Jerald Silverman, DVM, Column Coordinator

A hairy surgery

Dr. Jonas Gordon interrupted his morning rounds to rub the ears of one of his favorite rabbits. The rabbit was as calm and friendly as always, but Gordon noticed that she had hardly eaten any food and there were scant feces in the cage. He briefly examined her and thought he felt a mass in the anterior abdomen. Later that day, a radiograph revealed gas in and near the stomach, which Gordon believed was caused by a gastric hairball (trichobezoar). The animal was nearing the end of a study and did not appear dehydrated or uncomfortable, but Gordon prescribed intravenous fluids for the animal, hoping that the hairball would begin to pass through the gastrointestinal tract. However, the next day the rabbit still had not eaten much nor had she passed many fecal pellets. Gordon informed the investigator of the study that hairballs can lead to death in rabbits if they do not quickly begin to move out of the stomach, and Gordon requested the investigator's permission to attempt surgical removal of the obstruction. Somewhat reluctantly, but believing he had no options, the investigator agreed, hoping that some of his data would be salvageable.

When Gordon opened the abdomen, he found nothing abnormal. There was some hair that could be felt in the stomach, but this is typical for rabbits. However, with the rabbit still anesthetized, an oral exam by a technician determined that the cause of the rabbit's problem was overgrown molar teeth. The abdominal incision was closed by Gordon, and the technician cared for the overgrown teeth. To make matters worse, the next day the abdominal incision opened and had to be re-sutured. Although the rabbit healed well, the investigator's data could not be used.

Is it necessary for the veterinary staff to report this incident to the IACUC, given that it involved an NIH-supported study but was a clinical problem and not a research initiated event? Was there a serious deviation from the concept of adequate veterinary care? What action might the USDA take if an inspector reads the record of this incident?

RESPONSE

Jumping the gun?

Katie J. Knapek, DVM, MS, MLS, CMP, Erin S. McWhorter, DVM, MS & James Owiny, BVM, PhD, DACLAM, CM

Dr. Jonas Gordon, the clinical veterinarian at Great Eastern University, was familiar with the rabbit in the scenario and quickly noticed a change in the rabbit's eating habits and bowel movements. A cursory physical examination and a radiograph led him to diagnose a gastric hairball (trichobezoar), at which point Dr. Gordon initiated proactive fluid therapy, even though the rabbit appeared not to need it. Later, Dr. Gordon contacted and convinced the reluctant investigator to let him "surgically remove the obstruction." It appears that no alternative therapies were suggested. Celiotomy revealed no abnormalities, but an oral exam conducted by the technician determined that the problem was due to overgrown teeth. Subsequently, complications from the surgery resulted in loss of research data.

The whole scenario raises a number of issues directly related to Dr. Gordon's actions. First, Dr. Gordon carried out an incomplete physical examination, leading to a misdiagnosis and an unnecessary surgery. Second, Dr. Gordon had a laser-like focus on one possible problem without considering differential diagnoses. Third, Dr. Gordon initiated non-emergency fluid treatment without consulting the principal investigator. Fourth, Dr. Gordon gave the principal investigator only one option for treatment. And last, the surgery carried out by Dr. Gordon led to post-operative complications and unusable data. We are not told whether Dr. Gordon consulted with other veterinarians or the attending veterinarian for a second opinion.

The scenario asks whether or not it is necessary to report this incident, which relates to an NIH-funded study, to the IACUC. Both the Animal Welfare Act (§2.31; ref. 1) and the PHS *Policy on Humane Care and Use of Laboratory Animals*[2] mandate that the IACUC review concerns involving the care and use of animals at their institution. We feel that there is an animal welfare concern in this scenario and that it should be reported to the IACUC, regardless of the funding source. It is the responsibility of the IACUC to thoroughly investigate and address the concern. If appropriate, the committee should report the matter to the relevant agencies in consultation with the institutional official.

Was there a serious deviation from the concept of adequate veterinary care? The *Guide for the Care and Use of Laboratory Animals* states, "The primary focus of the veterinarian is to oversee the well-being and clinical care of animals used in research, testing, teaching, and production. This responsibility extends to monitoring and promoting animal well-being, at all times during animal use and during all phases of the animal's life"[3]. According to the Animal Welfare Act regulations (§2.33; ref. 1), adequate veterinary care includes: availability of appropriate facilities, personnel, equipment, and services; emergency care and use of appropriate methods to prevent, control, diagnose, and treat diseases and injuries; daily observation of all animals; guidance to principal investigators and other personnel; and adequate pre- and post-procedural care of animals.

We believe that there was likely a deviation from adequate veterinary care provisions, primarily because a more thorough physical examination could have led to a correct diagnosis. The fluid therapy, while helpful, should not have been started until after consultation with the investigator, given that it was not an emergency. Additional options for managing the case should have been discussed with the investigator as well.

What action might the USDA take if an inspector read about the incident? This is difficult to say as we are not certain what level of detail was maintained in the medical records for this case. Records should include all diagnostic test results, documentation of treatment, identification of all medical and physical problems, the length of the problem, physical examination results by body system, the proposed plan of action for medical and physical problems, weight, and information from the visual examination. It is possible the USDA inspector could seek additional information on the physical examination performed and the timing relative to initiation of treatment.

1. Animal Welfare Act regulations. CFR 9, Chapter 1, Subchapter A, Part 2, Subpart C.
2. Public Health Service. *Policy on Humane Care and Use of Laboratory Animals* (US Department of Health and Human Services, Washington, DC, 1986; amended 2002).
3. Institute for Laboratory Animal Research. *Guide for the Care and Use of Laboratory Animals* 8th edn. (National Academies Press, Washington, DC, 2011).

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RESPONSE

A case for clearer communication

Lara A. Helwig, DVM, DACLAM & Tiffany Borjeson, DVM

The *Guide for the Care and Use of Laboratory Animals* states, "Recurrent or significant problems involving experimental animal health should be communicated to the IACUC and all treatment and outcomes should be documented"[1], thus the veterinarian should report this incident to the IACUC. Clearly this scenario represents a "significant problem" that might result in the researcher requesting additional animals or might represent an underlying management concern with respect to the diet (ideally high fiber, low carbohydrate) or how health issues are communicated to the veterinary staff. Either way, the IACUC is charged with "ongoing assessment of animal care and use," which should include regular communication with the veterinarian and the IACUC regarding adverse or unexpected events that affect animals, regardless of whether they are related to the experiment or not. At our institution, we regularly prepare a veterinary report that is shared at the IACUC meeting. This serves to keep members informed about the types of clinical concerns that can arise from experimental or management issues, and keeps the IACUC abreast of trends within the animal care program and issues that result in requests for additional animal use. It also allows for transparency within the program.

Although we might have managed this case differently, we do not feel that this represents a deviation from the concept of adequate veterinary care[1,2]. This rabbit was quickly diagnosed and treated by the veterinarian based on the findings at the time and the treatment plan that was discussed with the investigator. In hindsight, more aggressive medical management of this case—oral rehydration, administration of lubricants, nutritional support and analgesics—or a more thorough examination under sedation or anesthesia before performing surgery might have yielded a better outcome. However, we feel that the veterinarian acted in accordance with the standard of veterinary care. The *Guide for the Care and Use of Laboratory Animals* states, "If a disease or infectious agent is identified in a facility or colony the choice of therapy should be made by the veterinarian in consultation with the investigator. If the animal is to remain in the study the selected treatment plan should be sound and when possible interfere minimally with the research process"[1]. Without knowing the type of study for which this rabbit was used, it is difficult to assess why the data was not salvageable. The outcome of this case was unfortunate, but we do not believe there was any wrongdoing. However, this case does highlight the need for regular and clear communication between the veterinarian and the investigator regarding diagnosis, treatment options and prognosis, and communication of the outcomes between the veterinarian and the IACUC.

Assuming the clinical care and treatment were appropriately documented in the animal's record, the USDA inspector should have no concerns when reviewing the record of this incident.

1. Institute for Laboratory Animal Research. *Guide for the Care and Use of Laboratory Animals* 8th edn. (National Academies Press, Washington, DC, 2011).
2. Animal Welfare regulations. CFR 9, Chapter 1, Subpart A.

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RESPONSE

The art of veterinary medicine

Jon Reuter DVM, MPVM, DACLAM

Provision of adequate veterinary care is an essential element of all animal care programs. Regulatory and practice standards require provisions for appropriate and competent clinical, preventive and emergency veterinary care[1–4]. An in-depth knowledge of species-specific behavior, anatomy and physiology is critical to assessing the well-being of an animal and conducting proper physical examinations.

Dental disease is one of the most common reasons for presentation of a rabbit to a surgeon[5]. This is because it is difficult to adequately examine the dentition of cheek teeth owing to the rabbit's large tongue, skin folds in the diastema, limited range of mandibular opening and prominent incisors. Clear visibility is achieved only when rabbits are under general anesthesia. Rabbit teeth are classified as aradicular hypsodont, with 28 permanent teeth that grow continuously. Growth is balanced by dental abrasion from chewing and fiber in the diet. Typically, the buccal surface wears away more quickly than lingual aspects. The most common finding that accompanies elongated cheek teeth is the formation of spurs on the lingual occlusal surface of the mandibular cheek

A word from USDA and OLAW

In response to the questions posed in this scenario, the United States Department of Agriculture, Animal and Plant Health Inspection Service, Animal Care (USDA, APHIS, AC) and the Office of Laboratory Animal Welfare (OLAW) offer the following guidance:

The Animal Welfare Act regulations, among other things, require that each facility establish and maintain a program of adequate veterinary care which includes appropriate methods to prevent, control, diagnose and treat diseases and injuries, along with daily observation of all animals to assess their health and well-being[1]. All of these requirements are met when a veterinarian that is adequately involved in the animal health program makes a diagnosis and implements treatment instructions. Reporting outcomes of veterinary interventions to the IACUC is not required; however, it is a good practice to keep the IACUC informed so as to identify and address broader programmatic problems when a pattern becomes evident.

The *Guide for the Care and Use of Laboratory Animals* espouses regular communication between the veterinarian and the IACUC as necessary for an effective animal care and use program, and IACUCs must be informed of animal welfare issues[1–3]. The information provided in the scenario suggests that the veterinarian promptly attended to the animal's clinical needs, but the outcome affected the continued usefulness of the animal in the ongoing PHS-funded research. For this reason, the veterinarian should inform the IACUC. Research facilities are expected to have records documenting that medical problems are being addressed and animals are receiving proper veterinary care[2].

1. Animal Welfare Act regulations. 9 CFR. Chapter I, Subchapter A, Part 2, Subpart C, Section 2.33(b).
2. Institute for Laboratory Animal Research. *Guide for the Care and Use of Laboratory Animals* 8th edn. (National Academies Press, Washington, DC, 2011).
3. Public Health Service. *Policy on Humane Care and Use of Laboratory Animals* (US Department of Health and Human Services, Washington, DC, 1986; revised 2015).

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teeth and the buccal surface of the maxillary cheek teeth[5]. Spurs or spikes, even as small as 0.1 mm, are always significant and indicate a relatively advanced stage of disease, and they can cause great discomfort and pain. However, clinical signs of dental disease are often non-specific, including poor appetite and scant feces, and overlap with other common gastrointestinal diseases such as trichobezoars.

Trichobezoars can be difficult to diagnose and often present subclinically. Problems are not typically evident until the pylorus is blocked[6]. If a trichobezoar is suspected, surgery should be carried out soon so that the rabbit is a good anesthetic candidate and the stomach wall is not yet friable. In this regard, Dr. Gordon's justification for exploratory surgery was correct. Exploratory laparotomies are often considered the gold standard for assessing gastrointestinal disease and should be a key diagnostic tool in all veterinary arsenals.

Dr. Gordon was expected to discuss the situation with the principal investigator to determine a course of action consistent with experimental goals[1]. It is not clear from this case report what was discussed and if the clinical disease and anesthesia had already affected the study's data integrity, or if surgery might have played a role. Dr. Gordon had evidence of an intestinal blockage from his physical exam and radiographs, so he acted with reasonable judgment. In hindsight, the malocclusion should have been caught before the surgery, but this would still have required full anesthesia.

The PHS *Policy on Humane Care and Use of Laboratory Animals* and the *Guide for the Care and Use of Laboratory Animals* require that animal welfare concerns be submitted to the IACUC for investigation[2,3]. Although a proper diagnosis was made and the rabbit fully recovered from the surgery, in the spirit of transparency, the attending veterinarian should make a report to the IACUC, regardless of the funding support, especially since this might require additional animals to be added to the protocol. This does not fall within OLAW's expectation that incidents of noncompliance be reported.

In reviewing the medical records, the USDA should expect adequate veterinary care and adherence to the standards of practice, including a work-up, pain support, anesthetics, postoperative analgesia, monitoring and record keeping[3]. If veterinary medical officers observe inconsistencies in meeting these expectations, then they can use this as a teaching moment, or if serious deviations are identified, issue a citation.

1. American College of Laboratory Animal Medicine. *Adequate Veterinary Care* (American College of Laboratory Animal Medicine, 1996). http://grants.nih.gov/grants/olaw/ACLAM_Adequate_Vet_Care.pdf
2. Institute for Laboratory Animal Research. *Guide for the Care and Use of Laboratory Animals* 8th edn. (National Academies Press, Washington, DC, 2011)
3. Public Health Service. *Policy on Humane Care and Use of Laboratory Animals* (US Department of Health and Human Services, Washington, DC, 1986; amended 2002).
4. Animal Welfare Act regulations. 9 CFR. Chapter I, Subchapter A, Part 2, Subpart C.
5. Meredith A. Rabbit Dentistry. *EJCAP.* **17**, 55–62 (2007).
6. Leary, S.J., Manning, P.J. & Anderson, L.C. Experimental and naturally-occurring gastric foreign bodies in laboratory rabbits. *Lab Anim Sci*. **34,** 58–61 (1986).

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