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Asian Journal of Animal and Veterinary Advances

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Asian Journal of Animal and Veterinary Advances 7 (1): 100-104, 2012
ISSN 1683-9919 / DOI: 10.3923/ajava.2012.100.104

Treatment of Spinal Luxation in Cat

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ABSTRACT

A 1 year old nondescript male cat was referred to Specialized Small Animal Clinic of Islamic Azad University because of falling from height. After clinical examination and radiography, it was diagnosed as L_1-L_2 lumbar vertebral luxation. Dislocated space between L_1 and L_2 was returned to normal state gently and cautiously and L_1 and L_2 vertebrae stabilization was done using plate and screw. General condition of animal, 7 month after surgical treatment and post operative care include penicillin, gentamicin, dexamethasone and physiotherapy was normal.

Key words: Vertebral luxation, lumbar, cat, paralysis, physiotherapy, depression

INTRODUCTION

Spinal injuries and associated neurologic dysfunction are most often the result of direct trauma but less commonly falls from heights, gunshot injuries, animal abuse and some pathological causes such as vertebral tumors can cause them (Smith and Walter, 1985). Infections and nutritional metabolic diseases may also cause vertebral fractures and luxations secondarily (Fossum *et al*., 2007; Strurges and LeCouteur, 2003). Intensity of neurologic injuries depends on factors such as force rate following injury, spinal cord compression intensity and the elapsed time since traumatic episode (Strurges and LeCouteur, 2003). Bali *et al*. (2009) reported that vertebral luxations in cats were significantly lower than in dogs (6 vs. 290%, respectively) but the rate of combined fracture-luxations in cats were significantly more frequent than in dogs. Treatment of spinal injuries depends on the location and severity of neurological damage and nature of structural damage (Palmer, 1976; Dulisch and Withrow, 1979).

There is a difficult decision for surgeon to which cases would benefit from external fixation/cage rest and which are benefice from surgical intervention. The prefer treatment on vertebral fractures and luxations with present paralysis, reduced deep pain perception and vertebral instability includes aligning the injured vertebral, reducing pressure from spinal cord and finally stabilizing the injured vertebral (Harari, 2009). Treatment can improve neural performance and it also inhibits neural disorders in a short term which includes instability and joint level disorder; and it can inhibit ultra formation of scar, joint metamorphosis along with soft tissue hypertrophy and exostosis (Fossum *et al*., 2007; Strurges and LeCouteur, 2003). In the rehabilitation of the cat, accurate surgery, carefully planned exercise and physiotherapy was conducted for the recovery of the patient.

MATERIAL AND METHODS

History and clinical signs: On January 25, 2011 a one year old nondescript male cat weighing 3.4 kg was referred to Specialized Small Animal Clinic of Islamic Azad University (Science and Research Branch) because of falling from height. After primary examination, it was diagnosed as lumbar vertebral luxation. During physical and neurologic examination, hind limbs had no motor ability, weight loading and the ability of response to pain had been decreased. The cat was suffering from involuntary urination and it lacked excretion ability. The body temperature, hematological and biochemical factors were normal. Clinical signs included depression, anorexia, dehydration, involuntary urination and paralysis.

In carried out radiographies, there was no specific signs in dorsoventral view except edema and inflammation in L_1 and L_2 vertebrae (Fig. 1) but luxation between L_1 and L_2 vertebrae was evident in the lateral view (Fig. 2).

Surgical procedure: Surgery was started by injecting 20 mL kg^{-1} per h, glucose-saline solution through vein. Cephazohn by dose of 22 mg kg^{-1} was used for prophylactic antibiotic therapy. Also, 2 mg kg^{-1} dexamethasone was used for this purpose. We used the following protocol for anesthetizing: 0.03 mg kg^{-1} atropine, 0.05 mg kg^{-1} diazepam and 3mg kg^{-1} ketamine hydrochloride were used as subcutaneously and intravenously for anesthesia induction, respectively.

Sodium thiopental by 10 mg kg^{-1} dose was used intravenously for anesthesia maintenance. The cat rested in sternal recumbency state and surgery was carried out after shaving and disinfecting.

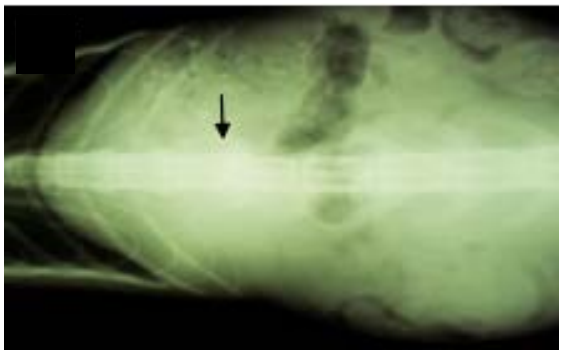

Fig. 1: Plain radiographs of a cat with lumbar vertebral luxation (Dorsoventral view)

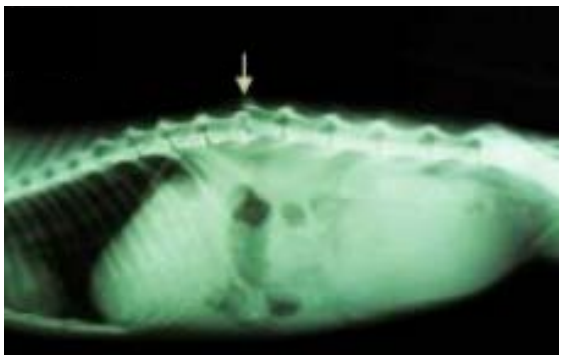

Fig. 2: Plain radiographs of a cat with lumbar vertebral luxation (Lateral view)

Skin incision was done from thoracic vertebra 13 to third lumbar vertebra on the midline. Electrocoter was used in order to inhibit hemorrhage and after separating both sides of epaxial muscles from spinous process, lamina, articular fossette and pedicles utilizing elevator, laminectomy was done in order to reduce the pressure on spinal cord, in addition to observing spinal cord status (Fossum *et al*., 2007; Strurges and LeCouteur, 2003; Slocum and Slocum, 1998). Then, dislocated space between L_1 and L_2 was returned to normal state gently and cautiously and L_1 and L_2 vertebrae stabilization was done using plate and screw (Smith and Walter, 1985) (Fig. 3). Before suturing the tissues, plain dorsoventral and lateral radiographs taken showed plate and screw were in the body of the L_1 and L_2 vertebrae (Fig. 4, 5).

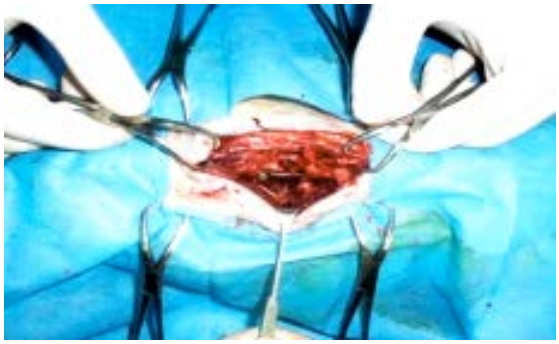

Fig. 3: Fixation of luxated vertebra with plate and screw

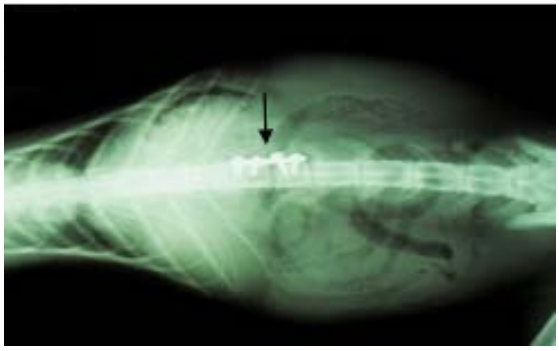

Fig. 4: Plain radiographs of luxation area after surgery (Dorsoventral view)

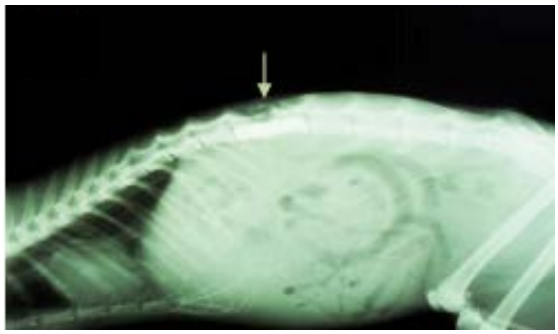

Fig. 5: Plain radiographs of luxation area after surgery (Lateral view)

The surgical area was rinsed by normal saline and after being assured that there was no hemorrhage and sufficient strength of stabilized vertebrae, this area was sutured. Polyglactin 910 No. 0-3 and nylon No. 0-3 were used for suturing muscles, fascia, subdermis and dermis, respectively.

Bandage was used for inhibiting manipulation and infection. After completing surgery, medicinal protocol such as using penicillin by dose of 20000 unit kg^{-1} as muscular injection and gentamicin sulfate by does of 8 mg kg^{-1} and dexamethasone by dose of 2 mg kg^{-1} as muscular injection was performed daily during 5 days (Denny and Butterworth, 2000; Sharp, 1995).

RESULTS

This animal had vital signs after regaining consciousness but it became weak during two days and had no control over its urination. The cat started eating mashed food and drinking liquids from the third day and began to urinate and excrete, its hind limbs responded to pain but it could not move them. After ten days, the animal started to load on hind limbs and to walk with support about one or two steps and its muscles and atrophied organs recovery was done through prescribing training movements and physiotherapy. Sutures were taken after 14 days which had proper healing process. In above-mentioned treatment, the animal recovered from paralysis during 7 months.

DISCUSSION

The rate of vertebral fractures and/or luxations are 6% of all spinal cord disorders in cats and 7% of all neurological disorders in dogs (Bali *et al.*, 2009). Spinal fractures, luxations and subluxations may require surgical or medical intervention. The use of antibiotics, cage rest and bladder management should be started early. Over 50% of animals with spinal cord injuries are treated medically. Surgery is recommended when the drug treatment is not effective or animal suffer from paralysis and vertebral instability (Dulisch and Withrow, 1979; Griffiths, 1980). In this case, according to the severity of spinal injury, it was decided that surgery should be done immediately.

The main effects which are observed following treatment of fractures and luxations of vertebral column are instability return and inappropriate stability at fracture area (Bali *et al.*, 2009; Fossum *et al.*, 2007). This results from using inappropriate surgery procedure, using inappropriate tools for stabilization and insufficient care after surgery. Other effects such as no healing or inappropriate healing of injured vertebrae, ultraformation of bone callus, plate dislocation, infection of surgery area, infection of urinary duct due of disorder in spinal nerve performance and bedsore formation may be observed (Bruce *et al.*, 2008; Lewis *et al.*, 1989; Strurges and LeCouteur, 2003). Prognosis of patients who suffer from spinal injury depends on various factors such as injury intensity, injury period, appropriate treatment and the skill of surgeon (Bagley, 2000). Physiotherapy have an important role in recovery of spinal injured animal but reports that demonstrated that paretic animals recovery can be achieved by physiotherapy were few. For 7 months after surgery, physiotherapy and exercise was performed in the patient and animal achieved full recovery.

CONCLUSION

Vertebral luxations may occur in small animals after automobile trauma, falls from heights tumors, etc. Clinical signs of injured animals included depression, anorexia, dehydration,

involuntary urination and paralysis. Surgery is one of the choice treatments in patient with present paralysis, reduced deep pain perception and vertebral instability.

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