

## Cutaneous Ulcerative Disease in a Star Tortoise

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### Abstract

A rescued Indian Star Tortoise (*Geochelone elegans*) was presented with shell deformities, limb weakness and ulcerative plastron lesions. Clinical evaluation, radiography and biochemical analysis were carried out. The plastron was abnormally soft and pliable, deviating markedly from the rigidity observed in healthy individuals. Deep ulcerative lesions were noted on the pectoral and abdominal scutes of the plastron. Hypocalcaemia with elevated phosphorus, parathyroid hormone and alkaline phosphatase levels was observed while reduced serum vitamin A and 1,25-dihydroxycholecalciferol concentrations. Microbiological culture of the ulcerative plastron lesions yielded *Escherichia coli* and *Staphylococcus* spp. Treatment included calcium and vitamin supplementation, fluid therapy and antimicrobial therapy, resulting in significant clinical improvement and shell remineralization within six weeks.

**Keywords:** Star tortoise, Cutaneous Ulcerative Disease

Reptilian species, particularly captive tortoises such as the Indian Star Tortoise (*Geochelone elegans*), are increasingly diagnosed with complex metabolic and infectious diseases resulting from improper husbandry and inadequate nutrition. This paper presents a case of a rescued *Geochelone elegans* (Indian Star Tortoise) exhibiting cutaneous ulcerative disease.

A male Indian Star Tortoise (*Geochelone elegans*) weighing approximately 800 grams was presented with a history of anorexia, stunted growth and restricted limb movement. Physical examination revealed multiple shell abnormalities, including irregular carapacial development with visible cracks (Fig. 1, 2) and inwardly collapsed scutes, most prominently in the caudal region (Fig. 3). The plastron was abnormally soft and pliable with deep ulcerative lesions on the pectoral and abdominal scutes of the plastron (Fig. 4). The plastrocarapacial bridge appeared vertically expanded. The pelvic limbs were splayed, with overgrown claws (Fig. 3). A cloacal prolapse was also evident upon examination (Fig. 5). The mucous membranes appeared dry and the tortoise exhibited clinical signs consistent with moderate to severe dehydration. Radiographic assessment revealed a generalized reduction in shell radiodensity, indicating decreased mineralization of both the carapace and plastron. Anaemia,

leukocytosis, hypocalcaemia, elevated phosphorus and alkaline phosphatase levels (Table 1) were noticed. Microbiological culture of the ulcerative plastron lesions yielded *Escherichia coli* and *Staphylococcus* spp., confirming secondary bacterial infection associated with necrotic shell regions. Serum vitamin A (retinol) and vitamin D<sub>3</sub> (1,25-dihydroxycholecalciferol) concentrations were reduced. The condition was diagnosed as Cutaneous Ulcerative Disease (SCUD).

Lactated Ringer's solution (@ 20 mL/kg subcutaneously bid for 3 days), calcium gluconate (100 mg/kg, intramuscularly, once daily 5days) were administered. Oral calcium carbonate supplementation (100 mg/kg, once daily), oral cholecalciferol drops (400 IU/kg, weekly), vitamin A supplementation (2000 IU/kg, orally, every other day for two weeks) were provided. Enrofloxacin (5 mg/kg, intramuscularly, once daily for 7 days) with topical wound care with diluted povidone iodine solution and mupirocin ointment was followed. After four weeks of treatment, the tortoise showed marked improvement in appetite, mobility and hydration status. Radiographic follow-up at six weeks revealed early signs of shell remineralization. Ulcerative lesions showed progressive epithelialization and serum calcium and phosphorus levels began to normalize, with a concurrent decline in PTH and alkaline phosphatase activity. The animal was deemed clinically stable and

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was transferred back to Forest Department for continued rehabilitation under improved husbandry conditions.

In reptiles, calcium and phosphorus homeostasis is critically dependent on adequate dietary ratios and vitamin D<sub>3</sub> metabolism. Vitamin D<sub>3</sub> synthesis through cutaneous photoconversion under UVB exposure is essential for calcium absorption and skeletal integrity (Mitchell and Perry, 2017). Inadequate exposure to natural or artificial UVB light, compounded by an imbalanced calcium and phosphorus intake, disrupts this homeostasis, resulting in chronic hypocalcaemia (Juan-Salles and Boyer, 2020). The resultant parathyroid hyperactivity promotes bone resorption and demineralization, producing classical manifestations such as shell softening, pyramidal scute formation and skeletal deformities (Music and Strunk, 2016). The observed decrease in serum vitamin A and 1,25-dihydroxycholecalciferol levels further evidence for the nutritional inadequacy responsible for this condition.

Consequently, ulcerative shell lesions frequently develop as secondary complications in animals with metabolic bone disease. Cutaneous Ulcerative Disease are largely avoidable through appropriate captive management. Ensuring optimal dietary calcium-phosphorus ratios, incorporating natural sunlight lighting, maintaining hygiene and routine veterinary monitoring are critical components in preventing recurrence.

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**Figure 1: Convex carapace with pyramidal growth**



**Figure 2: Cracked carapace (arrow)**



**Figure 3: Solid, cracked, inwardly collapsed scutes in caudal carapace with splay out legs**



**Figure 4: Deep ulcerative lesion on pectoral and abdominal scutes**



**Figure 5: Cloacal prolapse**

**Table 1: Blood profile in Indian Star Tortoise**

Parameters	Value
Haemoglobin	7.5 g/dl
PCV	23%
RBC	0.54 X 10 <sup>6</sup> /μL
Heterophils	39%
Eosinophils	6%
Lymphocyte	52%
Monocyte	3%
Glucose (mg/dL)	194
Total protein (g/dL)	4.93
Albumin (g/dL)	2.13
Globulin (g/dL)	2.80
BUN (mg/dL)	19.7
Creatinine (mg/dL)	1.1
Cholesterol (mg/dL)	115
Total bilirubin (mg/dL)	0.20
ALT (U/L)	6
AST (U/L)	23
ALP (U/L)	72
CK (U/L)	176
LDH (U/L)	356
Calcium (mg/dL)	7
Phosphorus (mg/dL)	11.8
Magnesium (mg/dL)	1.9
Vitamin A (Retinol) (mg/mL)	0.01
Vitamin D (nmol/L) (25 hydroxy vitamin D3)	12.9
T4 nmol/L	5.2 (0.46-3.15)

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