

Short communication

SURGICAL MANAGEMENT OF THORACIC AND LIMB INJURIES IN A HARE (*Lepus nigricollis*)

ABSTRACT

A one-month old hare (*Lepus nigricollis*) was brought to the department in emergency with a complaint of dog bite two hours ago due to long chase with dog. Animal was unconscious due to numerous wounds on the thorax and limbs. On clinical examination, fast heart beats were appreciated from the thoracic perforation at 5th intercostal space and an open wound at the hock joint with abrasions was visible on right hind limb. The animal was handled with appropriate care and after stabilization of vital parameters, surgical management was undertaken under general anaesthesia. The animal showed marked improvement and recovered uneventfully on the 10th post-operative day.

Key words: Hare, Injuries, Limb, Surgical, Thoracic.

INTRODUCTION

Hare (*Lepus nigricollis*) are easy prey for dogs in the farm environment which results in various superficial and deep injuries to them. During a chase, the severity of injury varies from superficial abrasion to penetrating wound on being caught by the predator which eventually results in the death of the animal. The teeth of the attacking animal can fracture the bones of the limbs of the rabbit. Bites located over the thorax and abdomen

can penetrate these body cavities; in addition, the teeth crush, lacerate, and avulse muscle and subcutaneous fat and create large areas of dead space, leaving only small and seemingly innocuous puncture wounds in the skin [1]. The incidence of such penetrating thoracic injury was 12% which was a potentially devastating component of acute trauma care [2]. In bite wounds, shearing, tensile, and compressive forces often combine to damage tissues. Shearing forces are responsible for the linear lacerations, tensile force results in the avulsion of the skin from underlying tissue, and compression of the skin by the teeth results in either puncture wounds, crushing injury or both depending on the shape of the teeth [3]. This combination of force is quite notable in the present case. The present case report deals with the surgical management of thoracic and limb injuries in a hare due to the chase and bite of the dog.

CASE HISTORY AND CLINICAL EXAMINATION

A ~~one-month-old~~ one-month-old hare (*Lepus nigricollis*) was brought to the Department of Veterinary Surgery and Radiology, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India in emergency hours with a complaint of dog bite two hours ago due to a chase with dog in the farm. The hare was rescued by the persons working in the farm, who brought it for the treatment. ~~Immediate~~ Immediately after the chase, the hare was unconscious with wounds on the thorax and limbs. Looking ~~to~~ at the critical condition, the hare was instantly attended and physiological parameters viz., rectal temperature (101.2°F), heart rate (276 beats/ minute), and respiratory rates (50 breaths/ minute) were recorded. Clinical examination revealed a circular penetrating wound of approximately 1.5 cm diameter at the level of 5th rib on the left thorax separated by thin muscle band (Fig. 1). The wound

was lacerating the intercostal muscle along with a fracture of the 5th rib and through which the heart beats can be easily visualized. Further, the right hind limb also has abrasion injuries and an open wound at the hock joint through which distal end of the femur and proximal end of the tibia are visible exteriorly. On palpation, complete dislocation of the hock joint with minute muscular attachments are-is evident. However, the radiography was not performed looking ~~to~~at the critical condition of the patient and presentation during emergency hours. Upon interpreting the condition, it was decided to manage the case by surgical reconstruction of the thoracic wound margins and amputation of the affected hind limb.

SURGICAL MANAGEMENT

The intravenous fluids and Inj. Dexamethasone at the dose rate of 1 mg/kg body weight intramuscularly were administered instantly to combat the existing shock. Then, animal was aseptically prepared after clipping of long hairs, shaving and adequate scrubbing of the surgical area along with painting of povidone iodine solution on the surgical site. General Anesthesia was achieved intramuscular administration of ketamine at the dose rate of 25 mg/kg body weight and xylazine at the dose rate of 3 mg/kg body weight.

The animal was positioned in right lateral recumbency, the thoracic wound was closed using Vicryl No. 1-0 by applying simple continuous sutures involving the intercostal muscles and subcutaneous tissues. The skin was closed in routine manner using silk No. 1-0 by applying simple interrupted sutures (Fig. 2). The negative pressure in thorax was created by sucking the air from the thoracic cavity with the help of sterilized disposable

syringe and needle. The needle was inserted in thorax adopting all precautions preventing the puncture to the lung parenchyma.

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Then, the animal was shifted to left lateral recumbency and affected right hind limb was surgically disarticulated/ amputated at the hock joint under all aseptic precautions. The underlying muscle and skin were sutured using vicryl no 1-0 and silk no 1-0, respectively in routine manner (Fig. 3).

Post-operative care includes daily antiseptic dressing with povidone iodine and lixen powder for 10 days. Antibiotic cefotaxim at the rate of 50 mg/kg body weight twice daily orally and meloxicam at the rate of 0.5 mg/kg body weight orally once daily for five consecutive days along with Syp. Verol at the rate of 2 drops once daily for a week. The improvement was observed in general condition and behavior from 3rd post-operative day and started consumption of green grasses on 5th post-operative day (Fig. 4). The animal had an uncomplicated recovery and the sutures were removed on the 10th day.

DISCUSSION

Dog bite wounds are commonly encountered in small animal practice, representing approximately 10% of canine trauma cases [4]. Dogs are carnivores and in field condition rely on the hunting of small mammals such as hare and rabbits in order to satisfy their hunger. During chase thoracic injury is common in both high and low-energy trauma.

As dog bites results in penetrating wound so a precise physical examination is must so as to ascertain depth of internal injuries to the patient. Thoracic injuries are rare and are of potential hazard for the life of patient. Unfortunately, traumas are still a very important problem mainly associated with significant morbidity and mortality. Blunt chest

trauma is a common problem in the care of critically ill trauma patients [5], and thoracic trauma accounts for 20%-25% of adult deaths caused by trauma [6].

BCT is one of the most important leading causes of morbidity and mortality around the world. Various large-animal models for LC have been developed, including studies in canines, swine, and monkeys [7]. As with the management of all traumas, thoracic trauma evaluation requires a systematic approach. The prior management in thoracic trauma is its evaluation and stabilization of airways, breathing, and circulation (ABC) [8]. Some studies conclude that tube thoracostomy is required for pneumothoracespneumothorax with volumes greater than 5 times 80 mm, those involving more than 2 rib fractures, or in patients requiring positive pressure ventilation [9, 10]. But here we employ aspiration as a treatment measure for spontaneous pneumothorax which has been described and is being adopted in the trauma setting, however some physicians use oxygen therapy to aid in intrathoracic air reabsorption [11]. Pulmonary contusions are one of the most destructive injuryinjuries directly associated with 5% to 30% mortality [12] and esophageal trauma a rare condition but also associated with a mortality rate of 20% to 40% [13] was not reported here in this case. Anaesthetic protocol used in this case found to provide optimum anaesthesia for performing the surgery was in accordance with other workers [14].

As punctured wounds can result in infections due to bacterial colonization in deep wounds but in order to prevent the vital organs from further damage primary closure of the dog bite wound was done with generous placement of subcutaneous sutures. Closure of dog bite wounds has largely been considered contraindicated due to the increased possibility of infection; however, this management remains controversial. If the infection

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rates are less than 6%, the dog bite wounds may be closed if desired for cosmetic or functional reasons [15]. In another study, it was observed that the infection rate in patients who underwent primary closure was equivalent (7.6% versus 7.8%) to the patients whose wounds were left open to heal by secondary intention [16].

CONCLUSION

The specifics of this care have undergone, but an overarching emphasis remains on patient stabilization before definitive surgical repair. Thus, it is concluded that the early presentation of a patient for treatment following a dog bite results in early and smooth recovery.

References

1. Davidson E.B. Managing bite wounds in dogs and cats. Part I. *Compend. Contin. Educ. Pract. Vet.* 1998; 20: 811.
2. Platz J.J., Fabricant L., Norotsky M. Thoracic trauma: Injuries, Evaluation and Treatment. *Surg. Clin. North Am.* 2017; 97: 783–799.
3. Trott A. 1988. Mechanisms of surface soft tissue trauma. *Ann. Emerg. Med.* 17: 1279.
4. Kolata R.J., Kraut N.H. and Johnston D.E. Patterns of trauma in urban dogs and cats: a study in 1000 cases. *J. Am. Vet. Med. Assoc.* 1974; 164(5): 499-502.
5. Shorr R.M., Crittenden M., Indeck M., Hartunian S.L., Rodriguez A. Blunt thoracic trauma: Analysis of 515 patients. *Ann. Surg.* 1987; 206: 200-5.
6. Lo Cicero J., Mattox K.L. Epidemiology of chest trauma. *Surg. Clin. North Am.* 1989; 69: 15-9.

7. Moomey C.B. Jr, Fabian T.C., Croce M.A., Melton S.M., Proctor K.G. Cardiopulmonary function after pulmonary contusion and partial liquid ventilation. *J. Trauma*. 1998; 45: 283-90.
8. Rotondo M.F. ATLS: Advanced Trauma Life Support, student course manual. 9th edition. Chicago: American College of Surgeons. 2012.
9. Garramone R.J., Jacob L., Sahdev P. An objective method to measure and manage occult pneumothorax. *Surg. Gynecol. Obstet*. 1991; 173: 257.
10. Enderson B.L., Abdalla R., Frame S.B., Casey M.T., Gould H., Maull K.I. Tube thoracostomy for occult pneumothorax: a prospective randomized study of its use. *J. Trauma*. 1993; 35: 726.
11. Pasquier M., Hugli O., Carron P.N. Videos in clinical medicine. Needle aspiration of primary spontaneous pneumothorax. *N. Engl. J. Med*. 2013; 368(19): e24.
12. Cohn S.M. Pulmonary contusion: review of the clinical entity. *J. Trauma*. 1997; 42: 973–9.
13. Asensio J.A., Chahwan S., Forno W., MacKersie R., Wall M., Lake J., Minard G., Kirton O., Nagy K., Karmy-Jones R., Brundage S., Hoyt D., Winchell R., Kralovich K., Shapiro M., Falcone R., McGuire E., Ivatury R., Stoner M., Yelon J., Ledgerwood A., Luchette F., Schwab C.W., Frankel H., Chang B., Coscia R., Maull K., Wang D., Hirsch E., Cue J., Schmacht D., Dunn E., Miller F., Powell M., Sherck J., Enderson B., Rue L., Warren R., Rodriguez J., West M., Weireter L., Britt L.D., Dries D., Dunham C.M., Malangoni M., Fallon W., Simon R., Bell R., Hanpeter D., Gambaro E., Ceballos J., Torcal J., Alo K., Ramicone E., Chan L. Penetrating esophageal injuries: multicenter

study of the American Association for the Surgery of Trauma. *J. Trauma*. 2001; 50(2): 289–96.

14. Tranquilli W., Thurmon J., Beneson G.J. Anesthetic and related drugs for use in rodents and rabbits. In: Lumb and Jones' *Veterinary Anesthesia*, 4th edn., William and Wilkins, Philadelphia, Baltimore, USA. 1996; p775.

15. Paschos N.K., Makris E.A., Gantsos A., Georgoulis A.D. Primary closure versus non-closure of dog bite wounds: A randomised controlled trial. *Injury* 2014; 45(1): 237-240.

16. Chen E., Hornig S., Shepherd S.M., Hollander J.E. Primary closure of mammalian bites. *Acad. Emerg. Med.* 2000; 7(2): 157-161.

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Figures



Figure 1: Penetrating thoracic wound



Figure 2: Surgical closure of the thoracic wound



Figure 3: Surgically amputated right hind limb



Figure 4: Postoperative recovery of animal on 5th post-operative day

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