MY PATIENT IS SEDATED, NOW WHAT: PRIMATE CLINICAL TECHNIQUES

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The order Primata is large and has over 200 species of primates, including humans. Veterinarians who elect to see non-human primates (NHP) in their veterinary practice have a responsibility to become educated in the specialized behaviors and needs of the many different species of NHP. One of the most critical of these concerns is becoming familiar with zoonoses of NHP and how to handle the NHP in order to screen for these diseases and others without unduly endangering the animal, the owner, staff, and other patients and owners. It is important to remember that experience with one species of NHP does not necessarily mean that another species of NHP can be approached in the same fashion.

It is beyond the scope of this report to cover, in depth, all of the zoonotic diseases transmissible from NHP to humans. It would be negligent not to state that any keeping of NHP as pets should be strongly discouraged, both from an animal health and welfare point of view, as well as a human health concern. It should also be pointed out that seeing NHPs in a private veterinary clinical setting should be approached with caution. Only a well-equipped practice, with staff that have been properly trained in primate handling and have been informed about and screened for zoonotic disease, should take on this challenge. Even then, the occupational health and safety hazards, ethical and legal ramifications can be enormous.

CONSIDERATIONS FOR NON-HUMAN PRIMATE PHYSICAL EXAMINATION

Staff Training/Safety

Any employees that are asked to work with NHPs need to be properly trained in an occupational health and safety plan and safe work practices to minimize the risks of physical injury and disease transmissions. Some of the topics that need to be discussed include NHP behavior, personal hygiene, housekeeping, specialized restraint equipment, personal protective equipment, blood-borne pathogen training, personal health screening as well as response procedures if an injury/exposure should occur. Human health recommendations for all NHP handlers, including veterinarians and staff, include the following: health screens including a health questionnaire that is reviewed by an occupational health expert, up to date immunizations (may vary depending on risk exposure), serum banking, and tuberculosis testing. Completion of all training programs must be documented before any contact with NHPs occurs and must be ongoing to address staff changes, as well as reviews and changes in protocols as needed.

The most common routes of exposure to potential zoonoses in NHP handlers are scratches, needle sticks, cuts, bites, and mucous membrane exposure. Every clinic that sees NHPs must be prepared to deal with accidental exposures and have a readily accessible and well-stocked primate exposure/bite kit. The likelihood of transmission of disease depends on several factors, including kind and severity of injury/exposure, health status of individual injured as well as that of the NHP involved. Defining this risk involves close communication with an occupational health expert familiar with both the person and NHP. Every facility/clinic must have a primate exposure/bite kit that should include the following: a 10% buffered bleach solution, an antiseptic skin cleanser, a sterile ophthalmic cleansing solution, iodophor surgical scrub, disposable latex gloves, sterile gauze and irrigation syringe, sterile bottle, safety glasses/face shield, phone numbers and directions to local emergency rooms, and step by step instructions. Wounds should be scrubbed vigorously with an antiseptic cleanser first. Then, using gloved hands saturate gauze sponges in bowl with the 10% buffered bleach solution and vigorously scrub and soak wound for a full 15 minutes. Irrigate deep wounds with this also via syringe. Loosely cover the wound and proceed to emergency room. For eye splashes, irrigate the eye with clear water or sterile ophthalmic solution for a full 15 minutes before proceeding to the emergency room. The animal involved should also be identified and appropriate testing done to determine any zoonotic risks. At a minimum, antimicrobial therapy should be initiated and the occupational health expert and employees supervisor should be notified immediately.

Equally important is education of NHP owners about the risks to themselves and their pets. Complete necropsies should always be done in the event of an animal death to rule out potential unknown health risks to caretakers and owners.

Primate Taxonomy

Understanding primate taxonomic categories will help in determining specific husbandry and veterinary needs. It is important to understand these categories when discussing zoonoses, specialized husbandry and dietary needs, and social complexities. While all NHP carry zoonotic diseases, the phylogenetic closeness of the Old World primates makes their zoonoses of particular concern. In general, the order primates share many behavioral and anatomical features that make them somewhat unique in the animal kingdom. Among these features are: well-developed manual dexterity, extreme strength for body size and agile reflexes, and a well-developed sense of sight and good hand-eye coordination. They have highly developed cerebral cortices, long infant dependency periods, and tend to have very complex social organizations. Physically, NHPs are set apart by their prehensile, opposable thumbs, tactile pads and nails on fingers and toes, a precise grip and extremely mobile, strong arms. They have large eyes with binocular vision. All of these physical and mental adaptations make the husbandry and veterinary care of NHP complex and demanding.

Clinical Adaptations

The examination room should be equipped with securely locking doors and escape proof, locked
windows. The counters should be cleared and everything needed for the examination (capture nets, primate gloves, towels, squeeze cage, pole syringe, and sedative dose drawn up) should be placed in the room before the NHP enters the room. Re-capping of injection needles should be avoided and a secure biohazard sharps container should be present at all times. Once the NHP is in the room the doors should not be opened again until the primate is properly restrained. Many NHPs are excellent escape artists and this skill should not be taken lightly.

**Pre-examination Considerations**

A large portion of the NHP medical examination may be done before ever having to restrain the animal. A complete medical history including any pre-existing diseases, assessment of anesthetic risk, temperament, and previous history of anesthetic problems is needed before proceeding with a NHP examination, with or without sedation or anesthesia. In order to minimize anesthetic time and risk, much of the examination can be done by keen observational skills and a good history from the owner or animal caretaker. Whenever possible, chemical restraint should be used for the actual physical examination.

Which sedative or anesthetic used to enable a thorough physical examination will depend on several factors including previous medical and anesthetic history, current health status, and temperament and drug delivery options. Any time a NHP is handled, examined or its cage cleaned, appropriate protective clothing, respiratory and mucus membranes protection, and primate bite gloves should be worn. Whenever possible, chemical restraint should be used to minimize the risk of injury and zoonotic disease to the handlers, veterinarian and non-human primate. All work should be done in a well-ventilated area that has UV exposure and air exchanges >6/min.

**Physical Examination**

Once the animal is safely restrained/anesthetized, a complete physical examination should be done, including a thorough dental and ocular exam, cardiac and gastrointestinal (GI) evaluation. GI examinations should include direct and indirect fecal screens (floatation as well as centrifugation techniques) and fecal cultures. Blood work should include a complete blood count (CBC), serum chemistry, as well as species appropriate viral screening and possibly serum mineral analysis. Whole body radiographs should also be taken to look for any suspicious thoracic lesions, diaphragmatic hernias, nutritional bone diseases, or other radiographic abnormalities.

Every NHP should have a tuberculosis screening, with frequency determined based on exposure risks. Current methods of TB screening include using 0.1 mL of a 1:10 dilution of mammalian tuberculin (Tuberculin mammalian, Human Isolates Intradermic sold by Synbiotics Corp.) equivalent to 1500 or more units of old tuberculin. A 25- to 27-gauge, ½-inch needle is used to inject the tuberculin intradermally, usually in the upper eyelid. The nipple can be used as a secondary confirmatory site. The test should then be read at 24, 48, and 72 hours. This test can give false-positive and false-negative results but any reaction should be considered positive until further diagnostics can be run and the animal should be immediately quarantined. A valuable ancillary test is the use of a rapid whole blood interferon-γ (WB-IFN-γ test – Primagam). This test measures cell-mediated immune responses in NHPs. The test kit also contains tuberculosis antigens (Bovine PPD, Avian PPD and Nil antigen control). Primagam® is available from Prionics AG Wagistrassa 27A. 8952 Schlieren-ZU Rich. Switzerland Phone +41 44 200 20 00; Fax +41 44 200 20 10 or www.info@prionics.com. Other diagnostic tests may include radiographs, sputum, fecal and blood cultures, gastric lavage for cytology and culture, and comparative TB tests.

Some NHPs may also be predisposed to certain diseases that may require additional diagnostic tools. Examples of these are the prevalence of cardiac disease in the apes, GI blockages due to parasitism in smaller primates and GI ulcerations in stressed animals.

**REFERENCES**

1. Murphy, H.W., Miller, M., Ramer, J., Travis, D., Barbiers, R., Wolfe, N.D., Switzer, W.M.
Table 1. Preventative Health: Vaccinations Differ Depending on the Age and Type of NHP (Old World vs. New World).

<table>
<thead>
<tr>
<th>Disease</th>
<th>Vaccination Schedule</th>
<th>Severity</th>
<th>Efficacy</th>
<th>Adverse Reactions</th>
<th>Vaccination Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetanus</td>
<td>2 mo, 4 mo, 6 mo, 18 mo, 4–6 yrs, 14–16 yrs, every 10 yrs after</td>
<td>Can be fatal</td>
<td>High</td>
<td>Numerous</td>
<td>All species</td>
</tr>
<tr>
<td>Poliomyelitis</td>
<td>2 mo, 4 mo, 6 mo, 18 mo, 4–6 yrs, 14–16 yrs</td>
<td>Inapparent to fatal</td>
<td>High</td>
<td>None reported</td>
<td>Great apes</td>
</tr>
<tr>
<td>Measles</td>
<td>15 mo, 10–12 yrs</td>
<td>Inapparent to fatal</td>
<td>High</td>
<td>None reported</td>
<td>All species if exposure risks</td>
</tr>
<tr>
<td>Hemophilus</td>
<td>2 mo, 4 mo, 6 mo, 18 mo</td>
<td>Mild to fatal</td>
<td>Unknown</td>
<td>Few</td>
<td>Limited</td>
</tr>
<tr>
<td>Rabies</td>
<td>16 weeks, annually after that</td>
<td>Fatal</td>
<td>High</td>
<td>Few</td>
<td>All in endemic areas</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>2 mo, 4 mo, 6 mo</td>
<td>Mild to fatal</td>
<td>Unknown</td>
<td>Few</td>
<td>Great apes</td>
</tr>
<tr>
<td>Mumps</td>
<td>15 mo, 10–12 yrs</td>
<td>Mild to fatal</td>
<td>Unknown</td>
<td>Few</td>
<td>Great apes</td>
</tr>
</tbody>
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