

# Management of tracheal rupture in a pup with n-butyl cyanoacrylate glue – a case report

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## Abstract

A four months old Labrador pup with a dog bite wound on the neck was diagnosed to have rupture of trachea between 5<sup>th</sup> and 6<sup>th</sup> tracheal ring. The pup was stabilized immediately after its presentation followed by detection of tracheal opening and sealing with N-Butyl Cyanoacrylate (surgicloz). Treatment was followed by Antibiotic and supportive therapy which yielded a good recovery in the case without any complications. The clinical symptomology, management and clinical outcome of the case were discussed.

**Key Words:** Tracheal rupture; Sub-cutaneous emphysema; N-Butyl Cyanoacrylate; pup

## Introduction

Trachea which otherwise called as wind pipe is large bored tube reinforced with c-shaped cartilaginous rings (Hallers et al., 2004). Annular ligaments connect these c-shaped cartilaginous rings and facilitate during movement of neck in different directions. Injuries of trachea are usually noticed in wild life animals during hunting process by carnivores; where as in domestic animals these injuries may result from intraluminal trauma during endotracheal intubation or by extra luminal trauma during automobile accidents and fights (Miles 1999). Subcutaneous emphysema at cervical and thoracic region is a common sign which is noticed in the animals suffering from tracheal injuries (Caylor and Moore, 1994). Clinical signs like exercise intolerance, cyanosis, respiratory distress, dyspnea, etc are expressed depending upon severity of the injury. Symptoms exhibited by animal, lateral cervical radiography and tracheoscopy helps in diagnosis of tracheal injuries.

Use of alternatives like tissue adhesive in wound closure has been evolved as a practice in human wound treatment: where as their use was limited in veterinary practice due to several reasons. Cyanoacrylates are one among these tissue adhesives which have wide range of applications in surgery for repair of different organs and closure of skin incisions and lacerations. They are affective against wounds, provide immediate homeostasis when applied over wounds and they cause rapid adhesion to hard and soft tissues (Kumar et al., (2010). In the present paper diagnosis and management of trachea rupture with a tissue adhesive was discussed.

## Materials and Methods:

A four months old Labrador pup was presented to the clinics with a complaint of dog bite wound on the ventral aspect of neck region which was said to be happened a day before. Respiratory distress was observed besides subcutaneous emphysema at cervical and cranial thorax region. Clinical examination of the animal showed hyperpnoea, hyperthermia and congested mucus membranes. Lateral thorax radiograph revealed radiolucent area on the ventral aspect of wall of trachea besides air density beneath the skin at cervical and thorax region (Fig-1). Hematological and serum biochemical parameters showed no deviation from their reference vales. Based on the findings of clinical examination and radiography the condition was diagnosed as tracheal rupture and decided to give conservative treatment.



Fig-1: Radiograph showing radiolucent area on ventral aspect of trachea and subcutaneous emphysema

Immediately after diagnosing the condition the pup was transferred for spontaneous ventilation followed by intravenous administration of normal saline at the dose rate of 50ml per kg body weight and Dexamethasone at the dose rate of 0.1 mg per Kg body weight. Once the animal was stabilized it was planned to seal the wound with N-Butyl Cyanoacrylate (SURGICLOZ 0.15GM 1'S, Amadeus Biotech & Pharmaceuticals, Aurangabad) so as to avoid surgery and anesthesia to the compromised pup. The wound was examined and the tracheal opening was identified by pouring normal saline at the site. Surgicloz was applied over the skin opening which is in continuation with tracheal opening to seal the communication of tracheal lumen with environment

and surrounding tissue followed by a protective padded bandage with a splint to avoid extension of head and neck. Normal respirations were observed in the animal immediately after sealing the opening. Postoperatively animal was given intra muscular injections of ceftriaxone sodium at the dose rate of 25 mg per Kg body weight for 5 days, Meloxicam at the dose rate of 0.2 mg per Kg body weight for 3 days and supportive therapy with multivitamin tonics orally for 15 days.

## Results and Discussion

By 5<sup>th</sup> postoperative day the subcutaneous emphysema was found to be absorbed in lateral cervical radiograph (Fig-2) and the wound was completely closed. No complications were recorded further during an observation period of 6 months.



Fig-2: Radiograph showing absorption of subcutaneous emphysema and normal tracheal lumen on 5<sup>th</sup> postoperative day

Rupture of trachea which was noticed in the present case was due to a dog bite wound which is in concomitance with the statement given by Miles (1999) that tracheal injuries may result from external trauma caused by animal fights and automobile accidents. Reports are available mentioning the tracheal injuries during endotracheal intubation in cats (Mitchell et al., 2000). Subcutaneous emphysema which was noticed in the present case was reported as usual finding seen after tracheal rupture in animals by Mitchell et al., (2000). The site of rupture was identified in the present case by pouring normal saline and observing bubbling as advised by Roach and Krahwinkel (2009). N Butyl cyanoacrylate was chosen to seal the tracheal wound in the present case yielded a better adhesion of the wound edges. Nagpal et al., (2004) observed good wound healing by applying N-butyl 2-cyanoacrylate over skin wounds in humans whereas Kumar et al., (2010) observed pain less and quick healing in intraoral wounds by using these Cyanoacrylates. Postoperative complications like laryngeal edema, pharyngeal edema and laryngeal paralysis etc were not noticed in the present case, which are postulated as common complications after tracheal surgery by Fingland, (1994) and Lipowitz *et al.*, (1996). Stabilization of animal followed management of tracheal rupture with tissue adhesive and proper post operative care followed in the present case ensured a good recovery from the condition.

Tracheal rupture is an emergency condition which should be attended immediately by a veterinarian for better prognosis. Tissue adhesives can be used to close the smaller openings of trachea in acute conditions so that surgical repair to the animal can be avoided. In the present case N butyl Cyanoacrylate use to seal the wound yielded a good recovery of the animal.

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