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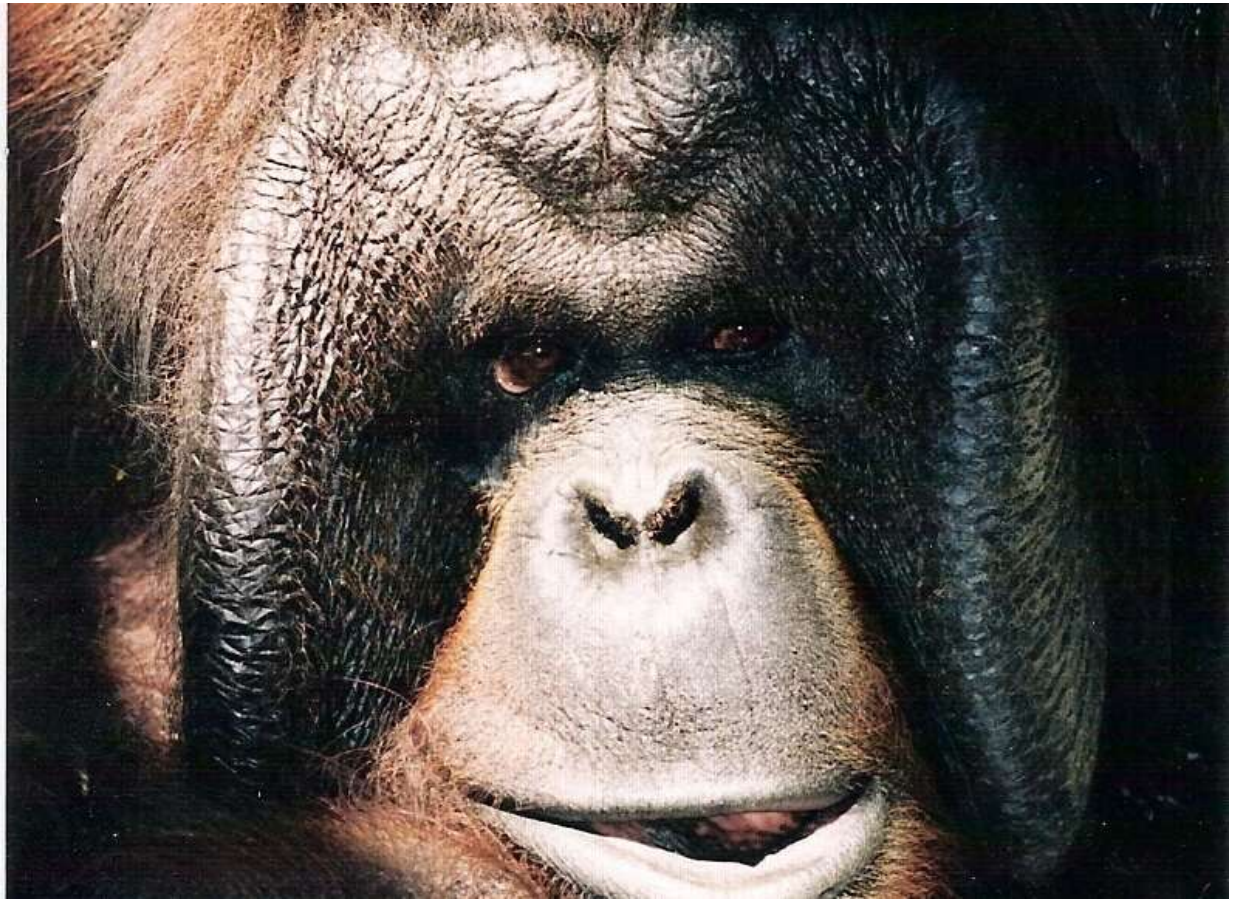

RESPIRATORY DISEASE IN CAPTIVE ORANGUTANS

OVERVIEW

- RESPIRATORY DISEASE– WHAT WE KNOW
- IMPACT OF RESPIRATORY DISEASE IN THE LIVES OF ORANGUTANS
- RESPIRATORY DISEASE– WHAT WE DO NOT KNOW
- ORANGUTAN HEALTH WORKSHOP– RESPIRATORY GROUP GOALS
- FUTURE WORK– SURVEYS

WHAT WE KNOW

RESPIRATORY DISEASE IN CAPTIVE ORANGUTANS

WHAT WE KNOW

- 2012 SSP Health Survey– valuable information
- We know it is the #1 health issue facing captive orangutans
- Respiratory infections considered the most serious health issue in 31 of 45 reporting institutions
- Over one-third of responding institutions reported that they have or are currently managing long-term, chronic cases of respiratory disease
- Respiratory infection is the leading cause of death in orangutans between the ages of 8-40 years

TYPES OF RESPIRATORY DISEASE

DISEASE	# INSITITUTIONS/ PERCENT
Air sac infection	19= 42%
Sinusitis	14= 31%
Pneumonia	14= 31%
Bronchiectasis/Chronic bronchitis	11= 24%
Allergies	7= 16%
COPD	4= 9%
Other (seasonal colds)	1= 2%

AIR SACCULITIS

- Air sacculitis– infection of the upper and lower respiratory tract including the air sac by multiple bacteria
- Air sacculitis has been documented in a number of other captive primate species including: owl monkeys, baboons, pig-tailed macaques, chimpanzees, and bonobos.
- Orangutans have a high incidence of air sacculitis, especially when compared to other species
- It has also been documented in a free-ranging mountain gorilla and in rehabilitant orangutans

AIR SACCULITIS

- Most common form of respiratory disease
- Large amounts of fluid/pus that varies from thin to thick
- Thicker fluid may not be detected by distended air sac
- Persistent infections
- Recurrent infections
- Drainage typically required

SIGNS OF AIR SACCULITIS

- Loss of appetite
- Lethargy
- Nasal discharge
- Coughing
- Bad breath
- Enlarged air sac
- Intermittent diarrhea
- Skin problems
- Weight loss
- Depression
- Breathing problems
- Change in body odor

SURGICAL INTERVENTION

SURGERY
#INSTITUTIONS/ PERCENT

- Marsupialization
  14= 31.11%
- Partial air sac removal
  4= 8.89%
- Complete air sac removal
  2= 6.67%
- Ostia closure
  2= 6.67%
- Other (trained for periodic surgical drainage) Toean
  1= 2.2%

TREATMENTS/MANAGEMENT

OTHER

- Nebulizing
- Environmental restrictions
- Temperature restrictions
- Oral/injectable medications
- Blood draws
- Regular weights

MINYAK AND HIS BATTLE WITH AIR SACCULITIS

IMPACT OF RESPIRATORY DISEASE IN THE LIVES OF ORANGUTANS

MINYAK

- Came to Los Angeles in late 2001 with advanced air sacculitis with chronic pneumonia
- Fistula to allow drainage of throat sac and had closed ostia
- He was depressed, despondent, and very sick
- In 2002 the zoo and staff knew that he needed immediate medical attention

BATTLING AIR SACCULITIS

- Moved to the Health Center for treatment
- Major 9 hour surgery to remove air sac
- One year of recovery and treatment at the Health Center
- Returned home in 2003 to the Red Ape Rainforest

IMPACT ON MINYAK AND CAREGIVERS

MINYAK

- Regular preventative exams
- Nebulized twice daily
- Occasional recurrence of pneumonia
- Hand-injection trained for antibiotic treatment
- Blood draw trained
- Weather restrictions
- Air filtration system

CAREGIVERS

- Stressful and emotional experience
- Long and risky procedure to remove air sac
- Long-term care
- Daily detailed monitoring of health
- Ensuring overall well-being

MINYAK TODAY

- Introduced to multiple females
- Berani– 7 years old
- Elka– 1 year old
- Intan
- Frequency of illness lessened
- Understand warning sings better

WHAT WE DO NOT KNOW

RESPIRATORY DISEASE IN CAPTIVE ORANGUTANS

UNDERSTANDING THE CONNECTION BETWEEN RESPIRATORY DISEASES

- It is not known what role respiratory diseases play in connection to one another
- The cause of respiratory disease is not known
- It is unclear if air sacculitis leads to pneumonia
- We do not know the progression between pneumonia and bronchiectasis which can lead to permanent life altering disease status
- It is not known if sinusitis is connected to air sacculitis
- It is not understood what role the environment and other various factors play in the development of respiratory disease

UNDERSTANDING RESPIRATORY DISEASE

- To begin the process of understanding these diseases, we need to standardize the collection of husbandry and hereditary information
- In order to effectively treat, diagnose, and understand respiratory disease, we need recommended standard protocols for veterinary respiratory evaluation and diagnostics
- We need more information from facilities dealing with these diseases
- This information needs to be made available

AIR SACCULITIS

- It is not well understood
- We do not know why it exists more within the captive orangutan population than in other species with air sacs
- It is not clear what factors are involved for individual susceptibility
- Trying to find early warning signs and catch this disease early in order to treat it in the beginning stages before it has progressed

EUROPEAN ZOO STUDY FINDS INTERESTING RESULTS (1969-2009)

	Chronic respiratory signs	Air sacculitis
Bornean	13.8%	10%
Sumatran	3.6%	14.3%
Male	15.8%	14.5%
Female	3.9%	12%
Hand-raised	NA	21%
Parent-raised	NA	5%

EUROPEAN ZOO STUDY

- Respiratory status of parents known in 46% of cases in both categories
- 93% = one or both parents had an episode with respiratory disease
- Healthy orangutans= 54% had parents with an episode of respiratory disease
- Possible environmental factors involved
- We do not know if this would correlate with the North American orangutan population– need surveys to understand risks and potential predisposing factors

WHAT WE NEED TO DO NEXT

SSP ORANGUTAN HEALTH WORKSHOP: RESPIRATORY GROUP GOALS

RESPIRATORY GROUP GOALS

1.) Standardize data collection/create protocols

2.) Create a centralized database

3.) Create standard protocols/recommendations

4.) Create a library of therapeutic options

5.) Create a network of consultation, resources, and support

6.) Future research

1.) STANDARDIZE DATA COLLECTION/CREATE PROTOCOLS

- Standard method to collect and catalog information
- Review known cases and case histories
- Case definitions– for education and better data– work with human specialists to help determine
- Definitions of respiratory disease: rhinitis, sinusitis, air sacculitis, pneumonia, bronchiectasis
- Respiratory review of studbook
- Surveys: 1. current therapies 2. ID risk factors
- Possible creation of subcommittee
- Develop check list for physical exams, respiratory exams, and necropsy– zoos to send information to SSP vet advisor to filter/interpret/compare

DEVELOP CHECKLIST FOR EXAMS AND NECROPSY

- Diagnostic imaging– CT scan if possible: sinus, air sac, chest (other recommendations if CT not available)
- Sample collections– bronchial wash if possible (other options)
- Air sac flush
- Bloodwork

2.) CREATE A CENTRALIZED DATABASE

- Data quality control– ensuring reliability
- Accessible information of various aspects of respiratory diseases
- Case studies– potential contacts
- Image library
- Familial information/background information
- Grant proposal– upkeep of web site and other potential funding needs

3.) CREATE STANDARD PROTOCOLS/RECOMMENDATIONS

- Definitions: rhinitis, sinusitis, air sacculitis, pneumonia, bronchiectasis
- Physical exam protocol
- Diagnostic protocol: imaging, sample collections, endoscopies, screening, assessing the air sac
- Necropsy protocol
- Establish training priorities for medical management
- Pre-shipment evaluations

4.) CREATE A LIBRARY OF THERAPEUTIC OPTIONS

- Utilize expertise available to maximize the therapeutic options
- Gather information on current therapies
- Make this information accessible

5.) CREATE A NETWORK OF CONSULTATION, RESOURCES, AND SUPPORT

- Imaging centers for each institution

- Consulting specialists:
  - Pulmonology
  - Respiratory therapy
  - Radiology
  - Infectious disease

- Other institutions

6.) FURTURE RESEARCH

- Assessment of allergy testing
- Create an atlas of the anatomy of the orangutan respiratory system
- Genetics

- Surveys:
- Current therapies
- Identify risk factors

CURRENT THERAPIES/ IDENTIFY RISK FACTORS

SURVEYS TO HELP UNDERSTAND RESPIRATORY DIESEASE

SURVEY TO FIND CURRENT THERAPIES

- Survey sent to zoos with orangutans with cases of respiratory disease within the past 10 years
- Survey monkey or call individual institutions, blog, list serve
- Will begin to develop treatment options and knowledge of successful therapies
- Potentially standardize recommended treatments

SURVEY TO IDENTIFY POTENTIAL RISK FACTORS

ENVIRONMENT/ HUSBANDRY

- Climate and restrictions
- Indoor/outdoor
- Activity
- Space/# animals
- Stress
- Bedding/substrate
- Cleaning protocols
- Off/on ground

INDIVIDUAL/GENETICS/ HISTORY

- Age
- Gender
- Species
- Relatedness
- Obesity
- Stress
- Parent reared

INDENTIFYING SIGNS FOR EARLY DETECTION

PHYSICAL SIGNS

- Nasal discharge
- Coughing
- Enlarged throat sac
- Weight loss
- Loss of appetite
- Bad breath
- Change in body odor
- Change in breathing

BEHAVIORAL SIGNS

- Lethargy
- Loss of interest
- Change in social behavior
- Depression
- Change in attitude

CONCLUSION

RESPIRATORY DISEASE IN CAPTIVE ORANGUTANS

- Respiratory disease is a significant problem in captive orangutans
- Respiratory disease is the leading cause of death of captive orangutans between the ages on 8-40 years
- This group constitutes our breeding population and this can be problematic for the overall health of this population
- We need a better understanding of respiratory disease for early detection, to effectively treat and diagnose disease
- In order to accomplish goals we need the assistance and support of the zoo community

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