Iranian Veterinary Surgery Association

IRANIAN JOURNAL OF VETERINARY SURGERY

Journal homepage: www.ivsajournals.com

CLINICAL REPORT

A Case of Gunshot Injury to the Spinal Cord in a Dog: Clinical, Surgical, and X-ray

Alireza Jahandideh[1*], Neda Vakili-Moghadam[2], Darab Faraji[1]

[1]*Department of Clinical Science, Faculty of Specialized Veterinary Sciences, Science and Research Branch, Islamic Azad University, Tehran, Iran*

[2] *DVM Student, College of Veterinary Medicine, Science and Research Branch Islamic Azad University, Tehran, Iran*

Received: 16 May 2018
Accepted: 12 November 2018
Available Online: 12 February 2018

Keywords:
Canine;
Injury;
Spinal cord;
Bullet.

Abstract

Case Description- A five-year-old female dog, weighing 35 kg, was presented as an emergency case after it suffered a gunshot injury.

Clinical Findings - Physical examination of the dog revealed paraplegia, the symptoms were normal. There was no bone fracture and dislocation in the lower extremity examination.

Radiological Diagnosis- A bullet (diameter, 4 mm) between the third and fourth lumbar was observed on radiographic examination.

Treatment and Outcome- The bullet was about 4 × 7 mm long, which stuck between the longitudinal spines and carefully removed. In the examination of the spinal cord, the rupture was observed relatively in some longitudinal strands, and no necrosis was present in the site. After the surgery, the dog was discharged with a good condition.

Clinical Relevance- As a consequence, a precise evaluation of the gunshot injury to the spinal cord could not be achieved by imaging, which made a prediction of the prognosis difficult prior to surgery. Therefore, if imaging tests provide evidence of a direct impact on the spinal cord, surgery should be considered a primary method to prevent irreversible harm necrosis of the spinal cord.

* Correspondence to: Alireza Jahandideh, Department of Clinical Science, Faculty of Specialized Veterinary Sciences, Science and Research Branch, Islamic Azad University, Tehran, Iran.
E-mail: dr.jahandideh@gmail.com

DOI: 10.22034/IVSA.2019.130485.1146

1. Introduction

The gunshot is a shot fired from a gun. Bullet injury to small animals is one of the reasons that may be ignored because of the rare. The prevalence of gunshot injuries seen by small animal veterinarians varies according to geographic location.[1-3] Animals that are allowed outside unsupervised or which are allowed to roam freely are at an increased risk of receiving gunshot injuries.[4-8] Most gunshot bullets are reported in a male dog.[9] Radiographic images showing the location of the bullet. Cases of such injuries are more common in dogs than in cats.[1,3,4] The most numerous wounds were those inflicted to the limbs 12/37 (32.4%),[4] In a recent study, which included a total of 122 cases, only 3.2% of the cases involved trauma to the vertebral column, conservative treatment was adequate for animals with limb injuries not associated with a fracture. Dogs with vertebral column or abdominal wounds may have a worse prognosis than dogs with thoracic or limb injuries.[1]

Various factors, such as the type of animal, the location of the bullet, the type of weapon, are effective on prognosis the treatment and prognosis in animals presenting with firearm wounds can vary considerably, depending upon the location of the injuries and the extent of the damage. There have been few reports of gunshot injury to the spinal cord in small animals.[3-9]

The aim of this report is to provide clinical information, including clinical symptoms, diagnostic imaging of findings, initial treatment, surgical approaches, and screening for bullets in the spinal cord of a dog.

2. Case Description

A five-year-old female dog with 35 kg weight without a supporter (street dog) was referred by Animal's supporter to the small animal clinic for examination. Biography of the dog was mentioned in the disability to walk is a cause of the referral. In the physical examination, the symptoms were normal. Regardless of the fact that there was no firing of bullets signs at first, clinical examinations with suspicion of lower extremity damage were investigated. The examination of the lower limbs, including examination of the presence of a possible fracture in the bones, as well as an examination of the range of joints for examination of dislocation, was carried out. All tests and examinations were at a reasonable level.

In the next step to evaluate the damage to the bones and nerves due to parapalzhy (paraplegia) on neurologic examination. A portable x-ray device with a current of 60 mA was used (Figure 1). A re-examination of the skin of the waist region indicates the incision of the bullet collision (Figure 2) Therefore, due to clinical examinations and the results of paraclinical measures such as x-ray, spinal cord injury was considered as a differential diagnosis. In the beginning, the site of the bullet wound was washed to prevent infections with povidone-iodine (Betadine) 10% (1% available iodine) and then washed with normal saline sodium chloride 0.9%.To perform a surgical procedure, the lumbar area was shaved and scrubbed. For anesthesia, combination of Ketamine 10% (PRO INJ, Alfasan) (10mg/kg, IM), xylazine (0.5 mg/kg, IM), and acepromazine (0.1 mg/kg, IM) were used. During surgery, ketamine and midazolam (0.2 mg/kg, IV) were used to maintain long-term anesthesia. We created an incision in the vertebral column. Positioning the patient for the dorsal approach to the thoracolumbar spine then position the patient in sternal recumbency with the thoracic and pelvic limbs in a flexed position. Create a dorsal midline incision, the muscles around the involved spinal cord were pulled off, and the spine process of the fourth lumbar spine eliminated (osteotomy), there was no detectable rupture and damage in the spinal cord (Figures 3 and 4). Then, bullet dimensions of about 4 to 7 mm, which stuck between the longitudinal cords of the spinal cord, were carefully removed (Figures 5 and 6). In the examination of the spinal cord, the rupture was observed relatively in some longitudinal strands, and there were no necrosis signs at the site.

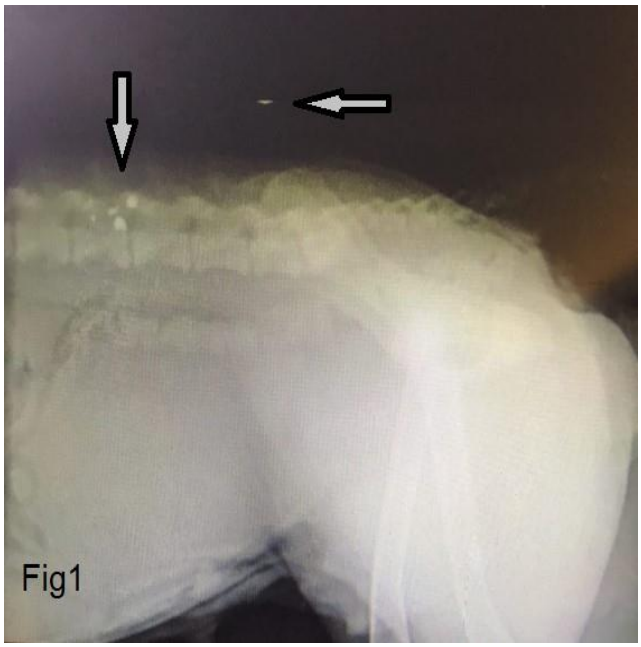

Figure 1. An X-ray images showing the location of the bullet. A radiopaque spot can be observed of L4-L5 on the lateral view.

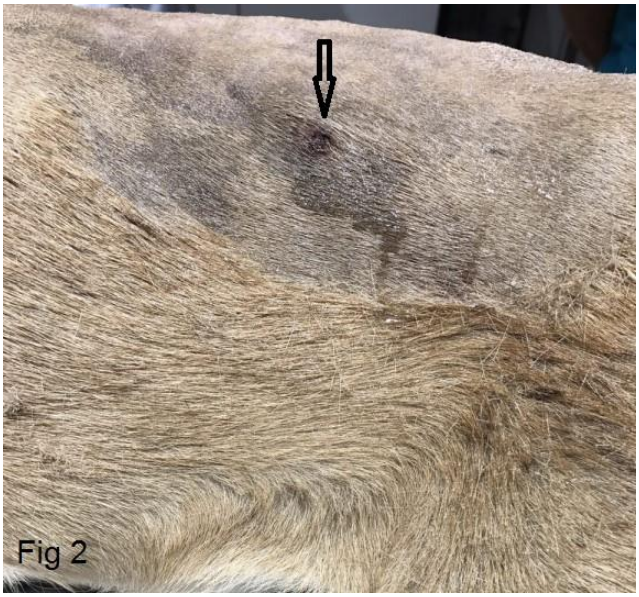

Figure 2. Oval-shaped hole due to the bullet on the skin, and contusion ring.

After the bullet was pulled out, a bone cement was poured and the surgical site was sutured. Another surface bullet that was visible in the radiograph was also removed during the anesthesia and the site was sutured. After recovery from anesthesia, advised to the animal's supporter to continue the treatment with physiotherapy. After recovery, the animal able to move its legs.

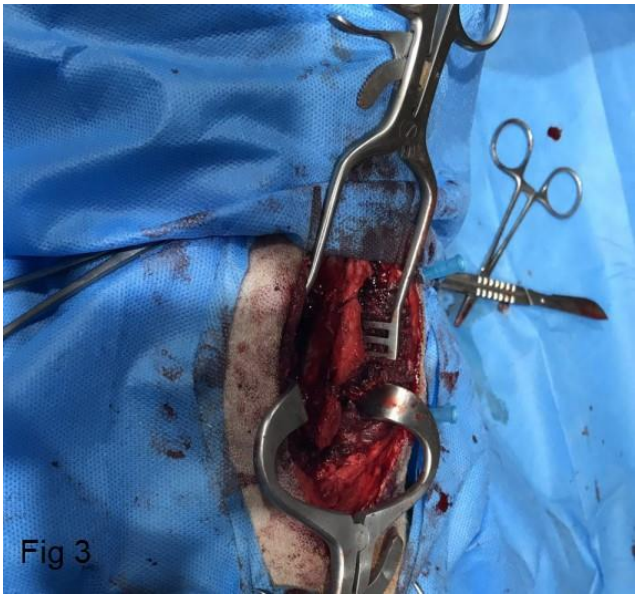

Figure 3. Intra-operative view of osteotomies. Removal of the spinous process of L4 and the incomplete fracture fragment have been performed to expose the lesion more clearly.

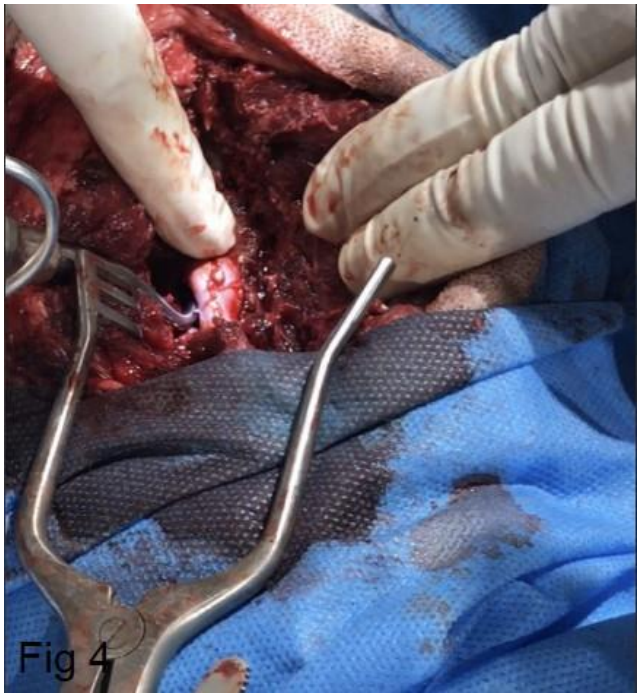

Figure 4. Access to the spinal cord. There was no rupture in the spinal cord.

Figure 5. The bullet was carefully removed from the spinal cord.

Figure 6. The wound itself will then be cleaned and any debris removed including hair, dirt, skin, bullet or bullet fragments.

3. Discussion

Gunshot injuries to the spinal cord in animals are rare. One study involving 122 injuries, 52 were to limbs (23/52 were associated with fractures), 32 involved the thorax, 14 involved the abdomen, 14 involved the head, 6 involved the neck, and 4 involved the vertebral column. Only 4 out of a total of 122 injuries (3.2%) involved the vertebral column.[1] In another study involving 121 cases, including 146 firearm injuries, reported that only 14 injuries (9.5%) involved the central nervous system (CNS).[4]

In total, there are few reports in the articles from the bullet to the spinal cord in the dog and the clinical data, including the clinical symptoms and the results of the imaging and treatment outcomes. In this case report, a point was of primary importance to researchers was that spinal cord injury was considered as a differential diagnosis in cases where an organ with paralysis, including lower limb paraplegia, was referred to treatment centers.

Animal immobility in addition to bone abnormalities and fracture problems or dislocation of the joints can be due to lumbar spinal cord injury. In these cases, due to the absence of clear history and also the lack of precision in the accurate examination of the body surface due to the presence of a very small bullet hole, it may not be detected. A careful examination of the animal in order to identify the path of the bullet is very important to decisions about the initial treatment. In the case of bullet damage, there is not always an outlet wound, and a bullet may come in from one side and like this case is placed in the third and fourth lumbar spine and does not pass through the body.

In patients with bullets, the x-ray is very useful in determining the location of the bullet, although CT scans are also effective in determining the severity of spinal cord injury.[5,6] With the help of X-ray, it cannot be determined whether the damage to the spinal cord has occurred. In this case, only surgery can be effective because these imaging modalities may not be able to detect aforementioned injuries caused by small projectiles, such as the 3-mm diameter shotgun pellets that caused the trauma in this patient. Since the prognosis differs from bullet damage, a complete assessment of the damage to prognosis and treatment (medical, surgical, or euthanasia) is important.

Although it is used to determine the spinal cord injury and lumbar spine of the MRI, it cannot be used here because of the presence of bullet-shaped pieces of space that prevents imaging in MRI. As a result, a precise assessment of the lumbar spine cannot be achieved by imaging alone and cannot be used as a pre-surgical prognosis. It can only be concluded that if imaging tests provide evidence of a direct effect on the spinal cord in animals that are fully clinical in the clinical examination of neurodegenerative deficiency, the prognosis is poor. In these cases, surgery should be considered a primary method to prevent irreversible harm necrosis of the spinal cord immediately be taken into consideration.

Conflict of interests

None.

References

1. Fullington RJ, Otto CM. Characteristics and management ofgunshot wounds in dogs and cats: 84 cases (1986-1995). *Journal of the American Veterinary Medical Association*, 1997; 210: 658-662.
2. Heard BJ. Ballistics. In: Handbook of firearms and ballistics,1st ed. New York: John Wiley and Sons. 1997; 73-104.
3. Keep JM. Gunshot injuries to urban dogs and cats. *Australian Veterinary Journal*, 1970; 46: 330-334.
4. Pavletic MM, Trout NJ. Bullet, Bite, and Burn Wounds inDogs and Cats. *Veterinary Clinics of North America: Small Animal Practice*, 2006; 36: 873-893.
5. Pavletic MM. A review of 121 gunshot wounds in the dogand cat. *Vet Surg,*. 1985; 14: 61-62.
6. Pavletic MM. Gunshot wound management. *Compendium on Continuing Education for the Practising Veterinarian -North American Edition*, 1996; 18: 1285-1299.
7. Pavletic MM. Management of specific wounds. In: Atlas ofsmall animal reconstructive surgery, 2nd ed. Philadelphia: WB Saunders. 1999; 66-95.
8. Plunkett SJ. Traumatic emergencies. In: Emergency proceduresfor the small animal veterinarian, 2nd ed. Philadelphia: WBSaunders. 2000; 48-71.
9. Seoung-yob Ahn, Hun-young Yoon and Soon-wuk Jeong.A Case of Gunshot Injury to the Spinal Cord in a Cat:Clinical, Surgical, and Computed Tomographic Features. *Journal of Veterinary Clinics*, 2015; 32(2): 187-190.

نشریه جراحی دامپزشکی ایران
سال۲۰۱۹ ، جلد ۱۴ (شماره ۱)، شماره پیاپی ۳۰

چکیده

گزارش آسیب وارده به طناب نخاعی توسط گلوله در یک قلاده سگ: بالینی، جراحی و پرتو ایکس

علیرضا جهاندیده[۱]، ندا وکیلی مقدم[۲]، داراب فرجی[۱]

[۱]گروه علوم درمانگاهی، دانشکده علوم تخصصی دامپزشکی، واحد علوم و تحقیقات، دانشگاه آزاد اسلامی، تهران، ایران
[۲]دانشجوی دامپزشکی، دانشکده دامپزشکی، واحد علوم و تحقیقات، دانشگاه آزاد اسلامی، تهران، ایران

توصیف بیمار- سگ ماده پنج‌ساله‌ای که وزن آن ۳۵ کیلوگرم بود، به‌عنوان یک مورد اورژانسی پس از آسیب‌دیدگی گلوله‌ای پذیرش شد.

یافته‌های بالینی- معاینه فیزیکی سگ نشانگر پاراپلژی (فلج اندام تحتانی) بود، علائم و نشانه‌های بالینی نرمال بود. هیچ‌گونه علایمی از شکستگی و یا دررفتگی در اندام‌های تحتانی در بررسی بیشتر وجود نداشت.

یافته‌های رادیولوژی- یک گلوله (قطر ۴ میلی‌متر) بین مهره سوم و چهارم در بررسی رادیوگرافی مشاهده و گزارش شد.

درمان و پیامد- گلوله با ابعاد ۴ × ۷ میلی‌متر که بین رشته طولی ستون فقرات وجود داشت که با دقت خارج شد. در بررسی نخاع، پارگی در بعضی رشته‌های طولی مشاهده شد، و هیچ نکروزی در محل وجود نداشت. پس از جراحی، سگ با وضعیت بالینی خوب ترخیص شد.

کاربرد بالینی- به‌عنوان یک نتیجه، یک ارزیابی دقیق از آسیب گلوله به ستون فقرات نمی‌تواند با تصویربرداری به دست آید که بتواند پیش‌آگهی قبل از عمل جراحی را پیش‌بینی کند؛ بنابراین، اگر بررسی تصویربرداری شواهدی از تأثیر مستقیم گلوله بر نخاع را مطرح کند، جراحی باید یک روش اولیه برای جلوگیری از نکروز غیرقابل‌برگشت نخاع باشد.

واژه‌های کلیدی- سگ، جراحت، نخاع، گلوله.