Long-Term Monitoring of Blood Parameters of Injured Sea Turtles Under Rehabilitation

Conference Paper · April 2014

CITATIONS
0

READS
47

6 authors, including:

Doğan Sözbilen
Pamukkale University
68 PUBLICATIONS **205** CITATIONS
SEE PROFILE

Barbaros Şahin
Pamukkale University
39 PUBLICATIONS **128** CITATIONS
SEE PROFILE

Eyup Başkale
Pamukkale University
161 PUBLICATIONS **466** CITATIONS
SEE PROFILE

Yakup Kaska
Pamukkale University
192 PUBLICATIONS **3,561** CITATIONS
SEE PROFILE

NOAA Technical Memorandum NMFS-SEFSC-701

doi:10.7289/V5/TM-SEFSC-701

PROCEEDINGS OF THE THIRTY-FOURTH ANNUAL SYMPOSIUM ON SEA TURTLE BIOLOGY AND CONSERVATION

2014 INTERNATIONAL SEA TURTLE SYMPOSIUM

NEW ORLEANS, LOUISIANA, USA

14 to 17 April, 2014
New Orleans, Louisiana USA

Compiled by:
Lisa Belskis, Amy Frey, Michael Jensen, Robin LeRoux, and Kelly Stewart

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149

December 2016

ANEMIA AND CONCURRENT GASTROINTESTINAL DISORDERS IN GREEN SEA TURTLES: A STORY OF SUCCESS AND LOSSES*

Estelle Rousselet[1], Steven Nelson[2], Terry M. Norton[2], and Nicole. I. Stacy[3]

[1] VetAgroSup-Campus Vétérinaire de Lyon, Lyon, France
[2] Georgia Sea Turtle Center, Jekyll Island Authority, Jekyll Island, Georgia 31527, USA
[3] Department of Large Animal Clinical Sciences, University of Florida, College of Veterinary Medicine, Gainesville, Florida, 32610, USA

Gastrointestinal (GI) disorders are frequently observed in green sea turtles admitted to rehabilitation facilities. Among the most common causes are infectious etiologies, motility disorders, trauma, foreign body and other obstructive processes that often lead to gas accumulation and buoyancy disorders. In addition to physical examination and diagnostic imaging of these patients, initial diagnostically useful laboratory tests include complete blood counts and plasma biochemistry. The objectives of this study were to summarize clinical, laboratory and pathologic findings in green sea turtles with diagnosis or clinical suspicion of GI disorders and concurrent anemia and to present medical treatment options and clinical decision factors that can be helpful to optimize medical care for such patients. Medical records of green sea turtles admitted to the Georgia Sea Turtle Center, Jekyll Island, GA (GSTC) from January 2010 to February 2013 were reviewed retrospectively. Inclusion criteria were clinical diagnosis or suspicion of GI disorder, packed cell volume of 25% or less and rehabilitation for longer than 5 days. Of forty-seven sea turtles with anemia at admission, six were included in the study. Three animals were successfully released and three died. Survivor turtles were diagnosed/suspected with gastrointestinal diseases such as impaction, cloacitis and/or distention of GI tract. The three survivors had mild to moderate anemia at admission and one developed moderate anemia during rehabilitation. The time from the presence of anemia to evidence of regeneration ranged from 12 to 48 days. Additional blood work results of all three survivors included monocytosis, heterophilia and elevated creatine kinase enzyme concentrations. Nonsurvivor turtles with clinical diagnosis/suspicion of GI disorders had impaction, ileus, stricture, abscesses and/or intestinal ulcerations upon gross and histopathologic examination. Consistent laboratory findings in turtles that died were mild to severe nonregenerative anemia without development of regeneration in any of the turtles. Other laboratory findings were monocytosis, hypocalcemia and hyperphosphatemia in two turtles that died. Sea turtle patients with GI disorders often present a challenge to the clinician with regard to diagnosis and medical care. The concurrent condition of anemia in these patients complicates treatment and the rehabilitation process, since the pathogenesis of anemia in these patients is often complex and poorly understood. First intention treatment is symptomatic and includes fluid supplementation, appropriate antibiotics, gastroprokinetics and/or laxatives, oral or injectable iron supplementation, and blood transfusions and/or bone marrow stimulants in the most severe cases. Treatment regimes for these clinically challenging cases will be discussed.

LONG-TERM MONITORING OF BLOOD PARAMETERS OF INJURED SEA TURTLES UNDER REHABILITATION

Dogan Sozbilen[1], Çiğdem Fak[2], Barbaros Sahin[2], Eyup Baskale[3], Meliha Cedetas[2], and Yakup Kaska[3]

[1] Pamukkale University, Vocational School of Acıpayam, Department of Herbal and Animal Breeding, Denizli-Turkey
[2] Pamukkale University, Sea Turtle Research Centre (DEKAMER), Denizli-Turkey
[3] Pamukkale University, Faculty of Arts and Sciences, Department of Biology, Denizli-Turkey

Two species of sea turtles (*Caretta caretta* and *Chelonia mydas*) are using Turkey's Mediterranean coastline for nesting and foraging. Dozens of sea turtles are being injured or killed in consequence of fishery interactions, speed boat accidents, ghost nets etc. along the coastline of Turkey. Annually around 20 injured turtles are being admitted by DEKAMER (Sea Turtle Research, Rescue and Rehabilitation Centre, Turkey). Most turtles need long term

rehabilitation after receiving treatment at the centre. To assess baseline health parameters of turtles, we have been recording healthy and injured turtles' biochemical blood parameters since 2009. Sixty-two of a total 96 admitted injured turtles kept under rehabilitation more than 60 days. Therefore, we started to record monthly monitoring of 16 biochemical blood parameters in injured turtles since 2012. Twenty-one loggerhead turtles have been monitored in the last 14 months. We also captured 41 healthy loggerhead turtles from wild to compare the results of injured turtles. 10 of 16 monitored parameters showed significant differences between healthy and injured turtles. These results are the first long term monitoring of blood biochemical parameters of injured loggerhead turtles and comparison of these results with healthy individuals will be very useful as a complementary diagnostic tool in rehabilitation of turtles.

ECOSYSTEM HEALTH AND ENVIRONMENTAL INFLUENCES ON INNATE IMMUNE FUNCTION IN THE LOGGERHEAD (*CARETTA CARETTA*) AND GREEN (*CHELONIA MYDAS*) SEA TURTLE*

Patricia L. Sposato, Patricia Keating, and Sarah L. Milton

Florida Atlantic University, Boca Raton, Florida, USA

Sea turtles are remarkable, long- lived reptiles that have occupied the marine realm for millions of years, migrating thousands of miles to nearshore habitats that pose numerous anthropogenic threats. Of increasing concern is how anthropogenic impacts and global climate change may affect the emergence of infectious disease within Florida's coastal wildlife populations. Our understanding of disease processes in sea turtles, however, is hampered by our lack of basic knowledge of their immune function. While adaptive immune responses have been previously investigated to some extent, there has been virtually no work on the far older, native system of innate immunity. By elucidating the basics of innate immune function in sea turtles, we will gain a better understanding of their physiology in degraded near shore habitats as well as predict responses to ever increasing global temperatures. As non-specific immune defenses evolved relatively early, it is likely that the sea turtle as a "living fossil" relies heavily on this modality in addition to mounting an adaptive response. The objective of this research was to quantify phagocytosis by the innate immune cells in the loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtle. We isolated peripheral blood mononuclear cells (PBMCs) from polymorphonuclear granular leukocytes (PMNs) and utilized both flow cytometry and fluorescent microscopy to quantify phagocytosis of FITC labeled latex beads and fluorochrome conjugated *Staphalococcus aureus* to demonstrate that sea turtle monocytes and heterophils engage in phagocytosis. We examined the innate immune response at a variety of temperatures in both healthy turtles and those from habitats where disease is prevalent. Results showed that the innate immune system is likely to play an important role in the overall immune response of sea turtles, as suggested by both the high proportion of heterophils in the circulating WBC population, and the finding that their rates of phagocytosis exceed those of the monocyte/lymphocyte enriched cell layer at all temperatures and in both degraded and pristine habitats. Despite the fact that very cold or warm temperatures generally have negative impacts on reptile physiological processes, sea turtle white blood cells continue to function across a wide range of temperatures and are capable of phagocytosis across a temperature range of 7° to 37°C. However, animals that resided in a polluted habitat (the environmentally degraded Indian River Lagoon) mounted a far less robust immune response than those from the more pristine Trident Basin, which exhibited five-fold higher heterophil phagocytic activity ($p < 0.05$). With the innate response likely to be such a critical part of the overall immune system, its suppression in degraded habitats as has been previously shown for the adaptive immune response may in part explain the prevalence of GTFP in young green sea turtles. By interpreting how aspects of their habitat influence the immune function of sea turtles, we will be better equipped to develop recovery plans for these endangered and threatened species, as well as manage their diseases in captivity with the hope of releasing them back into the wild after rehabilitation.