CASE REPORT

Use of Computed Tomography in Evaluation and Management of Shell Fracture in a Red Eared Slider Turtle (*Trachemys scripta elegans*) A Case report

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Traumatic lesions of the shell are common problems in chelonians. Lesions of the shell vary in severity from a simple superficial abrasion (with a loss of the external skin layer and exposure of the bone) to complicated fractures of the carapace with exposure of internal organs of the coelom and injury of the soft tissues (Barten, 2006). In most shell or skeletal injuries in the turtle, plain radiographic data do not reveal the extent of complex fractures due to superimposed bone structures (Abou-Madi *et al*., 2002). In Comparison with conventional radiography, computed tomography (CT) allows better distinction of specific tissue densities and discrete changes in organ size, shape, margin, contour and position (Gaudron *et al*., 2001). Computed tomography is a non-invasive, cross-sectional diagnostic imaging technique that offers significant advantages for detection of pathologies in chelonians, and is ideal for diagnosing skeletal and soft tissue abnormalities (Gumpenberger and Henninger, 2001). The aim of the present work was to evaluate the three dimensional computed tomography (CT) for clinical examination of shell lesions in a red eared slider turtle.

Case History and clinical observation

A 6 year old female red eared slider turtle weighing 1.7 kg was brought to the Madras Veterinary College Teaching Hospital, Chennai with a history of traumatic injury. Patient was subjected to a thorough physical examination.Vital parameters such as respiratory rate and heart rate were within the normal range. On physical examination, both the bridges of the shell were fractured. Additional fractures were present in the carapace beginning at the left sixth and right fourth marginal scute extending to the pleural scute and plastron. Further diagnostic investigation by radiography and computed tomography was performed. Whole body radiography revealed fracture in the carapace and plastron.

Computed tomographic scan and Discussion

Computed tomographic scan was performed with patient positioned and restrained in ventral recumbency using third generation, 16 slice multi row detector CT scanner unit. In addition to radiographic findings, CT scanning revealed left sixth marginal carapace fracture with involvement into the Coelomic cavity with thickened pulmonary septae. Since it was a non-displaced fracture, stabilization and management of the fracture site was achieved by using cyanoacrylate. Additionally, the turtle was treated with antibiotic (Enrofloxacin @ 10 mg/kg, P/O), analgesic (Meloxicam @ 0.2 mg/kg, P/O). The animal recovered uneventfully within 15 days.

One of the most common forms of trauma encountered in turtles is shell injury, as a result of falling (they are avid climbers) or being dropped or stepped on.

Radiography of the chelonian skeletal system is often complicated by superimposed shell structures. Radiographic silhouettes are created by the carapace fused to spine, costal arches, and pelvic girdles. Computed tomography and 3D reconstruction have a role in the diagnosis of a wide range of diseases in a variety of animals (Garland, 2002). In the present case radiographic studies were helpful in diagnosing the shell fracture, however evaluation of internal organs was done using computed tomography studies.

Fig. 1. Ventro-dorsal Radiograph view of shell indicating fractures

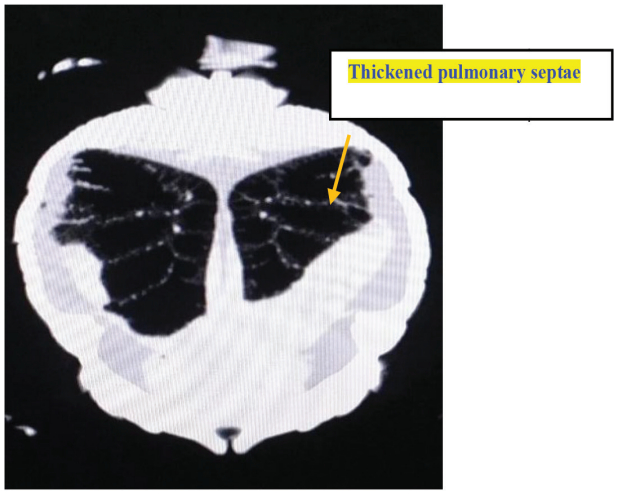

Fig. 2. Coronal view of turtle indicating thickened pulmonary septae and fracture involvement in coelomic cavity

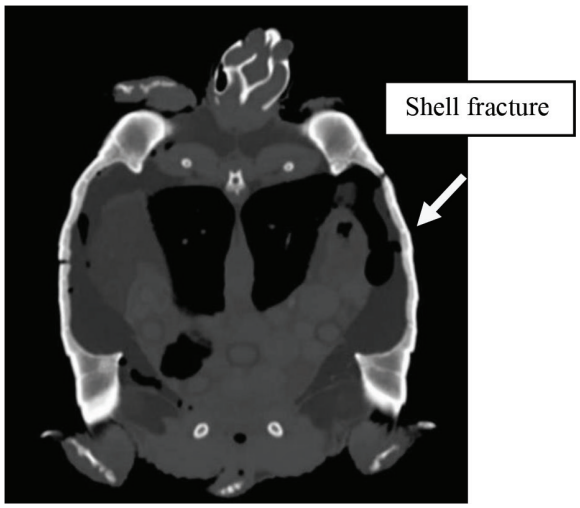

Fig. 3. Cornonal view of Fracture of shell and pleural damage on left lung

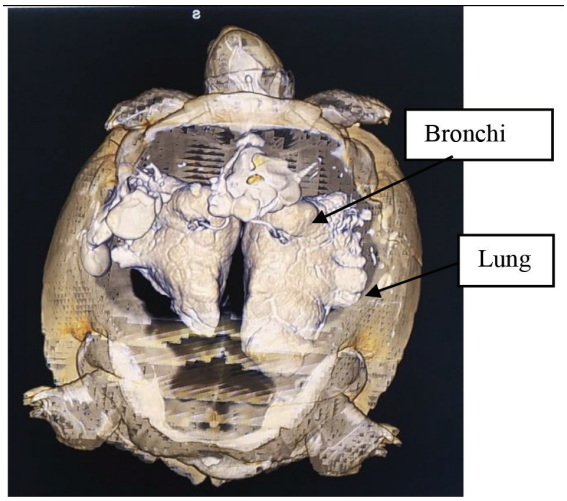

Fig. 4. 3D reformation CT image in turtle indicating the pleural damage and respiratory tracts.

Computed tomography allows accurate definition of organs in the coelom without superimposition of adjacent structures. The slow respiratory rate in turtles minimises any possible artefacts caused by the movement of lungs (Gumpenberger, 2011). Considering this fact, CT scan was done without any anaesthesia. Shell structures are perfectly outlined by the multiplanar, three-dimensional images obtained from computed tomographic scan. CT scan is advised if precise description of skeletal lesions is needed for a surgical decision, treatment evaluation, monitoring, or prognosis.

Lim *et al.*(2013) reported that in leopard tortoise the normal lung have diffuse reticular lung pattern and affected tortoise have a thickened pulmonary septae. The same finding was observed in this case with thickened pulmonary septae and confirms the pulmonary affection.

Chelonians have a great ability to repair shell injuries and deficits, including very large wounds (Vella, 2009). Shell injury in our case healed within 15 days and the follow up has been done for another one month. This confirms the statement of Garland et al. (2002) that total healing of the shell injury was over within a short span of time. According to Barten, (2006) epoxy resin and fibreglass patches were associated with abscess and osteomyelitis. He has recommended to repair shell fracture with orthopaedic screws, wires, bone plates and cable ties. In our study the owner was not willing for any surgical intervention and hence cyanoacrylate was used to fix the shell fracture. Post-operative follow up for one month revealed no complications.

When extensive damage is suspected on the basis of the location of shell trauma, CT provides an important tool to confirm lesions in vital skeletal structures.

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