

DIAGNOSIS AND TREATMENT OF AURAL ABSCESES IN TURTLES

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Abstract: Diagnosis, etiologies, and techniques for treating aural abscesses in an ornate box turtle, *Terrapene ornata ornata*, are discussed.

Key words: ornate box turtle, *Terrapene ornata ornata*, aural abscess, hypovitaminosis A.

CASE REPORT

Signalment

A female approximately 12-yr-old ornate box turtle, *Terrapene ornata ornata*, originally wild-caught and kept in captivity for 3yr.

Presenting Complaint/History

This turtle presented with slowly progressive swellings on both sides of its neck, puffiness of both eyes, and periodic nasal discharge from both nares. In addition, it had decreased appetite and activity.

Physical Examination

On presentation the turtle appeared depressed, weak, and lethargic with significant bilateral aural swellings, mild bilateral blepharodema, and a mild mucopurulent nasal discharge.

Questions

- What's your diagnosis?
- What husbandry conditions are likely to have induced this disorder?
- How should it be treated?
- How can it be prevented?

Differentials

Differentials for these clinical signs include the following: bilateral aural abscesses, hypovitaminosis A, upper/lower respiratory tract disease, other infections, systemic disease, trauma, and chemical or parasitic inflammation.

While the exact cause of aural abscesses cannot be definitively stated, most appear to be the result of several predisposing factors. Commonly, affected reptiles are the victims of improper husbandry including chronic suboptimal temperatures and inadequate nutrition. This then results in immunosuppression with development of secondary opportunistic infections. Therefore, to arrive at a diagnosis one must begin by taking a thorough history and doing a complete physical examination. Some level of systemic evaluation of the patient is also indicated, as ancillary diagnostic testing may provide important therapeutic and prognostic data (Mader, 1985; Boyer, 1992; Boyer, 1996).

Treatment/Prognosis

At this time, because of the nature of the reptilian inflammatory response, the location of the inflammatory exudate, and the relative ease of surgical manipulation, a surgical approach appears to be the most appropriate method of treatment (Frye and Williams, 1995; Bennett, 1998). In the case of chelonians with long standing abscesses and/or those patients with evidence of systemic disease, delaying surgical intervention and instead initiating systemic therapy of antibiotics, fluids, and other appropriate supportive care for 3-4d may prove beneficial towards improving the overall outcome of treatment. Delaying surgical intervention, while providing needed supportive care, tends to decrease the local inflammatory response and may decrease local hemorrhage intraoperatively. Also, a calculated delay for treatment before surgery may enhance the animal's ability to tolerate the anesthesia through correction of fluid and electrolyte imbalances, and may allow time to elevate the patient's core body temperature to a point within the preferred optimal temperature zone (POTZ) for that species (Mader, 1985; Donoghue, *et al*, 1996) .

The author uses the physical and laboratory examination findings to determine the overall health status of the animal. From that point it is determined what degree of supportive care is indicated and when surgical intervention should be planned. Typically, most presenting turtles are debilitated and respond to 2-3d of supportive care prior to the surgery. These turtles are often given warmed intracoelomic fluids, vitamin supplements parenterally as deemed appropriate, and preoperative antibiotics, all determined on a case-by-case basis. They are caged in intensive care where all of their species specific physiologic needs can be met. Surgery is planned when it is determined that the animals are more alert, responsive, and hydrated, and would therefore be better able to tolerate the procedure and anesthesia.

Surgical treatment of aural abscesses should occur using appropriate anesthesia. This allows the surgeon the opportunity to perform thorough debridement of the tympanic cavity and alleviates the pain associated with the treatment of the disease process. Typically the surgical procedure does not take very long, and the author has had good success using propofol at 10.0mg/kg IV (Abbott Lab., N. Chicago, IL, USA) (Carpenter, *et al*, 1996; Bruederle, 1998). In the author's experience, propofol provides a quick induction, is short acting, and produces a level plane of anesthesia with a relatively rapid rate of recovery and few side effects. Other anesthetics may also be employed.

Proper sterile surgical preparation should be employed prior to surgery. This is especially important if it is anticipated that specimens shall be collected for culture and sensitivity. Each veterinarian may have a different surgical approach to chelonian aural abscesses. The main objective, however, is to ensure complete removal of the abscess contents from the tympanic cavity, while avoiding possible damage to the columella (stapes) during debridement, and ensuring that fluids or other materials are not aspirated by the patient during or after the procedure (Evans, 1963; Mader, 1985; Gatten, 1989). The author's technique involves making a full-thickness horizontal incision through the entire tympanum from the 3 o'clock position across the center of the tympanum to the 9 o'clock position. A second vertical incision is then made from the 12 o'clock position down through the center of the tympanum to the 6 o'clock position. Together these 2 incisions form a cross.

The inflammatory debris may then be gently removed using small ear loops or forceps. Again, care must be taken not to damage the columella during the debridement and subsequent flushing. If desired, specimens for culture and sensitivity should be collected at this time. Ideally, the author tries to remove the caseous material in one piece. After removal of all the grossly visible inflammatory debris, all aspects (especially the caudal extent) of the tympanic cavity need to be evaluated as caseous material may extend quite far, especially in cases that are more chronic.

Once it has been determined that all visible pieces of abscessed material have been removed, the tympanic cavity and the eustachian tube need to be gently but liberally lavaged using an appropriate antimicrobial agent. The author prefers to use diluted chlorhexadine solution [1 part chlorhexadine: 50 parts saline] (Nolvasan, Fort Dodge, IA, USA) (Carpenter, *et al*, 1996; Bruederle, 1998). Diluted chlorhexadine solution has a wide spectrum of antimicrobial activity, is relatively nontoxic to tissue, and maintains a sustained residual activity. While there are reports of using diluted povidone-iodine (P-I) solution, it remains controversial, as it has been demonstrated in *in vitro* studies that concentrations in excess of 1% P-I solution killed fibroblasts. Also, the active antimicrobial ingredient in P-I, free iodine, is inactivated in the presence of the proteins of serum – which are often present postoperatively within the tympanic cavity (Mader, 1985; Nesbitt and Ackerman, 1991) .

Throughout the entire procedure, the oral cavity must be examined frequently to prevent the possibility of aspiration as debris and liquids may be forced/flushed through the eustachian tube into the oropharynx. In an effort to avoid such aspiration, the author typically places the turtle in a head down position while flushing the tympanic cavity and eustachian tube. This allows fluid and debris that enter the oropharynx to exit via gravity out of the mouth. After thorough flushing, the surgery site may be filled with an appropriate antibiotic ointment and allowed to heal by secondary intention. The author prefers to use a triple antibiotic ophthalmic ointment (TriOptic-P, Pfizer, PA, USA). The veterinarian or client should continue to lavage and pack the surgical site on a daily basis until healed. The decision to place the patient on systemic antibiotics is dependent upon the results of physical and laboratory evaluations. Typically, if the author has started the animal on presurgical systemic antibiotics, these are continued for a prescribed course of treatment based on the initial physical examination and laboratory workup.

The potential for concurrent hypovitaminosis A should be addressed as well as any other husbandry issues determined to be a problem during the initial history and physical exam. For a definitive antemortem diagnosis of hypovitaminosis A, a vitamin A assay of the liver, or a large volume of blood is required (Lawton, 1993; Cooper and Sainsbury, 1995; Exotic Anim, 1995). In this case, the abscesses were the result of overall poor husbandry combined with a diet deficient in either beta-carotene, preformed vitamin A retinol, or retinyl ester. Additional treatment, if concurrent vitamin A deficiency is present, would consist of parenteral injections of 1000–2000IU vitamin A/kg (Aquasol A, Armour Pharmaceutical, NY, USA) once a week for 2wk (mild cases) to 6wk (severe cases) (Mader, 1985; Boyer, 1992; Donoghue, *et al*, 1996). Higher doses of vitamin A do not speed recovery and can result in hypervitaminosis A.

Symptoms generally resolve gradually within 2-6wk depending on the severity of presenting clinical signs. The cellular debris under the eyelids can be carefully removed with a moistened cotton tip applicator and digital pressure. Ophthalmic antibiotic ointments, such as TriOptic-P, can be used at the clinician's discretion. If nasal discharge or other evidence of respiratory disease (dyspnea, rales) or systemic disease are present, then all indicated diagnostic tests (hematology, radiography, culture, etc.) should be performed and proper treatment/medications instituted (Vaughn, *et al*, 1974; Johnston, 1991; Murray, 1996). Prevention involves, along with proper species specific environmental maintenance, providing growing box turtles with either a natural source of beta-carotene, or supplementing their diet with an oral source of preformed vitamin A in the form of a commercial product specifically formulated for the species (Mader, 1985; Boyer, 1992; de Vosjoli and Klingenberg, 1995).

If the animal is anorexic, routine force feedings and fluid and electrolyte supplementation should be administered as needed to maintain a positive caloric balance. Most aural abscesses respond well to surgical treatment and heal completely. Recurrences do occur and are often the result of either inadequate surgical debridement, or failure to address the underlying, predisposing causes of the disease (Mader, 1985; Murray, 1996). Finally, at this time, it is uncertain to what degree the turtle's auditory capability is compromised by this disease process. The trauma associated with the disease itself, the surgical repair, and the fibrotic changes that most likely occur during the healing process, must certainly affect the ability of the columella to transmit sound to the inner ear. However, this assumed decreased hearing capability does not appear to have any long-term effects on the reptiles commonly presented and treated for aural abscesses (Mader, 1985; Boyer, 1992; de Vosjoli and Klingenberg, 1995).

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