SURGICAL REDUCTION OF A VERTEBRAL FRACTURE IN A COASTAL TAIPAN (*Oxyuranus scutellatus*)

M. Kelcourse, DVM,[1]* P. Barratt, BASc,[2] and M. O'Brien[3]

[1]Charlotte Animal Hospital, Port Charlotte, FL 33948 USA; [2]Marlin Coast Veterinary Clinic, Trinity Beach, Queensland 4879 Australia; [3]Cairns Tropical Zoo, Clifton Beach, Queensland 4879 Australia

ABSTRACT

A 2.3-meter-long Coastal Taipan (*Oxyuranus scutellatus)* maintained in captivity presented at the veterinary clinic for a mid-spinal vertebral fracture of unknown cause. Due to the lifestyle of a snake (sinuous movements, climbing and wrapping around vegetation and rocks, coiling, etc.), a short spinal staple that would span four vertebrae was the elected procedure to attempt surgical reduction of the spinal fracture. Though having been previously described in the literature for application in small dogs, the procedure was minimally modified and easily adapted for use in our patient. This case provides evidence that surgical reduction of vertebral fractures in reptile patients is a treatment option to consider for similar cases in the future.

Introduction

A 2.8-kg, 230-cm-long breeding female Coastal Taipan (*Oxyuranus scutellatus)* was found lying in an agitated state on the ground level of her habitat at the Cairns Tropical Zoo during her keeper's morning rounds. She was also having difficulty moving the posterior length of her body and was therefore presented at the veterinary clinic with a suspected spinal injury.

Examination revealed a notable swelling at the mid-spine level with an estimated 90 percent loss of normal neurological function posterior to the swelling as determined by observation of voluntary motor activity and response to deep pain stimulation with a 24 gauge syringe needle at 5 cm intervals along the length of her body.

Radiographs confirmed a displaced compression fracture (step lesion) of a single, mid-spine vertebra with the fracture fragment anterior to the fracture gap displaced approximately 2mm dorsally relative to the posterior fragment. Due to a grave prognosis for recovery without surgical intervention the decision was made to attempt surgical reduction using the spinal staple technique described by Gage.[1]

Methods and Materials

The patient was restrained by the zoo's snake handler for IV sedation with 5mg/kg alfaxalone (Alfaxan 10mg/ml, Jurox Pty Ltd., Rutherford, NSW 2320, AUSTRALIA) in the coccygeal vein, inhalation induction with isoflurane, USP (Forane, Baxter Healthcare Corp, Deerfield, IL)

and placement of a 2.5mm endotracheal tube for anesthetic maintenance. The patient was then placed in ventral recumbency and prepared for sterile surgery.

A dorsal midline incision between the scales over the mid-spine fracture location allowed sharp and blunt dissection to expose the dorsal aspect of the vertebral fracture site prior to obtaining measurements for a spinal staple fashioned from a trocar-tip, 0.045in k-wire (IMEX Veterinary, Longview TX, 75604) to be inserted in the dorsal spinal process of the intact vertebra directly orad to the fractured vertebra and span to the dorsal spinal process of the second intact vertebra caudad to the fractured vertebra. The staple was then secured flush to the lateral aspect of the two intervening dorsal spinal processes with 22 gauge cerclage wires (IMEX Veterinary, Longview TX, 75604). This staple placement offered approximately 2mm of stable traction across the fracture gap that also brought the step lesion into anatomical alignment. The surgery site was then closed routinely prior to placing a 20cm long post-operative, restrictive bandage centered over the fracture.

Post-operative radiographs showed good fracture reduction and implant placement and the patient was allowed to recover in her transportation carrier. She was then returned to the zoo for convalescence care in a restricted environment and placed on 10mg/kg enrofloxacin (Baytril, Bayer Healthcare LLC, Shawnee Mission, KS) SC q 24 hr for 14 treatments with veterinary examinations and bandage changes performed every seven days.

Results

Each follow-up examination performed during weekly bandage changes at the zoo revealed notable improvements in the patient's neurological and voluntary motor abilities posterior to the vertebral fracture site. Six weeks after surgery, when she had regained better than 90 percent of what was considered a normal functioning activity level, laying a clutch of eight fertile eggs in the process, the bandage was removed while continuing to house her in a restricted environment.

Two weeks later, after being fed her second normal meal consisting of a small rat, the healing fracture site had a catastrophic collapse and she was euthanatized. The eight fertile eggs she had laid went on to a successful incubation and hatching.

Discussion and Conclusions

Although the skeletal anatomy of reptilian and mammalian spines differ in many ways, the similarities allow for reliable application of the spinal staple technique in the management of spinal fractures in larger reptiles when the attending veterinarian is convinced that external coaptation will be insufficient.

This case provides convincing evidence that surgical candidacy not only depends on the type and severity of the injury, but more importantly the resources and ability to maintain follow-up care - particularly serial radiographs, bandage placement and husbandry - for a period extending

beyond that utilized for this particular patient as it may now be concluded that, under similar circumstances, postoperative vertebral fracture healing occurs at a significantly slower rate in reptiles than in mammals.

The discussion of this case would also be incomplete if the authors did not mention the importance pre-operative and serial post-operative blood testing and obtaining intra-operative tissue samples for histopathology as well as culture and sensitivity analysis to determine any pathologic involvement metabolic and/or infectious processes may have had in the initial fracture event. Had these diagnostic procedures been financially available to the zoo and veterinary staff involved in this case, a more specific treatment plan could have been tailored for this patient's convalescence thus reducing the risk of a delayed or nonunion of the healing fracture.

LITERATURE CITED

1. Gage E.D.: Surgical repair of spinal fractures in small breed dogs. Vet Med 66:1095, 1971.