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Laserpuncture Treatment for Cat Fractures at Airlangga University Veterinary Teaching Hospital

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ABSTRACT

Cats are pets that are often found and commonly kept in Indonesia. Cats themselves are among the pets where many cases of bone fractures are found, which is one of the musculoskeletal disorders. Reports of these fracture cases are reviewed from a domestic female cat named Titi, with three colors of fur: orange, black, and white, aged 4 months, weighing 1.2 kg, and showing pain in her back and extremities when handled. The method of treatment in this case is to perform an X-ray to confirm the cat's diagnosis. Then, laser puncture treatment is given as an alternative treatment provided for medical care due to the low costs required for the cat. Post-treatment care for the cat includes administering supportive medication such as multivitamins and minerals.

Keywords: Bone faracture, Pain in back, Extremities, Medication, Laser puncture

ABSTRAK

Kucing adalah hewan peliharaan yang sering ditemukan dan umum dipelihara di Indonesia. Kucing sendiri adalah salah satu hewan peliharaan di mana banyak kasus patah tulang ditemukan, yang merupakan salah satu gangguan muskuloskeletal. Laporan kasus patah tulang ini ditinjau dari seekor kucing betina domestik bernama Titi, dengan tiga warna bulu: oranye, hitam, dan putih, berusia 4 bulan, dengan berat 1,2 kg, dan menunjukkan rasa sakit di punggung dan ekstremitasnya saat dipegang. Metode perawatan dalam kasus ini adalah melakukan rontgen untuk memastikan diagnosis kucing. Kemudian, perawatan laser akupunktur diberikan sebagai perawatan alternatif yang disediakan untuk perawatan medis karena biaya yang dibutuhkan untuk kucing tersebut rendah. Perawatan pasca perawatan untuk kucing meliputi pemberian obat penunjang seperti multivitamin dan mineral.

Kata kunci: Fraktur tulang, Nyeri punggung, Ekstremitas, Obat-obatan, Laserpunktur

INTRODUCTION

Fracture is one of the musculoskeletal disorders that are often found in pets such as cats and dogs (Priyanka *et al.,* 2019). Pets themselves are animals that are kept to be friends in their owners' daily activities, unlike livestock or experimental animals that are kept for a specific purpose or task. The most common pet found in Indonesia is cats. Valid data on the number of fractures that occur in cats in Indonesia is not yet available, but it is not uncommon for cats to experience fractures. Several reports have been found regarding musculoskeletal disorders in pets, namely dogs and cats in Indonesia, one of which is the occurrence of fractures (Wirata, 2015).

Cats are one of the animals that have a high possibility of paralysis. The cause of paralysis in cats is due to nerve damage, but it often occurs in the rear extremities of cats, causing the innervation of the brain to be cut off and the muscles of the cat's limbs and resulting in inactivity (disability) and physical paralysis. Damage to the thoraco-lumbosacral spinal cord segment will result in loss of motor and sensory function in cats (Wimbavitrati *et al*., 2020).

One type of fracture that is difficult to treat is a comminuted fracture, which is a bone fracture into more than two segments and which often causes complications (secondary infection) due to the loss of part of the bone. Comminuted fractures cannot be completely treated with the installation of bone pins, screws, and wires. Bone grafts are often used in treating these cases. However, the availability of bone grafts in Indonesia is still limited and dominated by imported products.

Treatment with laserpuncture method can be used as an alternative that is currently starting to be used frequently, especially to control pain and nerve stimulation. Laserpuncture is a cheap and effective treatment option compared to medical treatment because the costs required are low with minimal side effects. Laserpuncture is a traditional method that can be used as one form of treatment for fractures. Traditional Chinese Veterinary Medicine (TCVM) states that laserpuncture has one of the goals in stimulating the restoration of normal transmission of nerve impulses.

Laserpuncture is a clinical system using electromagnetic energy with a wave strength of 100-10,000 nanometers that can be used in therapy for paraplegia or paralysis cases, where the light energy is transmitted in space as waves that have a collection of energy called photons. Laserpuncture has three broad influence factors on animal tissue such as overcoming pain, overcoming inflammation and helping in the healing process. Laserpuncture does not cause pain compared to acupuncture, Laserpuncture must be performed at a location diagnosed with an abnormality or disorder (Riegel and Goldbold, 2017).

Causes and Clinical Symptoms of Fractures

Fracture is a condition of broken bones that can be caused by stress or pressure, in addition fractures can also be caused by trauma or due to accidents, and several diseases (Pelawi and Purba, 2019). Fractures or commonly referred to as broken bones can also cause paraplegia or a condition where the ability to move the limbs is lost (Mujoomdar *et al.,* 2012). Severe spinal cord injuries can cause physical disabilities and can affect other systems in the body, so immediately evaluating patients with neurological disorders due to suspected trauma, it is very important to have a comprehensive examination, including checking the function of the pulmonary and cardiovascular systems. The diagnosis of spinal cord injury can be established through a thorough optimal examination including anamnesis, physical examination, and supporting examinations. One of them is a neurological examination must be carried out systematically and should start from the highest to the lowest integration center. In general, clinical symptoms that can be observed are by looking at the ability to walk using two legs if there is a disturbance or loss of balance when walking. or may be an incidental finding experienced by cats with congenital diseases. Cats with diseases that cause prolonged respiratory effort or coughing, metabolic diseases, or certain neoplasms are at very high risk for nontraumatic spontaneous rib fractures if the animal shows pain when the fractured limb is handled.

Fracture Diagnosis

In diagnosing fractures, it is generally done by conducting a physical examination, and radiology, namely X-Ray. In a physical examination, usually a cat with a fracture will show pain when its limbs are palpated or touched. Then in a radiological examination using an X-Ray device aims to support the diagnosis, cats with fractures show cracks or fractures in the cat's bones that are visible in the X-Ray results.

Therapy for Fractures

In fracture cases, not all patients undergo therapy, Laserpuncture Therapy in Cats (Riegel and Godbold, 2017). The use of laserpuncture therapy aims to treat by providing therapy from point to point, in its use the laser light should not stay at the same point must move every 2-7 cm / second so that the cat does not feel excessive heat in the therapy area (Riegel and

Godbold, 2017). In its use, laserpuncture therapy has two basic methods, namely direct (direct contact between the laser and the tissue) and indirect (indirect contact) with the tissue, the direct method is used on parts that are not injured while indirect is used if there is a wound. Cats that have thick and long hair can use the help of hands to open their hair and reach the therapy point more easily without being obstructed (Enwemeka, 2009). The dose given for laserpuncture therapy of pets such as cats in superficial tissue conditions is 1–5 J/cm2, tissue conditions are 8–10 J/ cm2, chronic complex conditions are 15–25 J/cm2, musculoskeletal conditions are 0.5–8 J/cm2 (Riegel and only 60% in dogs and 65% in cats that receive treatment based on the consent of their owners (table 1).

Tabel 1. Percentage of therapy given and therapy results

	Total* Dog		Percentage** Cat	
Therapeutics				
Yes	42	(60)	93	(65)
No	28	(40)	50	(35)
Total	70	(100)	143	(100)
Explanation				
Surgery	24	(57)	27	(29)
Non-surgery	18	(43)	66	(71)
Total	42	(100)	93	(100)
Result				
Recover	5	(12)	11	(12)
Treated	4	(10)	1	(1)
Dead	3	(7)	7	(8)
N/A***	30	(71)	74	(80)
Total	42	(100)	93	(100)

Source: Amelia, 2021

Generally, therapy performed in cases of fractures in cats can be surgical or non-surgical. Surgery is performed with the aim of installing pins or screws on the bones of animals that have fractures, then non-surgical actions can be performed by using plaster, or by performing alternative treatments such as acupuncture and laser puncture.

CASE REPORT

A female domestic cat named Titi, has a mixoren, black, and white striped color, is stated to be 4 months old with a weight of 1.2 kg, shows pain in the back and stiff tips when held. Then action will be taken to support the diagnosis using X-Ray. The use of laserpuncture therapy aims to treat by providing therapy from point to point, in the system of its use the laser light should not be stationary at the same point must move every 2-7 cm / second so that the cat does not feel excessive heat in the monotonous therapy area (Riegel and Godbold, 2017). In its use, laserpuncture therapy has two basic methods, namely direct contact (between the laser and the tissue) and indirect contact connected to the tissue, the direct method is used on parts that are not injured while indirect is used if there is a wound. Cats that have thick and long hair can use the help of hands to open their hair and reach the therapy point more easily without being hampered (Enwemeka, 2009). The therapeutic dose of laserpuncture for pets such as cats in superficial tissue conditions is 1–5 J/cm^2, deep tissue conditions 8–10 J/cm^2, chronic complex conditions 15–25 J/cm^2, musculoskeletal conditions 0.5–8 J/cm^2.

X-Ray Procedure

Before performing X-Ray, the animal (patient) is first anamnesis in order to determine the initial condition of the animal before receiving further action. Then the animal that has been given anamnesis is immediately subjected to a physical examination including weighing, calculating pulse, respiration, measuring temperature, making observations and also palpating the affected area. Laser is an acronym for light amplification by stimulated emission of radiation, in the veterinary profession most lasers are used as medical devices in therapeutic and surgical applications where lasers can emit light through an optical amplification process based on stimulated electromagnetic radiation emissions. Lasers can emit energy in the form of a photon system which is a packet of electromagnetic radiation energy. There are three main components in a laser as an energy source, an amplifier medium and a resonance cavity limited by a mirror. Based on the intensity of the energy delivered, the laser can also be grouped as follows. Gallium Arsenide (Ga As) which is classified as a diode laser (semiconductor), Hellium Neon (HeNe) which is classified as a gas laser, low-power laser (cold laser) and high-power laser (hot laser). High-power lasers are used in procedures in surgery, ophthalmology, oncology, and dermatology. Meanwhile, low-power lasers are known as "cold" lasers and are commonly used for several tissue repair processes (wound healing) and to overcome pain in the affected areas. Low power lasers will cause more photochemical effects than thermal. Laser light has monochromatic properties (single wavelength) collimation (travel

in one direction without divergence) and coherence (all waves are in phase). Laser light can penetrate the surface of the skin non-invasively based on its existing properties. Then, to obtain further examination results and patient anamnesis results, the patient is consulted with a veterinarian to get the right action. which is indicated by both hind legs of the cat in the case of not being able to stand upright and not being able to move. The cat's front legs moved with short and very slow steps because the hind legs that were dragged while walking were unable to support the weight. Most patients who experience tetraplegia or post-traumatic paraplegia cannot control urination and experience urinary tract infections because the bladder is distended and has urinary stagnation. In the cat case treated, the cat experienced sudden urination and uncontrolled urination or urinary incontinence caused by lesions in the lower motor neuron (LMN). After that, an X-Ray was performed with the aim of supporting the diagnosis. X-Ray was performed using the lateral and ventrodorsal positions. After the X-ray process was carried out, the results of the action were consulted with a veterinarian and a fracture image was found in V. Thoracalis 13 and V. Lumbalis 1. In V. Lumbalis fractures can be one of the factors in the occurrence of spinal cord injury which will attack the sensory and motor functions which will cause paraplegia (Wimbavitrati *et al.*, 2020).

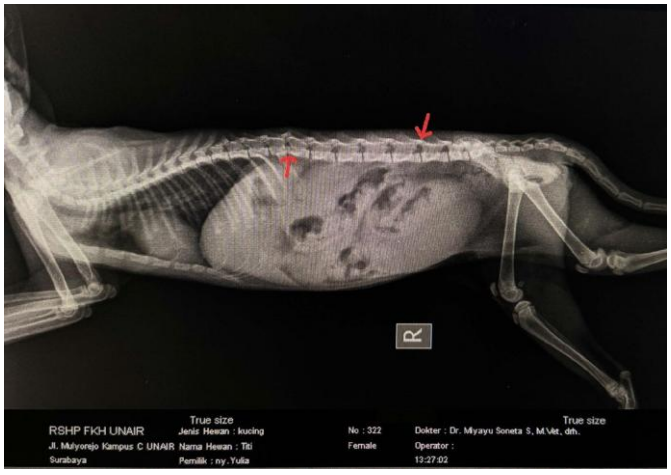

Figure 1. Lateral X-ray

Laserpunktur Treatment

After the X-Ray process, consultation with a doctor and approval from the owner of Titi's cat can be carried out further action. Therapy that uses laser light to stimulate acupuncture points, without needles, to relieve pain and improve health. Laser acupuncture is one modality that can be an option to help overcome various diseases through needle-free acupuncture therapy. The action chosen for this fracture case is to use alternative treatment, namely laserpuncture. Laserpuncture is one of the treatment methods that can be done using electromagnetic energy with a wavelength of 100-10,000 nanometers and can be used in therapy for paraplegia cases. Laserpuncture used low level intensity or low-power laser has extensive benefits on animal tissue can reduce inflammation, reduce pain, and accelerate wound healing. In addition, laserpuncture can also drastically reduce edema and acute inflammation. In its use not only on pets, pediatric and geriatric, but laserpuncture can also be applied to small exotic animals, mammals, birds, reptiles, wildlife, aquatic animals, livestock and including horses (Riegel and Godbold, 2017). Laserpuncture therapy does not cause pain to cats, unlike acupuncture, laserpuncture therapy also does not cause or make cats feel panicked or bad which can cause stress because it is done calmly. Routine and scheduled therapy makes positive progress during its use, consideration is needed when administering laserpuncture therapy in order to get maximum and beneficial results.

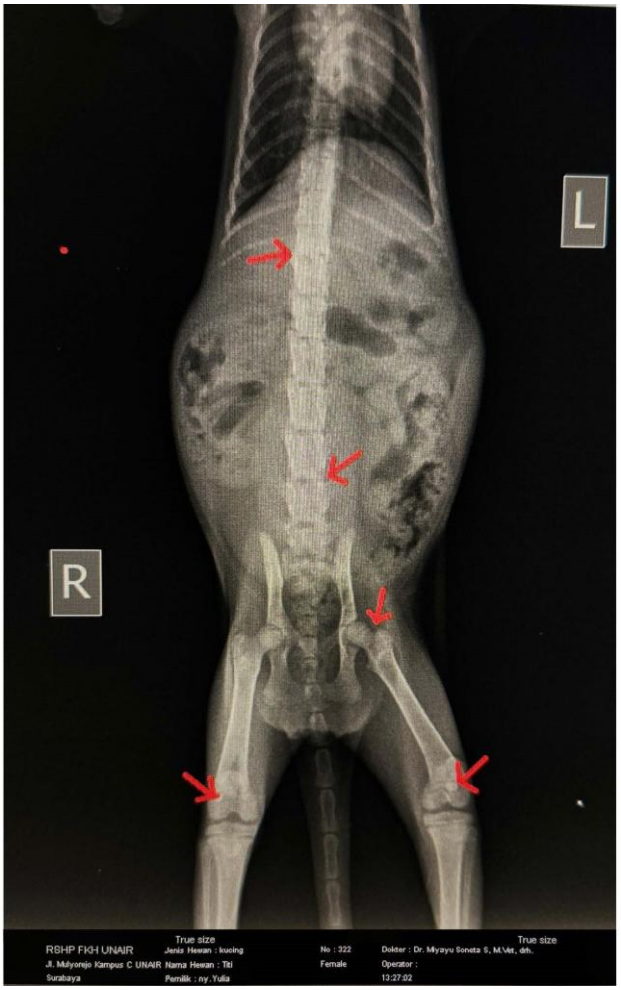

Figure 2. Ventro dorsal X-ray

Laserpuncture therapy requires anesthesia first to facilitate the continuation of therapy, so it is very necessary to pay attention to the cat's temperature periodically during therapy and ensure that the cat's temperature remains normal. Laserpuncture therapy is given for six sessions, twice a week with a duration of each session for 10-15 seconds per point. The laser puncture tool uses Hesan with a dose of 4 J / cm2 and a power of 50m / W. During laser puncture therapy, the operator and patient use googles. The cat's position is laid laterally, ventro-dorsal, or dorso-ventral depending on the location of the lesion that needs to be treated using a mattress or underpad. Therapy is carried out directly on the tissue at the specified point. It is an alternative treatment that is almost the same as laserpuncture, only the media is different. Unlike acupuncture which uses needles, laserpuncture uses infrared rays with certain waves for treatment.

Figure 3. Titi cat laser puncture process.

DISCUSSION

In the physical examination of the patient, it was found that there was an initial condition of the cat which had a rectal temperature of 38.8C. In general, the normal temperature for cats is 37.2 - 39.1C. Therapy with electroacupuncture or laserpuncture has points that are adjusted to the indications of suspected disease and the location of the eliminated disc, the points used in therapy are BL-23, BL-25, BL-32 and ST-36. At points BL-23, BL-25, BL-32 are points used in conditions of paralysis in the lower extremities, back pain, and sacrolumbar pain. Then at points BL-23 and BL-25 are points to strengthen bones and kidneys, then point BL-32 is often used when there is pain and edema in the hind legs, paralysis in the hips and penis, and problems in the iliosacral. Then at point ST-36 it is used in therapy for tendon and ligament disorders, liver and gallbladder disorders, lameness in the hind legs, paralysis and paresis, and general pain. The ST-36 point is also used to overcome moisture, and nourish the blood in relieving pain in the hind legs, in addition the ST-36 point is also used to overcome pain in the leg muscles and myofacial and leg muscles (Ritonga et al., 2022). normal conditions. Based on the results of the physical examination that has been carried out, then palpation will be carried out on the part that shows the location of the pain. The following clinical signs will lead to a fracture so that action is needed to support the diagnosis with a radiological examination using X-Ray. The X-Ray results showed fractures in V. Thoracalis 13 and V. Lumbalis 1. After the X-Ray treatment was carried out, the patient underwent further action using laserpuncture treatment which is an alternative treatment with a system of focusing the laser on certain points to get maximum results. And after the treatment was carried out, drugs were also given as a support that had been prescribed by a veterinarian such as minerals and vitamins. The procedure carried out in this laserpuncture is by selecting certain points that have been diagnosed on the body as the key to the success of the following alternative treatment. In the healing process of the fracture, Titi's cat laserpuncture treatment is also supported by the use of medication prescribed by the doctor.

When an animal experiences an accident or there are clinical symptoms that indicate several fracture points, an examination should be carried out as early as possible to provide treatment. Handling of animals with nerve disorders should be carried out immediately when the animal shows several clinical symptoms, to prevent decubitus. Evaluation of healing is observed every time therapy is given for six times based on symptomatic changes in symptoms after laserpuncture therapy. The installation of a modified wheelchair is highly recommended to assist in the mobility activities of cats in cases of flaccid paraplegia due to trauma with paralysis of both hind legs. Giving massage to the area of both hind legs that have never been used for activity must also be given significantly routinely. In addition, supervision of pets is also very

necessary to avoid fractures in pets. Evaluation of healing is observed every time therapy is given for six times based on symptomatic changes in symptoms after the laserpuncture therapy system is given.

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