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Surgical intervention and its management of tibial fracture in a rabbit

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Abstract

An one year old male rabbit was presented which was unable to walk since two days. On examination of the rabbit revealed inability to stand on its right hind limb and crepitus on palpation was noticed at right tibial region. Survey radiograph revealed complete oblique fracture of the tibial bone. The fracture was stabilized by Intramedullary pinning with cerclage wiring under General anaesthesia and immobilized with Robert Jones bandage. Rabbit recovered uneventfully and was able to walk after 30 days of surgery.

Keywords: Rabbit, fracture, tibia, intramedullary pin

1. Introduction

Bone fractures were relatively common in pet rabbits (Zehnder and kapatkin, 2012) [9]. Rabbit bones were delicate in comparison with the long bones of other domestic companion animals (Barron *et al.*, 2010) [1]. Rabbit skeleton was light and comprises 7-8% of body weight. Rabbits have powerful muscular hind limbs and 70% of the body weight is carried by this part of the body. Low bone density and large muscle mass predisposes rabbits to fractures. Therefore long bone fractures were relatively common presentation regarding pet rabbits especially within the hind limbs (Barron *et al.*, 2010) [1]. Fractures in a rabbits can occurs due to errors in handlings, accidental blunt trauma, predation (Rich, 2002) [4], improper handling or caging, when a limb becomes trapped in improperly sized wire mesh (Richardson, 2000) [5]. Fractures in lower limbs (below elbow) were often open, due to the minimal presence of soft tissue (Reusche, 2008) [3]. They are often difficult to treat and need to be mended with patience, in order to avoid further complications. This paper deals with the surgical management of complete oblique fracture of the right tibial bone by intramedullary pinning cerclage wiring in a rabbit.

2. Case History and Observations

A one year old male New Zealand white rabbit weighing about 3kg was presented with the history of not bearing weight on right hind limb since two days and since then having difficulty in walking (Fig.1). On examination of the rabbit revealed inability to stand on its right limb and crepitus on palpation was noticed at right tibial region. Physical examination revealed swelling and crepitus at right tibial region. Radiograph of antero-posterior and medio-lateral views of right leg revealed closed, complete, oblique fracture of right tibial bone (Fig.2). It was decided stabilize the fractures by intramedullary pinning.

3. Surgical Treatment

The rabbit was administrated with butorphanol @ 0.1 mg/ kg, IM to provide peri-operative analgesia. General anaesthesia was done by combination of Inj. xylazine @ 5 mg/kg body weight and Inj. Ketamine @ 30mg/kg body weight intramuscularly. The hairs around the surgical site was clipped and surgical site was prepared aseptically after scrubbing with 7.5% povidine iodine solution. The rabbit was positioned on the table in lateral recumbence. The skin incision was made at the fracture site. Subcutaneous tissue and muscles were dissected to expose the fracture ends and then intramedullary pin was inserted using retrograde technique and cerclage wiring done (Fig.3). Muscle was sutured with catgut No 2-0 with simple interrupted pattern and skin was opposed with monofilament Polyamide No-2-0 using simple interrupted pattern. Wound was cleaned and dressed with povidine iodine ointment and the leg was immobilized using Reinforced Robert Jones bandage.

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Postoperatively antibiotics and analgesics were administered through parental root for five days. Sutures were removed on 10th postoperative day and rabbit recovered uneventfully. Rabbit was able use the limb for ambulation after 30 days of surgery (Fig.4).



Fig 1: Photograph showing lameness of hind leg



Fig 2: Radiograph showing complete oblique fractures of right tibial boneright



Fig 3: Check radiograph showing intramedullary pin and cerclage wire



Fig 4: 30th post-operative day Photograph showing weight bearing on

4. Discussion

Rabbit cortical bone was more brittle than the cortical bone of other studied species making fracture management challenging (Massie *et al.*, 2019) ^[2]. Rabbit bones have a comparatively higher mineral content and extremely brittle resulting in an increased incidence of open, comminuted fractures with multiple sharp fragments that can be traumatic to surrounding soft tissues, therefore more difficult to surgically repair them when compared to those of other animal species of similar weight and size. Tibia was reported to be the long bone most commonly fractured in a small breed of rabbits and the majority of the long bone fractures developed without a clear aetiology. The accidental drops were the most common cause for fractures (25%) in rabbits and only 2% of the rabbits were classified as hopping outside the cage (Sasai *et al.*, 2018) ^[7]. A variety of surgical fixation methods have been described including external coaptation, ESF, intramedullary pinning (IMP), pins and rigid fixations (Zehnder and Kapatkin, 2012) ^[9]. Many of the surgical implants made for use in veterinary are too heavy or large for rabbits. Even when standard implants are applied correctly, the brittle bones of domestic rabbit may fail (Barron *et al.*, 2010) ^[1]. Intramedullary fixation is optimal for use in rabbits as the implant will help bear the weight of the body although healing time may be delayed (Reusche, 2008) ^[3]. In the present case also intramedullary pinning was done. Further intramedullary pinning is superior over the use of dynamic compression plates or external fixation in light of the low density and small diameter of the cortices of the long bone as well as nature of this species (Rickards *et al.*, 1972) ^[6]. Rabbits are easily stressed and tend to thump their hind limb therefore Diligent postoperative care is essential to compliment fracture repair particularly in rabbits. Immobilisation methods like external coaptation, splints, casting and cage rest are well tolerated by rabbits for distal limb fractures (Wood, 1978) ^[8].

5. Conclusion

Time of presentation of patient and proper surgical technique is essential to prevent further complications. A successful surgical management of oblique fracture of tibial bone in a rabbit by intramedullary pinning with cerclage wiring is reported.

6. Acknowledgment

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