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Generalised subcutaneous emphysema in a dog and its surgical management: A case report

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Abstract

A four year old non-descript dog weighing 15kg with swelling at the head and neck region was presented to TVCC, CVSc, Khanapara, Guwahati with the history of fighting with other dog three days back. Clinical examination revealed no gross visible skin injury and all the vital parameters were within normal range. It was a case of localized subcutaneous emphysema at head and neck region.

The dog was first treated with palliative care by putting pressure bandage. But it did not respond and subcutaneous emphysema extended to shoulder and whole body including limbs and tail. Subcutaneous gas was partially expelled through three stab incisions on back. Shaving of hair at the suspected ventral part of cranial neck revealed bite marks in skin and hence the case was suspected to have perforation in trachea. Later surgical exploration under general anaesthesia confirmed perforation of trachea and was corrected. The clinical symptoms subsided and the animal showed uneventful recovery.

Keywords: Emphysema, subcutaneous emphysema, tracheal perforation

Introduction

Trapping of free air or gas under the skin is termed as subcutaneous emphysema. Defects in airways and lungs, rib fractures, oesophageal trauma, infection with gas producing microorganisms and iatrogenic trauma to trachea or oesophagus may lead to this condition which is seen both in large and small animals [1]. The acute onset and a distinct cracking sound (crepitus) upon palpation, characterizes this entity [2]. The penetrating injuries in neck are mostly bite wounds or bullet wounds and they cause immense pain and damage to cervical structures i.e larynx, trachea or oesophagus. External injury of trachea is an emergency condition. Cases of tracheal perforation resulting in subcutaneous emphysema have been reported in canine, feline, equine and humans [3]. Persistent peritracheal and subcutaneous emphysema along with dyspnoea, dysphagia, wheezing and severe stress are the indications of tracheal damage. It can be complicated by restriction of full lung re-expansion and can lead to high airway pressure, severe respiratory acidosis, ventilator failure, pacemaker malfunction, airway compromise and tension phenomena [4]. Pneumomediastinum, tracheal deviation, peritracheal air retention, tracheal compression and pneumothorax etc in radiograph can be of help for diagnosing upper airway leak. But radiological examination is least useful to locate the site of rupture or tear [5]. Tracheoscopy or bronchoscopy and computed tomography can be beneficial for this purpose [5]. Various methods have been described to relieve the condition such as subcutaneous cuts or blow holes, needles, drains, subcutaneous catheters etc. Our case report describes the clinical and radiographic findings of a generalized emphysema case in a local non-descript dog along with its surgical management.

Anamnesis and Clinical Findings

A four year old local non-descript dog weighing 15 kg was presented to TVCC, CVSc, Khanapara for swelling at the head and neck region. There was history of dog bite in the neck region three days back. On examination all the vital parameters were found within normal range. On palpation crepitating sound felt over the swollen body part and no external injury was seen. Radiography of the neck region revealed presence of air under the skin (Fig. 1). The case was diagnosed as a case of subcutaneous emphysema. Unsuccessful palliative attempt was made to treat the dog. Rupture of trachea-bronchial tree is a common cause of generalized subcutaneous emphysema [6]. Hence, tracheal perforation was suspected and it was decided to treat surgically.

Treatment Regimen

At first the case was treated with conservative method where multiple small skin incisions were made and the trapped air released followed by application of pressure body bandage. A course of antibiotics were prescribed. There was no positive response seen after three days rather emphysema extends to whole body and became generalized. The dog was taken to the operation theatre and prepared for surgery. The dog was premedicated with Xylazine Hydrochloride and Atropine Sulphate @ 1mg/kg body wt. and 0.04 mg/kg body wt. respectively. General anaesthesia was induced using Diazepam hydrochloride and Ketamine @ 0.05 mg/kg body wt. and 4 mg/kg body wt. respectively and maintained with 2.5% Isoflurane in Oxygen. The dog was positioned in dorsal recumbency and incision was made on the ventral aspect of the neck to expose the trachea. Tracheal perforation was located (Fig. 2) and sutured using 2-0 Polyglactin. Subsequently, the subcutis and the skin incision were closed by standard protocol. A course of antibiotic and NSAID were prescribed for 5 days. The dog had an uneventful recovery (Fig. 3) and skin sutures were removed on 10th postoperative day.

Discussion

Tracheal injury is less common in small animals as mostly they get traumatized laterally. However, traumatic injury to trachea can be the result of bite wounds to the neck, gunshots, car or motor accidents, transtracheal wash procedure, over inflation of endotracheal cuffs (especially in cats), in conjunction with thoracic trauma, after bronchoscopy, during or after surgery of the trachea or during jugular venous puncture [7, 8]. Here, in the reported case, it was due to dog bite after fighting with other stray dogs. But the consideration regarding tracheal perforation was masked as gross skin wound was not noticed. Leakage of inspired air through tracheal rupture is most common cause of subcutaneous emphysema [3, 6]. Tracheal injury was suspected only after progressive advancement of subcutaneous air leading to generalized subcutaneous emphysema from a localized one. The tracheal perforation by dog bite might have acted as a one way valve such that the breathing air escaped into the subcutaneous space as the skin wound started healing partially. Initially it started as swelling of the neck region which then progressed to face, limbs, thorax and abdomen progressively. Management of this kind of cases should begin with a concerted effort to identify the offending cause of the subcutaneous dissection of air [9]. In this reported case, the radical cause of the condition could not be appreciated initially. Hence, the cutaneous incisions on the back were made in order to discharge the accumulated air and pressure bandage was applied to prevent aggravation of the condition but in vain. After suspecting tracheal damage, exploratory surgery was done and site of injury was located which was the source of air accumulating under the skin. Treating the primary cause i.e. repairing the tracheal defect relieved the animal. Tracheal leak and subsequent emphysema can be perilous. The related problems include pneumothorax, dyspnoea, dysphagia, severe stress, restriction of full lungs expansion, high airway pressure, respiratory acidosis, ventilator failure, tension phenomena etc [4, 10]. Fortunately, this was an uncomplicated case and all the vital parameters were in normal range. But delayed medical approach could have been malicious. So, competent clinical care and management rendered the animal at ease.



Fig 1: Survey radiograph of head and neck showing subcutaneous accumulation of air



Fig 2: Intraoperative picture showing the perforated trachea



Fig 3: Post operative picture of the dog

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