Clinical Conditions Affecting the Head of Reptiles

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Abstract: There are a myriad of clinical problems that affect the head of reptiles. Conditions and causes such as congenital abnormalities, trauma, neoplasia, infectious disease and nutritional disorders can all have impacts on the cephalic region that result in pathology. Diagnosis of these conditions requires a thorough history, physical examination, laboratory testing, imaging and if warranted biopsies and histopathology. Treatment depends on various factors such as type of patient and cause of the disease. Prognosis also varies from excellent to grave depending on the specific pathology.

Introduction

Clinical conditions affecting the head of reptiles could easily fill an entire chapter or full day seminar.[1-11] Typical pathology falls under the various categories of dermatology, oncology, ophthalmology, neurology, otorhinolaryngology and dentistry. Likewise, causes are numerous. This paper will review the most common presentations of clinical conditions affecting the cephalic region of reptile patients.

Congenital Defects

Head

The most pronounced congenital defect in reptiles is bicephaly: having two heads. This has been reported in lizards, snakes and turtles. In most cases, both heads are independently functional. Although not to believe that these animals fair well in the wild, in captivity some live relatively normal lives.

It is felt that bicephaly develops as a consequence of aberrant temperatures during incubation.

Central nervous system

Meningoencephalocoele and hydrocephalus have been reported in crocodilians and anecdotally in water dragons. Most congenital neuropathies lead to embryonic or early death in the animal.

Eyes

Unilateral and bilateral anophthalmia can occur, but is not as common as microphthalmia. The latter, being either uni- or bilateral, can be minimal or severe, often with the globe never being seen as the small organ develops under the scales with no visible palpebral or ocular fissure.

As with the bicephaly, this is believed to be an incubation consequence.

Animals with either anophthalmia or microphthalmia can survive in captivity. However, affected animals may also have other occult congenital anomalies that may have direct negative impact on the animal's survival.

Ears

No congenital aural defects have been reported in reptiles.

Nose

Occasionally congenital defects of the oral cavity will incorporate the rostrum or nasal cavity. See below for more detail.

Oral cavity

Congenital defects of the oral cavity and facial bones are commonplace. Brachygnathism, both mandibular and maxillary, are seen in lizards, chelonians and crocodilians. Cleft lips (cheiloschisis) and cleft palates (uranoschisis) have been reported in crocodilians, snakes, chelonians and lizards. These can be unilateral or bilateral. Severity can range from minor disfiguration of the lip to complete absence of the rostrum or mandible.

These defects can be attributable to aberrations in incubation temperatures, genetic defects, toxins and nutritional deficiencies of the gravid females.

Trauma

Head

Trauma is probably the most common clinical condition affecting the head. In this category, husbandry related trauma has to top the list. Rostral trauma from captives rubbing against or striking the glass or screen can lead to severe damage to the scales, facial bones and soft tissues. Secondary infection and osteomyelitis is common. Anorexia secondary to the injury leads to further deterioration of the patient with death often as the endpoint.

Trauma from conspecifics, predators, prey is also encountered.

Thermal burns can fall under the category of trauma. Heat damage from light bulbs and other heat sources are not uncommon in caged reptiles.

Crushing injuries, lawnmower encounters, boat propellers and automobiles are all potential sources of head trauma.

Central nervous system

Any severe head trauma has the potential of damaging the brain and CNS.

Freeze damage has been seen in tortoises emerging from brumation. Etiology is not clear but suspected to be related to either post brumation fatty liver syndrome or bacterial micro-abscesses forming in the brain.

Eyes

As above, bites from conspecifics, prey and predators are not uncommon. Likewise, burns can be seen on or around the eyes. Abrasions from difficult sheds, rubbing on cage furniture or squeezing into small hide places can all damage the spectacle and eye.

Any penetrating wound or foreign body can cause panophthalmitis. Damage to the Harderian duct can reduce drainage from the subspectacular space, thus putting pressure on the globe.

Freeze damage (seen during improper hibernation) has been reported in all taxa and can result in either reversible or permanent cataract formation.

In animals without protective spectacles, corneal damage such as abrasions and ulcers are not uncommon.

Ears

As above, any of the previously mentioned scenarios can cause traumatic injury to the external, middle or inner ear.

Nose

Rostral trauma is common in captive reptiles, either from rubbing on screen or constant abrasions from contact with glass or other barriers. Metal screen is the worst culprit as it can literally wear the skin and soft tissue down into the bone. Even in the presence of severe, self-induced lesions, the self-destructive behavior seems to continue. This can lead to deep infections, including cellulitis, osteomyelitis and sloughing of the maxillary bone. Although some can be treated if the underlying cause can be eliminated, the damage that results can be permanent, resulting in an animal becoming an obligate mouth breather.

Oral cavity

Iatrogenic trauma, such as forcing the mouth open during an examination, can damage teeth and bones. Teeth can be injured from biting into hard objects or during missed strikes.

Soft tissues of the oral cavity are also subject to trauma. Bites from live prey can damage the gingiva, glottis and tongue. Force feeding by inexperienced handlers can damage the jaw, hinge structure, soft tissues and tongue. Lacerations in the esophagus are not uncommon during rough "force" feeding attempts in snakes.

Foreign bodies, such as string, hair (human, animal), large scales, bones, substrates and more can become lodged in the oral cavity and cause serious health problems.

Nutrition

Head

One of the most common conditions that affect captive reptiles is nutritional secondary hyperparathyroidism (NSHP). The hallmark is foreshortening of the bones of the mandible, but, when the condition affects young, growing animals, as it often does, all of the flat bones of the head tend to be affected. Normally long skulls develop foreshortened with a more "round" appearance. NSHP can have anywhere from mild to severe effects on a patient's cosmetics even if the underlying deficiencies can be corrected. Mandibular or maxillary brachygnathism often results in the extreme, whereas chronic malocclusion with exposure gingivitis is the more common outcome.

Central nervous system

Toxic ingestion of heavy metals such as zinc or lead can cause CNS derangements. Certain nutrients, such as avidin, found in raw, unfertilized eggs, can induce biotin deficiencies in egg eating reptiles. Reptiles that eat fertilized eggs do not experience this problem. Clinical signs include muscle tremors and generalized weakness.

Ingestion of toxins such as organophosphates and pyrethrins, as well as disinfectants such as chlorhexidine can all cause nervous system signs such as paralysis and death.

Hypocalcemia, a common finding in captive reptiles, can impact nerve conduction (more of a PNS involvement) which results in generalized tetany.

Similar symptoms are seen in crocodilians suffering from hypoglycemic stress.

Thiaminase, which is found in certain frozen feeder fish, can induce leukoencephalopathy. This results from the thiaminase destroying the thiamine in the eaten fish. Clinical signs include muscle twitching, incoordination, blindness, seizures and potentially death.

Eyes

Arcus lipoides cornea, which manifests as infiltration of cholesterol crystals in the peripheral cornea is not uncommon in aging *Testudo* species. Corneal cholesterol dystrophy and corneal lipidosis also are seen in reptiles fed high polysaturated fat diets.

Hypovitaminosis A can lead to squamous metaplasia, which can have many consequences. Of importance here is that it can lead to blockage of the nasolacrimal ducts, especially in aquatic chelonians, which ultimately causes blepharoedema, giving the appearance of bilaterally swollen eyes.

Ears

Aural abscesses in chelonians, especially common in terrapins, have been associated with Vitamin A deficiencies. Although suggested, these abscesses are seen in wild animals and animals on proper diets.

Nose

No specific nutrition-related nasal conditions have been reported. That stated, cases of severe NSHP can develop facial deformities that may affect the nasal cavity.

Oral cavity

As stated, the most common nutritional problem in reptiles, NSHP, can lead to severe facial deformities that can have direct effects on the oral cavity.

It has been suggested that a vitamin C deficiency can be associated with gingival bleeding in the Boidae. However, studies in garter snakes show that at least in that species, they make enough vitamin C in their kidneys it is not required in the diet.

In chelonians hypovitaminosis A has been associated with abnormal growth of the rhamphotheca.

Although not directly related to nutritional intake per se, dental calculi are seen in several species of lizards, most notably bearded dragons.

Infections: Bacterial, Viral, Fungal and Parasitic

Head

Any breach in the skin can result in bacterial or fungal infections of the cephalic region. Cephalic cellulitis, a generalized swelling of the head, has been associated with gram negative septicemia. Viremic animals, especially those that are immunosuppressed from the pathogen, are likely to become secondarily affected by bacteria or fungi.

Chrysosporium anamorph of *Nannizziopsis vriesii* (CANV) and other fungi can affect the skin and soft tissues of the head.

Papillomavirus and pox viruses have been associated with skin lesions on the head.

Subcutaneous parasites and parasitic cysts may be found in the skin and muscles around the head region.

Central nervous system

Bacterial, viral, fungal and parasites are all known to affect the CNS in reptiles. Acanthamebic meningoencephalitis, toxoplasmosis, viral and bacterial meningitis are all reported.

Paramyxovirus and arenavirus are two common agents causing viral meningitis in snakes. West Nile virus has been implicated in crocodilians with neurological symptoms.

Eyes

Bacterial, viral, fungal and parasitic pathogens can all affect the eyes, from the globe to the extraocular tissues.

Ectoparasites, such as mites, ticks and leaches can all attach to the periocular tissues for protection and feeding. In heavy numbers these can cause severe damage to the globe and adnexa.

Nematodes of the genus *Serpentirhabdias*, have been reported throughout the periocular tissue, the subspectacular space and the subcutaneous tissues of the head in ball pythons.

Ears

As with the eyes, bacteria, viruses, fungi and parasites have all been associated with pathology of the middle and inner ears. Aural abscesses in aquatic turtles, as mentioned previously, are often colonized by a mix of bacteria and fungi. Cryptosporidiosis has been associated with middle ear infections in the iguana.

Nose

Secondary infection of the nasal cavity can occur with bacteria or fungi, especially in cases of trauma.

Oral cavity

"Mouth rot," the lay term for "infectious stomatitis," is the most common malady of the head in snakes. It is not a disease, per se, but rather a consequence of a combination of many factors: malnutrition, improper husbandry, immunosuppression, trauma, neoplasia and much more. Similar lesions are seen in lizards, and to a certain extent, chelonians.

Although Gram-positive bacteria are the most prevalent organisms in the oral cavity, bacterial stomatitis is most commonly associated with Gram negative bacteria. *Pseudomonas, Aeromonas, Salmonella, Morganella, E. coli,* and *Proteus* have all been associated with stomatitis and oral abscesses. Anaerobic bacteria such as *Bacteroides*, *Clostridium, Fusobacterium* and *Peptostreptococcus* have also been isolated in cases of oral cavity disease.

Mycobacteria have been reported as pathogens associated with granulomatous and non-granulomatous lesions in snakes.

Several viruses have been linked to oral cavity disease. Herpesviruses, ranavirus, adenoviruses, papillomaviruses, arenaviruses, reoviruses and picornaviruses have all been associated with stomatitis and oral lesions.

Fungal stomatitis is usually considered secondary to other disease conditions and an immunocompromised patient. Patients with fungal stomatitis usually have systemic fungal disease.

Metazoan parasites are not common causes of pathology in the oral cavity. Encysted helminths may be seen under the mucosa and nematodes, such as *Kalicephalus* species, may accumulate the oral cavity.

Neoplasia

Head

Several viruses have been associated with neoplastic lesions seen on or around the head. Papillomavirus, reoviruses and fibropapilloma-associated turtle herpesvirus (FPTHV) can all cause large, neoplastic masses on the skin surface of the head.

Papillomas, keratomas, squamous cell carcinomas, melanomas, lymphosarcomas, fibrosarcomas have also been reported.

Eyes

Herpesvirus, specifically FPTHV, produces papillomas on the corneal surface and surrounding ocular tissue. A sarcoma has been reported in the eye of a milksnake. Meibomian gland tumors have been seen from the palpebra of green iguanas.

Ears

Nothing reported.

Nose

A finding of a papilloma was reported in the "nasal area" in an American alligator, but actual location was not specified.

Oral cavity

FPTHV masses have been reported in the esophagus and stomach in green turtles, but not in the oral cavity.

Squamous cell carcinomas, transitional cell carcinomas, rhabdomyosarcomas, adenoameloblastomas, lymphoma, fibroma, adenocarcinomas, lymphosarcomas and osteosarcomas have all been reported from the oral cavity and mandible in snakes, lizards and chelonians.

Diagnostics

Pathology of the head should be evaluated no differently from any other body location. A thorough history is imperative. A complete physical examination from nose to tail is crucial.

Supportive diagnostics should include laboratory testing, including CBC, chemistries, bacterial culture and sensitivity testing, cytology, fine needle aspirates, biopsies, radiographs may all be necessary. In complicated cases advanced imaging such as ultrasound and CT/MRI may be needed.

Therapeutics

Treatment of cephalic pathology will depend directly on the diagnosis, type of patient and experience of the clinician. Topical and systemic (oral and or parenteral) therapy may be warranted. Physical therapy, cold laser therapy and other modalities may be incorporated as needed. In cases of neoplasia, adjunctive therapies such as radiation treatment may be required. Surgical resection of masses, abscesses or orthopedic implants are indicated in certain conditions.

Summary

A myriad of conditions can affect the cephalic region of reptiles. Detailed evaluation may be required to elucidate the cause(s). Treatment may be anywhere from a simple topical application of an antibiotic to complex surgical, chemotherapy and radiation therapy. Prognosis depends on cause and length of time the condition has been ongoing.

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