Exotic Animals

AVMEDICINE AND MANAGEMENT OF PET PRIMATES / MEDICINA Y MANEJO DE PRIMATES UTILIZADOS COMO MASCOTAS

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ABSTRACT
Key words: non-human primates, management, infectious diseases, non-infectious diseases.

Non-human primates are wild species that are frequently kept as pets, even though they are not adequate to keep humans company. Several primate species are threatened or endangered due to hunting or destruction of their habitat. It is convenient for veterinarians to have some knowledge of the treatment of these wild species in order to immediately provide care to these patients and if needed, refer them to specialists.

Considering their smaller size and lower maintenance cost, primates that are kept as pets are New World primates, but nowadays even Old World primates are found as pets. New World species that are usually kept as pets are squirrel monkeys (Saimiri sciureus), capuchin or “organ-grinder” monkeys (Cebus sp.), spider monkeys (Ateles geoffroyi), howler monkeys (Alouatta sp.), night monkeys (Aotus trivirgatus), titi monkeys (Callicebus sp.), marmosets (Callithrix sp) and tamarins (Saguinus sp.). Galagos or bush babies (Galago senegalensis), which are prosimians from the Old World, are popular pets in some regions. Old World primates that are kept in research facilities include rhesus monkeys, stump tailed macaques, crab eating macaques and Japanese macaques (Macaca sp.), green monkeys (Cercopithecus sp.) and Patas monkeys (Erythrocebus sp.). Sometimes, chimpanzees (Pan troglodytes), baboons (Papio sp), and orangutans (Pongo pygmaeus) are found in scientific institutions or as pets.

Feeding and Nutrition
Finding foodstuff is one of the main activities developed by primates in wildlife and behaviors related to feeding is a characteristic feature of each species. In general, most primate species are classified as opportunistic omnivores and they need animal protein besides fruits and vegetables. Some primates, such as howler monkeys and colobus monkeys, have specialized diets, having evolved to use fiber through fermentation by intestinal flora. Except for these species, primates obtain nutrients from an incredible amount of sources: leaves, fruits, seeds, shoots, vegetable roots, insects, bird eggs, birds, small animals and even mineral salts; in captivity, pellets, mixed cereals, pinkies, insects, cooked eggs, fruits and vegetables are provided. In captivity, primate nutrition should be part of a preventive medicine program. Selectivity can play an important role in nutrient balance. In primates that are kept as pets, a common problem is an incorrect nutrition and usually the patient is taken to the vet once nutritional disorders are so advanced that a total recovery can hardly be expected.

All primates require some source of vitamin C. New World primates require vitamin D3 because they cannot use vitamin D2, and due to diets lacking calcium they can develop secondary nutritional hyperparathyroidism. In general, primates should be fed twice a day, to reduce the incidence of acute gastric dilation and behavioral disorders (see animal enrichment). Total food intake is equal to 2 to 4% body weight (as fed rather than in dry matter). Hyperphagy and obesity can be found. Sometimes, even though the individual is eating a seriously imbalanced diet, parasite or infectious problems show up before nutritional deficiencies. Diet can turn into an obstacle that interferes with the individual's adaptation to captivity.

Behavior and Facilities
Most of the times, after achieving sexual maturity primates present unpredictable behaviors and can be aggressive and dangerous for human beings. Tamarins are less prone to this behavior, compared to marmosets.

Primates are social animals and it is better to keep them in groups, except when an individual needs to be separated to get medical treatment. Groups in captivity should be similar to those observed in wildlife. Due to their intelligence, non human primates develop more psychological pathologies than any other animal order. Isolating an individual can cause disorders in a short time. A serious problem is imprinting with human beings. A lack of environmental stimuli will cause psychopathologies such as cage destruction, licking or eating paint, over grooming, urine ingestion, masturbation, self-inflicted mutilation, regurgitation-reingestion, coprophagy and stereotyped behaviors amongst others. It is necessary to provide behavioral therapy (animal enrichment). Marmosets and tamarins can easily be stressed, so excessive handling should be avoided and any procedure in their enclosure should be monitored. Nests for this species should be provided.
Most primates come from warm weather, so temperature has to be kept between 15 and 24 centigrade for Old World monkeys, and between 20 and 28 centigrade for New World monkeys. Generally, they can gradually adapt to lower temperatures; but sudden changes are a stressing situation and can predispose them to respiratory problems. Recommended relative humidity goes from 55% to 70%; marmosets require 70 to 80%. If relative humidity is below these figures it can predispose them to skin and coat problems, but on the other hand, an increased humidity will promote bacterial and mycotic growth. Enclosures should provide enough space to promote normal, natural behaviors for each species. Resistant materials should be used, mostly in water stations, as well as escape proof locks. Different species of primates should not be housed together because many diseases do not affect one species but are lethal for another.

Physical and Chemical Restraint

Many of these species can be carriers or spread dangerous zoonoses if they attack human beings, therefore, an adequate management is very important. Two people should be available to handle the animal (veterinarian and assistant). Depending on the patient's size and type of procedure, it is better to use chemical restraint to manage non-human primates and avoid accidents. The following are some of the most commonly used drugs and drug combinations in primates, due to their availability: ketamine, ketamine/xylacine, ketamine/medetomidine, ketamine/midazolam, ketamine/diazepam and tiletamine/zolacepam. Inhaled anesthesia: halothane (low safety level) and isofluorane (safer in primates). Recovery: they must be placed in a warm environment, especially the smaller ones, prevent them from climbing up until they have recovered, use bedding material. The use of analgesics is advised in painful procedures, as well as returning gregarious animals to their group as soon as possible. In most cases, kennels in small species practices are not safe enough to house non-human primates.

Disease overview

Physiological data:
Rectal temperature: 37.2 40.2° C (average 38.8° C)  
Pulse: small: 165-240 bpm, medium to large: 95-112 bpm.  
Respiratory rate: large: 30 - 50 (12 to 20 breaths/min) 
small: 50-70 (20-50 breaths/min)  

Many procedures and treatments used in human medicine may be applied to non-human primates. Pharmacological principles and pathological processes are the same. Dosing is done in many occasions based on human dosages but an option is to use allometric scaling for this purpose.

The veterinarian should examine all non-human primates at least twice a year including: physical examination, complete blood count, fecal examination and tuberculin testing. Some data to remember:

Edematous swelling and intense coloration of the perineal area are normal signs of estrous in some species. 
Primates are capable of hiding disease signs so once these signs are obvious, the prognostic is reserved. 
Primates are potentially dangerous even if the patient is relatively treatable by owners. Care should be taken at all times.

Some drugs may be hidden in tasty food or drinks. Use the gastrocnemius, biceps or quadriceps muscles for intramuscular administration of drugs. Cephalic, saphenous, femoral and jugular veins are used for intravenous administration of drugs and for venipuncture. The intra osseous via may be used for fluid therapy and drug administration.

Infectious diseases of concern

Generally speaking, the main problems that make owners present pet primates to the vet are: gastrointestinal and respiratory problems. Gastroenteritis are among the main gastrointestinal problems. Etiologies vary including Shigella, Salmonella and Yersinia. The use of antibiotics may lead to a carrier state dangerous to owners. Streptococcus zooepidemicus outbreaks have been reported in callitrichids due to the use of contaminated raw horse meat. Occasionally, diarrhea is related to a high proportion of dietary fruits and vegetables.

Respiratory signs generally indicate pneumonias. These may be primary or secondary to other diseases i.e. measles or pulmonary mites such as Pneumomysus. Streptococcus pneumoniae is commonly found as the etiologic agent of pneumonia cases. Tuberculosis may be caused by Mycobacterium tuberculosis (the majority of cases), M. bovis and M. avium. Pasteurella sp causes disease in callitrichids including pneumonia, hepatitis, dental infections and septicemia. Other important bacterial diseases in callitrichids include pneumonia by Bordetella bronchiseptica, Klebsiella sp infections and sporadic cases of leptospirosis, meningitis caused by Listeria sp and peritonitis associated to Aeromonha hydrophilica.

Herpesvirus tamarinus and Herpesvirus hominis (simplex) (HVS) may cause acute disease characterized by oral and skin ulceration, lethargy and death. Squirrel monkey is a reservoir of herpesvirus T. El Herpesvirus saimiri in squirrel monkeys, Herpesvirus ates in spider monkeys and the human virus Epstein-Barr (VEB), may induce lymphoproliferative and lymphomatous conditions in callitrichids. These diseases may be prevented by avoiding direct or indirect contact or mixed exhibitions which include cebids and callitrichids; people showing symptoms of infection by HVS or VEB should not have any contact with callitrichids. Old World monkeys may be Herpesvirus simiae (B virus) carriers (mainly Rhesus monkey). It may cause ascendant encephalitis in humans; mortality in spider monkeys has been reported. The lymphohorionmeningitis virus (LCMV) causes hepatitis in callitrichids and its transmission is related to feeding practices that include laboratory mice or feeding on free-living mice infected with LCMV. Other viral diseases lethal for callitrichids include infections by measles, encephalomyocarditis virus, inclusion bodies hepatitis, parainfluenza type 1 virus (Sendai) and another paramixovirus other than measles.

Parasitism

Proceedings of the WSAVA Congress, Mexico City, Mexico 2005
Toxoplasma gondii sporadically affects marmosets and tamarins. The best prevention is to control wild mice and cats. Trypanosoma cruzi causes Chagas disease in humans and may be carried by callitrichids which are natural reservoirs. Protozoarians such as amoebas and giardias are present in many collections.

Cockroaches and coprophageous beetles may carry three spirurid nematodes pathogenic for callitrichid species: Pterygodermatites nycticebi, Trichospiro rostoma (involved in CWMS) and Gongylonema pulchrum. An aberrant migration (larva migrans) of the nemaode larvae of Baylisascaris species may cause cerebrospinal nematodiasis in these primates; raccoons, skunks and badgers are natural carriers of this parasite. Mortal peritonitis in callitrichids due to the thorny-headed worm Prosthennorchis elegans has been reported; cockroaches may carry it.

Many viral, bacterial and parasitic diseases are related to cockroaches, mice and other vectors that primates, mainly callitrichids, search for and feed on regularly. A vermin control program should be established in all facilities that keep primates.

Non-infectious diseases of concern