Hematologic Assessment in Pet Rats, Mice, Hamsters, and Gerbils

Blood Sample Collection and Blood Cell Identification

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KEYWORDS

• Hamster • Mouse • Rat • Gerbil • Blood collection • Hematology • Hemogram

KEY POINTS

- Hamsters, gerbils, rats, and mice are presented to veterinary clinics and hospitals for prophylactic care and treatment of clinical signs of disease.
- Normal reference hematologic parameters are valuable for comparison with the results of clinical and diagnostic testing, and for development of treatment plans for small rodent patients.
- It is important to recognize that several variables affect hemogram results, including methods of sample collection, preparation of samples, equipment, reagents, methods of analysis, age, gender, circadian rhythm, breed, and environment of the animals being sampled.

Medical treatment of pocket pets has become an increasing component of veterinary clinical practice. According to the 2013 to 2014 American Pet Products Association National Pet Owners Survey, 68% of US households own a pet, which is approximately 82.5 million homes. Roughly 6.9 million of those homes (8.3% of the total) owned noncat/nondog small animal species.[1] About 1.3 million households have small rodent species (rat, mouse, hamster, gerbil) as pets.[2]

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small rodent patients. It is important to recognize that several variables affect hemogram results, including methods of sample collection, preparation of samples, equipment, reagents, methods of analysis, age, gender, circadian rhythm, breed, and environment of the animals being sampled.[3,4] As a resource for veterinarians and their technicians, this article describes the methods for collection of blood, identification of blood cells, and interpretation of the hemogram in mice, rats, gerbils and hamsters.

BIOSAFETY AND OCCUPATIONAL HEALTH CONSIDERATIONS FOR CLINIC STAFF

Rodents from pet stores, from the wild, and pet rodents that may be exposed to wild rodents in the home, can carry several zoonotic diseases that can be easily transmitted to humans. A variety of publications are available that explain in detail the signs and symptoms of these diseases in both rodents and humans.[5–8] Zoonotic agents of concern are listed in **Table 1**, along with the modes of transmission, clinical signs in animals, and symptoms in humans.

Of equal importance for occupational safety in the clinic when handling small pet rodents is the recognition that these rodents produce allergens that can cause acute allergic reactions in handlers (dermatologic, such as wheal-and-flare reaction; eye and nasal passage irritation); in hypersensitized individuals there is a risk of anaphylactic shock. Allergens are secreted in the urine and saliva of rats, mice, and gerbils. It should be recognized that fur and dander may be contaminated with the allergens from grooming (saliva) or contact with urine in the cage environment.

Exposure risks for clinic staff can be mitigated by appropriate handling and restraint of the animals, wearing basic personal protective equipment (gloves, mask, long-sleeved coat or gown, eye protection), practicing good personal hygiene, sanitization of examination room surfaces the rodents came into contact with, and effective rodent pest control in the clinic.[5]

METHODOLOGY FOR BLOOD COLLECTION

Restraint

Proper restraint is an absolute necessity for venipuncture of small mammals. Most hamsters, gerbils, mice, and rats can undergo manual restraint alone for venipuncture. However, it is important to remember that the handling and restraint, transport to the veterinary hospital, and the hospital environment itself are stressful to these prey species. It is vital to approach these animals calmly and confidently and to minimize visual, olfactory, and auditory stimuli.[3,9,10] Anesthesia may be needed for adequate restraint to obtain samples from small mammals. However, anesthesia itself has been shown to produce changes in hematology parameters including decreased hematocrit, hemoglobin level, and red blood cell (RBC) count.[3] Handling and restraint, sedation, and anesthetic protocols for mice, rats, hamsters, and gerbils have been described in a variety of articles and books.[11–15]

Manual restraint

Mice Pet mice that are accustomed to being held can be lifted with both hands. To move single animals for short periods of time (2–3 seconds) from cage to examination table, grasp the animal gently at the base of the tail and lift. Do not lift mice by the tip of their tail, because that results in degloving injuries to the tail tip. The other hand can be placed under the mouse for additional support. Alternatively, mice can be picked up by the base of the tail or scruff of the neck using rubber-tipped forceps. Mice can also be coaxed, head first, into an appropriately sized disposable plastic syringe cover or large centrifuge tube, leaving the tail exposed for blood collection.