 37; Pages: 165-168

Iranian Veterinary Surgery Association

Iranian Journal of Veterinary Surgery

Journal homepage: www.ivsajournals.com

Clinical Report

Death Due to Migration of a Wooden Skewer Foreign Body from Gastrointestinal Tract to the Lung in a Dog

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ARTICLE INFO

Article History:

Received 1 November 2021
Revised 6 December 2021
Accepted 6 December 2021
Online 6 December 2021

Keywords:

Foreign body
Kebab skewer
Lung collapse
Dog

ABSTRACT

Sharp wooden skewers can easily migrate from the gastrointestinal tract after ingestion and penetrate to abdominal and chest organs. Clinical signs can vary depending on the location of the foreign body. This report describes the death due to the penetration of a foreign body (kebab skewer) from the gastrointestinal tract into the lungs in a dog. A 6-month-old mixed-breed male dog weighing 16 kg was referred to the clinic due to severe dyspnea, anorexia, and diarrhea. The physical examination showed a sharp increase in the number of breathing and severe dyspnea. Lateral thoracic radiography revealed the unilateral collapse of the caudal lobe of the lung and fluid accumulation or mass in the thorax. In order to obtain a dorsoventral radiograph, the dog was anesthetized using the diazepam-ketamine combination. Shortly after induction, the dog experienced cardiopulmonary arrest and cardiopulmonary resuscitation was not successful. At autopsy, a wooden kebab skewer with a length of about 15 cm was observed in the abdomen and chest of the animal. The importance of thorough physical examination and patient assessment before anesthetic induction or positioning for radiography, thoracocentesis, and provision of adequate ventilation and oxygenation are discussed.

Introduction

There are many reports on the presence of a foreign body in the gastrointestinal tract and abdomen of small animals, the clinical signs of which vary greatly depending on the location of the foreign body, the severity and duration of the obstruction, and the damaged organs.[1] In addition to the possibility of gastrointestinal obstruction, the penetration of a foreign body into various organs of the abdominal cavity may lead to peritonitis as well as damage to various vital structures within thoracic and/or abdominal cavities. Wooden skewers used to prepare food may penetrate through the gastrointestinal tract due to their sharpness and damage other organs of the abdominal cavity and even the chest. The presence of sharp objects in the sublumbar musculature, spine, bladder, pelvic area, abdominal wall and chest have been reported.[2,3] In the present article, the sudden death of a dog due to the penetration of a wooden

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www.ivsajournals.com© Iranian Journal of Veterinary Surgery, 2022
https://doi.org/10.30500/IVSA.2021.312948.1284

skewer into the lungs has been reported and the special considerations of patients with severe respiratory failure have been discussed.

Case Description

A 6-month-old mixed-breed male dog weighing 16 kg was presented for acute, severe dyspnea. According to the owner, the animal has been suffering from anorexia for 4 days and has had diarrhea since the day before admission. On general examination, the animal appeared a little lethargic. Heart rate was normal (98 beats/minute) and rectal temperature (39.5° C) indicated mild fever. The patient's respiration rate was severely increased (78 breaths/min, normal range: 20-30 breaths/min) and the animal showed signs of severe dyspnea. Based on the clinical signs, traumatic rupture of the diaphragm was suspected and the patient was referred for radiographic examination. Lateral chest radiograph revealed unilateral collapse of the caudal lobe of the lung and the outline of the heart and the abdominal part of the diaphragm were obscured (Figure 1). Although it is difficult to evaluate a chest radiograph based on the only available lateral radiograph, subsequent observations of the animal at autopsy confirmed the presence of fluid in the thoracic cavity.

Treatment and Outcome

All applicable international, national, and/or institutional guidelines for the care and use of animals were followed in this study. The patient was given a combination of diazepam (0.25 mg/kg) and ketamine (5 mg/kg) intravenously for radiography in the dorsoventral (DV) position. Within two minutes of receiving the drug, the animal suddenly developed respiratory arrest, followed by cardiac arrest. Tracheal intubation, oxygen administration and cardio-pulmonary resuscitation (closed-chest cardiac massage and intermittent administration of epinephrine and atropine) were unsuccessful and the animal died. At autopsy, a wooden skewer with a length of about 15 cm was observed in the abdomen and chest of the animal (Figures 2 and 3). The posterior blunt end of the skewer was located in the liver and the anterior sharp end had entered the left lung after passing through the diaphragm. The skewer was passed just beside the heart but heart and pericardium were intact (Figure 4).

In obtaining a re-history from the owner, it was stated that kebab was used to feed the animal three days before the onset of symptoms. A careful examination of the trachea, esophagus and stomach showed no penetration of the kebab skewer. Therefore, it is not clear how the foreign body entered the lungs. However, due to the fact that the sharp end of the skewer was towards the lungs; it seems that the kebab skewer entered the gastrointestinal tract through the esophagus and then penetrated towards the lungs.

Clinical Relevance

The present report and similar cases show that sharp wooden skewers can easily migrate from the gastrointestinal tract after ingestion and penetrate into various organs of the abdominal cavity and chest. Clinical signs can vary depending on the location of the

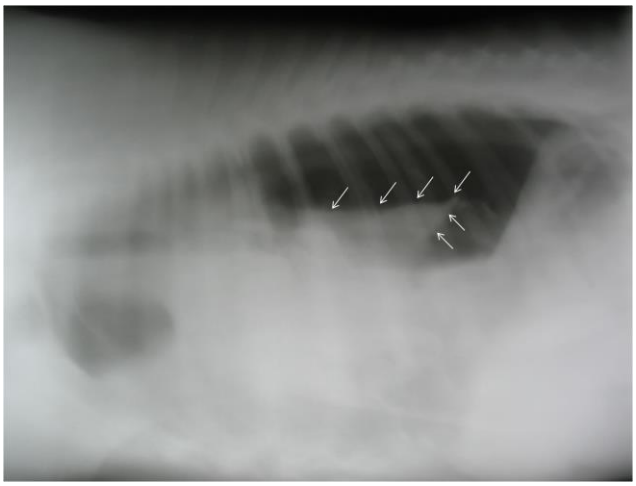

Figure 1: Right lateral radiograph of the dog. Caudal lobe of a lung is collapsed (arrows). Heart outlines and the abdominal diaphragm are not visible, which may be due to fluid accumulation in the pleura or the presence of a large mass in the lung, pericardium, or diaphragm or due to rupture of the diaphragm.

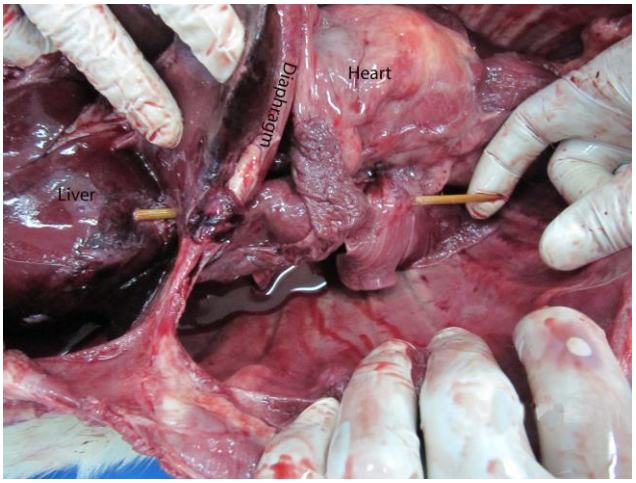

Figure 2: The wooden skewer foreign body in abdominal and thoracic cavities of the dog.

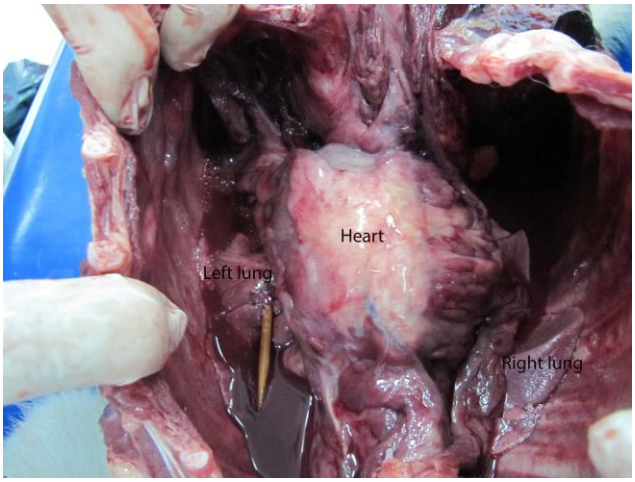

Figure 3: The position of the wooden skewer foreign body next to the heart of the dog.

Figure 4: The wooden skewer foreign body was removed from the abdominal and thoracic cavities of dog with severe dyspnea.

foreign body. Gastric abscess and peritoneal abscess following ingestion of a piece of wooden barbecue skewer,[4,5] liver abscesses due to ingestion of metal plaque of teeth and bones[6,7] and needle penetration into pancreas[8] have been reported in humans. In humans, liver abscess due to the migration of sharp foreign objects (bone) from the gastrointestinal tract has been observed.[9] In one study, 8 cases of migration of kebab skewers in dogs were reported. In one case, the penetration of the skewer into the chest and perforation of the diaphragm resulted in pneumothorax.[3] In an animal with hydrothorax or pneumothorax, the pulmonary ventilation is severely impaired by impeding normal expansion of the lungs; subsequently, the lungs collapse and the respiratory residual capacity is severely reduced, and respiratory rate and effort are increased as a compensatory mechanism. If these efforts are inadequate, then minute volume ventilation is decreased, and hypoxia, hypercarbia and respiratory acidosis occurs. In these conditions, general anesthesia can rapidly deteriorate respiratory function and may eventually lead to cardiovascular collapse.[10] In the present patient, due to the migration of a wooden skewer into the left lung, the left lung was collapsed and fluid was accumulated in the pleural cavity, and severe dyspnea and tachypnea were evident. An animal with a respiratory disease should not be placed in a dorsal recumbency position as much as possible, because in this position, the patient's breathing is disturbed more than positioned in the lateral recumbency. In cases of hydrothorax and pneumothorax, the patient will be prone to severe hypoxia. Therefore, before anesthesia induction, pneumothorax and hydrothorax should be eliminated by placing a Chest tube in the thoracic cavity.[10,11] The cause of death of the present patient may be exacerbation of respiratory depression due to general anesthesia despite previous pneumothorax,[11] and development of cardiogenic shock due to tension pneumothorax, [12] or a combination of these factors.

Although chest radiographic evaluation is very important in a patient with respiratory failure, the patient should be stabilized before performing the radiology and avoid putting stress on the patient or placing him or her in an abnormal position (such as ventrodorsal position). Therefore, radiography is allowed when the patient can tolerate the necessary manipulations and positioning in radiology. Ultrasound is also a useful tool for detecting woody foreign objects[5, 13] and in some cases, it can be more sensitive than radiology. In one study, only 2 of 8 cases of woody foreign body were detected by radiography.[3]

Careful physical examination of the patient, blood gas analysis, use of pulse oximetry and capnography and the administration of pure oxygen are some of the measures that are necessary in the evaluation and management of patients with respiratory diseases.[10] If general anesthesia is required, the best method of induction is the use of rapid-acting injectable drugs, rapid tracheal intubation, and mechanical ventilation. In case of need for continued anesthesia, the use of inhalation method is recommended.[10, 14] Nitrous oxide should not be used in patients with pneumothorax or when oxygenation is inadequate.

Conflict of Interest

The authors declare that they have no conflict of interest.

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