Avian Respiratory Distress: Etiology, Diagnosis, and Treatment

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- Infraobital sinus • Upper respiratory infection
- Paleopulmonic respiratory system
- Neopulmonic respiratory system

Respiratory distress is usually a life-threatening emergency in any species and this is particularly important in avian species because of their unique anatomy and physiology. In the emergency room, observation of breathing patterns, respiratory sounds, and a brief physical examination are the most important tools for the diagnosis and treatment of respiratory distress in avian patients.[1–5] These tools will help the clinician localize the lesion, which will facilitate immediate steps to stabilize patients. This discussion focuses on the 5 anatomic divisions of the respiratory system and provides clinically important anatomic and physiologic principles and diagnosis and treatment protocols for the common diseases occurring in each part.

Every bird with breathing difficulties requires immediate stabilization in a warmed incubator with oxygen flow at 5 L/min, delivering oxygen concentrations at 78% to 85% in a Lyon cage (Lyon Technologies Inc, Chula Vista, CA, USA). A bronchial dilator, terbutaline (eg, 0.01 mg/kg intramuscularly [IM] every 6–8 hours; Brethine), and an anti-anxiety analgesic, butorphanol (1–2 mg/kg IM every 2–3 hours; Torbutrol), are usually given to birds in respiratory distress before placing in the oxygen-enriched incubator.

FIVE AREAS OF THE RESPIRATORY SYSTEM

Upper Airway and Infraorbital Sinus

Anatomy and physiology

The cere is the area around the most dorsal surface of the maxillary rhamphotheca or upper bill. It may be feathered or unfeathered in various species of birds. In adult male

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budgerigars, the cere is usually blue (**Fig. 1**); in adult females it is usually brownish pink. Changes in the normal color pattern of the cere are suggestive of gonadal tumors in this species. Each species has a characteristic size and shape and any variation should be noted on the physical examination.

The nares or nostrils are located dorsally within the area of the cere in psittacine birds. The openings may be shaped abnormally as a result of chronic upper respiratory infection and should be noted on the physical examination (**Fig. 2**). Air moves through the nares into the nasal cavity. In Amazon parrots and Galliformes, a rounded, keratinized structure called the operculum is found in the rostral-most extent of the nasal cavity. It acts as a baffle to deflect and prevent inhalation of foreign bodies.

In most species, the nasal cavity is divided by a nasal septum. Within the lateral walls of the cavity are highly vascularized nasal conchae (**Fig. 3**). Most birds have 3 conchae: the rostral, middle, and caudal nasal conchae. The middle nasal concha is the largest. A clinically important anatomic feature is the relationship of this concha to the openings of the infraorbital sinus, the only true paranasal sinus of birds. This sinus opens dorsally into both the middle and caudal nasal conchae. The caudal nasal concha drains only into the nasal cavity by its dorsal opening into the infraorbital sinus. As a result, the only passageway for drainage of mucopurulent material in the infraorbital sinus is the caudal nasal concha up through the dorsal opening, or over the middle nasal concha into the nasal cavity. Pus collects in the sinus and can distend it around the eye.

The infraorbital sinus is located ventromedial to the orbit and has numerous diverticuli. A rostral diverticulum extends into the maxillary rostrum or bill, a preorbital diverticulum lies rostral to the orbit, a postorbital diverticulum may be subdivided to surround the opening of the ear, and a mandibular diverticulum extends into the mandibulary rostrum. In addition to its communication with the nasal conchae, the infraorbital sinus also communicates with the cervicocephalic air sac at its caudal-most extent. Knowledge of the relationship of this sinus and air sac with the bones of the skull is important during examination of the upper respiratory system and during irrigation and surgical drainage procedures.

History

The owner will often describe nasal discharge, redness or swelling of a portion of the infraorbital sinus and particularly around the eye (**Fig. 4**), feather loss on the head and ocular discharge, and some birds will rub their beak on the perch or scratch the sides of their head.

Fig. 1. Blue cere in a male budgerigar (*Melopsittacus undulatus*). Males typically have a blue cere at the base of the beak, whereas females have a brownish pink one.