



Diagnosis and Management of Moth fly Larvae Infestation in an Indian Flapshell Turtle (*Lissemys punctata*; Lacepede, 1788)

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Abstract

The Indian flapshell turtle (*Lissemys punctata*; Lacepede, 1788) is one of the most commonly found freshwater turtles in India. Detailed investigations on diagnosis and treatment of clinical diseases of Indian flapshell turtle are not conducted so far. A case of Indian flapshell turtle with peeling-off of upper layer of shell, moth fly larvae infestation and deformed limb is documented in the present paper. Efforts have been made by utilizing available resources to elucidate the case to enable veterinarians in decision making process and to promote timely rescue and rehabilitation of Indian flapshell turtles confined in small contaminated water-logged areas.

Keywords: Indian flapshell turtle, moth fly larvae infestation, diagnosis, management

Introduction

A wide range of climatic zones in India provide a unique and comfortable survival place for many mammalian, avian and reptilian species. Diverse range of animal species survive depending on their close linkage to regional temperatures, rainfall, and humidity, type of water (i.e., freshwater or saltwater) etc. (Partz *et al.*, 2005).

Turtles, tortoise and terrapin are docile reptiles which have been observed to have significant cultural/spiritual impressions among Indian citizens. Most of the turtles are protected under the Wildlife (Protection) Act, 1972 of India which means keeping turtles as indoor or in-house companions is prohibited.

Out of different types of turtles and terrapins, the Indian flapshell turtle (*Lissemys punctata*; Lacepede, 1788) is a commonly found freshwater turtle. It is included under the 'Least Concern' category by the International Union for Conservation of Nature (IUCN). Turtles may get affected by various diseases; however, exclusive details on actual prevalence of infectious or non-infectious conditions affecting Indian flapshell turtles are not available in India. This reason negatively affects veterinary practitioners while approaching for treatment of sick turtles.

Hence, there is an absolute necessity to understand current clinical ailments. Under such circumstances, a better explanation of existing disease conditions requires consistent application of appropriate diagnostic methods, careful interpretation of laboratory findings, and description of suitable therapeutic and management strategies. Various scientists, veterinarians and academicians have made frequent attempts to document clinical ailments of turtles in form of case reports, scientific abstracts, clinical observations, post-mortem findings, and some small case studies (Eckert *et al.*, 1999; Flint *et al.*, 2009; Bhadesiya *et al.*, 2016). However, there is no veterinary documentation of moth fly larvae infestation in an Indian flapshell turtle in India.

The present report depicts an unusual case of moth fly larvae infestation, deformed limb and contamination of upper layer of shell in an Indian flapshell turtle at Anand, Gujarat.

Case Management

A rescued Indian flapshell turtle was brought to Department of Veterinary Medicine, Veterinary

College, Anand, Gujarat with a history of peeling-off of upper layer of shell and worm-like infestation over the body surface. Anamnesis revealed that the turtle was rescued from contaminated water-logged small area with less exposure to direct sunlight and perhaps limited physical activity because of size of the area. History did not reveal any other specific details.

Physical Examination and Laboratory Observation

Detailed physical examination revealed corrugation of upper layer of shell and skin indicative of prolonged direct contact with water [Figure-01], presence of debris and contamination in corrugated surface, conspicuous presence moth fly larvae and 'dead-space' created by peeling-off of upper layer of shell [Figure-02], clear evidence of healed right hind leg with partial loss of tissue on flap [Figure-03(A) and Figure-3(B)]; generalized presence of larvae over the body surface [Figure-3(C)]. Turtle did not show other critical clinical manifestations.

The larval samples were collected and examined under microscope which revealed a structure resembling larvae of *Clogmia* spp. of moth fly [Figure-04].

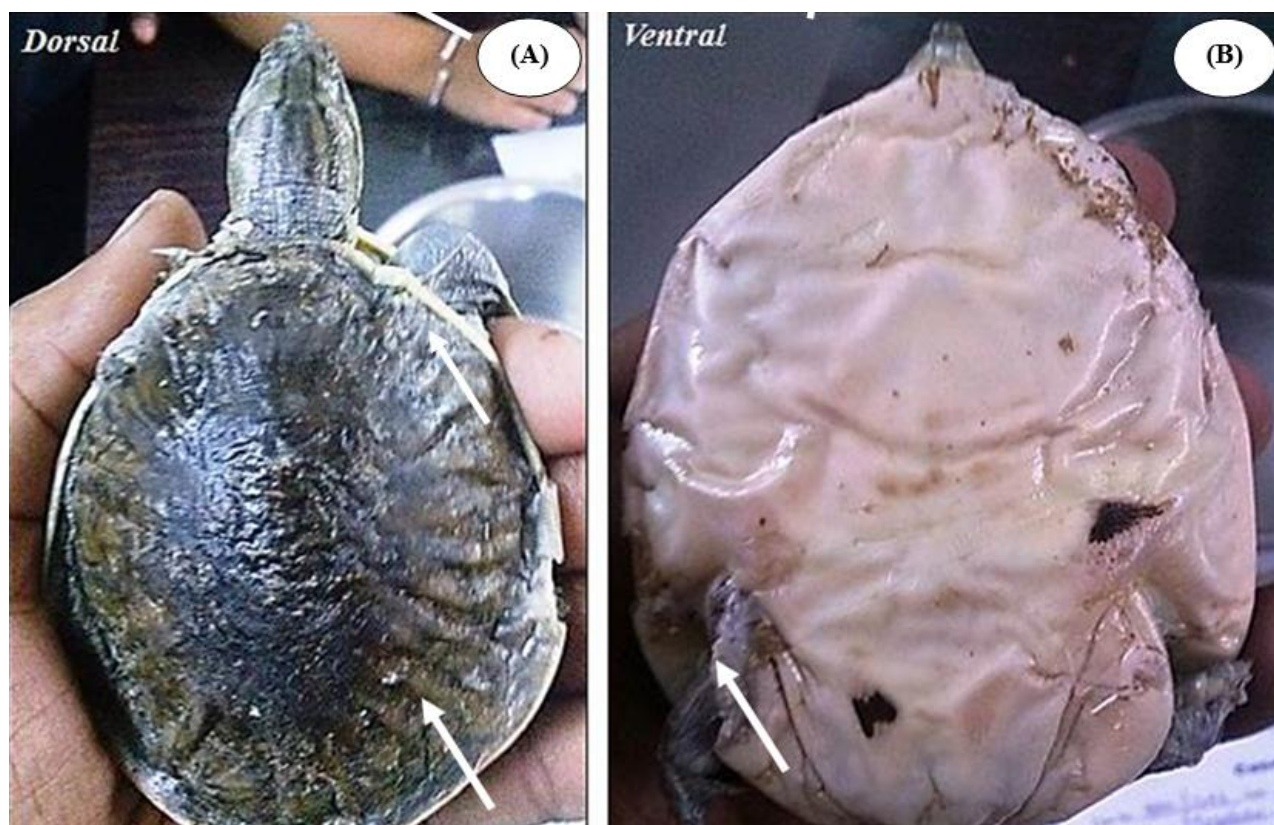


Figure-1: Contamination and corrugations on (A) upper layer of shell and (B) ventral side



Figure-2: Peeling-off of upper layer of shell creating a space for accumulation of debris and larvae infestation

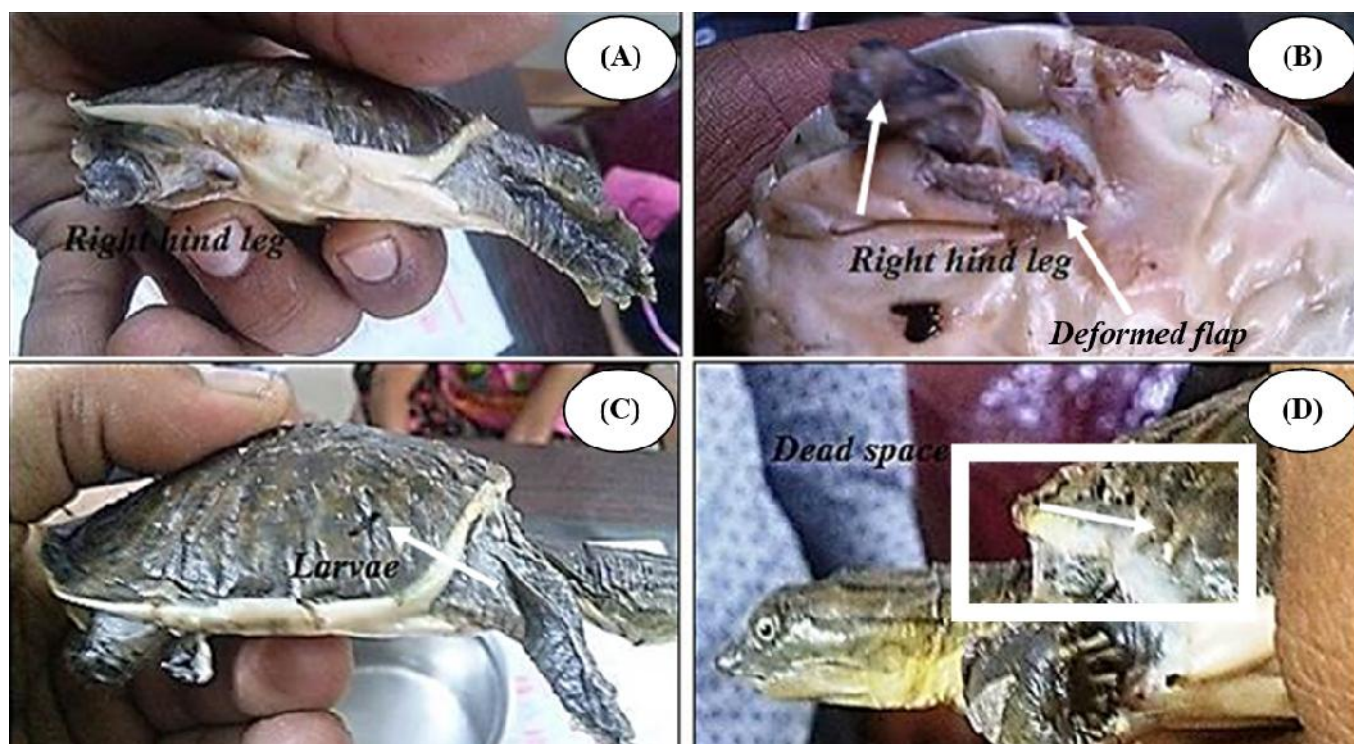


Figure-3: (A) Lateral view of right hind leg; (B) Deformed right hind leg and flap; (C) Presence of larvae; (D) 'Dead space'



Figure-4: Microscopic view of structure of a larva collected from the case

Clinical Management:

Gentle manual removal of larvae was carried out by use of cotton soaked in sterile normal saline and also by use of blunt forceps. Debris over the carapace was cleaned by use of sterile cotton followed by flushing with sterile fluid (Normal saline), application of antiseptic solution (Povidone iodine), and filling the gaps with antibiotic powder (Cephalexin powder). The same steps were also used on the deformed right hind leg, right sided flap and other areas near borders/rim of the shell. The turtle was provided with parenteral administration of multivitamins (especially vitamin-A and B-complex) and non-steroidal anti-inflammatory drug (Meloxicam) to relieve pain caused by underlying inflammatory process. Rescuers were advised for implementation of better management practices with regards to feeding, housing, basking hours, follow-up and finding a suitable habitat for release. The turtle was observed for clinical recovery for next 3 days. Later, it was advised to release the turtle in a suitable area after complete clinical recovery was noticed.

Discussion

Free-living and clinically healthy Indian flapshell turtles usually tolerate minor environmental changes. They are commonly found in freshwater and it is uncommon to see turtles stuck in small water-logged areas or drains. Unnoticed presence of turtles in a small/confined contaminated water-logged area for prolonged period can lead to development of abnormal clinical signs because of multiple reasons. These reasons include constant contact with contaminated water leading to corrugation on skin and layer of shell/plastron, contamination of small injuries leading to septicemia, delay in healing of wounds/injuries, limited food resources causing deficiency disorders, moth fly or drain fly or other vectors and insects attracting towards the area which can affect overall health and well-being of the turtle.

‘Basking’ or ‘Sunning’ or ‘Sunbathing’ is a behavior related with thermoregulation in turtles. Clinically healthy turtles use different spots above the water level for basking (e.g., banks of river and ponds, floating vegetation etc.) to raise their body temperature and sometimes to get rid of ectoparasites or excess moisture (Boyer, 1965; Bhupathy *et al.*, 2014). One additional clinical finding of the case was deformity in right hind leg and flap. This could have led to reduced mobility and prolonged presence of the turtle in water-logged small area. Basking is compromised under such circumstances causing

disturbance in normal homeostasis. Hence, it was assumed that the present case went unnoticed and apparently no efforts were made to control moth fly larvae or to rescue the turtle.

As mentioned earlier, water-logging attracts flies and mosquitoes. Moth fly or drain flies commonly inhabit drains and sewage systems. Generally, they do not cause clinical diseases in turtles and other reptiles but are described to cause persistent annoyance (Oscoz *et al.*, 2011). Moth flies are known to possess hairs on their bodies and on larvae which protect them from getting affected by common bleach. Mechanical cleaning of water-logged areas to remove larval food resources and use of caustic cleaners is documented to be effective control measures for moth fly. Undoubtedly, use of repellents or insecticide to control moth fly can adversely affect animals or reptile unknowingly present in the area. Therefore, it is also not advisable to use such products without evaluating presence of animals in the area. The best possible management of such cases is timely rescue of animal and provision of veterinary care.

Pathology of diseases and disorders of Indian flapshell turtle is poorly understood in India. Veterinarians play an important role for diagnosis of the disease of free-living populations of turtles. A dedicated effort is required to improve the knowledge of possible threats to their survival in the wild. In the present case, intensive treatment was not directed towards killing the larvae, but the turtle was treated. Successful outcome of this case was observed due to (a) symptomatic treatment; (b) advise on keeping the turtle in clean area until recovery, (c) keeping sand and mud in water-pen as substrate to reduce chances of shell infection, (d) frequent replacement of water contaminated by turtle's excreta, (e) provision of space for basking to facilitate thermoregulation and to draw away flies/mosquitoes/insects/other vectors, (f) making necessary arrangements for food; and (g) release in a suitable area after complete clinical recovery. To the author's knowledge, there is no available published report on moth fly larvae infestation in turtle and deleterious health effects associated with constant presence in contaminated water-logged areas.

Conclusion

An uncommon case of moth fly larvae infestation in an Indian flapshell turtle is documented. Emphasis has been placed specifically on possible factors associated with occurrence of the condition, identification and

rectification of the issues. The information will (a) provide a base for veterinarians to manage clinical cases, (b) create a platform to conduct large-scale research in future, and (c) encourage timely rescue and rehabilitation of Indian flapshell turtles surviving in small water-logged areas.

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