GUIDELINES FOR POST-OPERATIVE AND POST-PROCEDURAL MONITORING

For experiments involving surgical procedures, post-operative monitoring is mandated. Many other types of experimental procedures also require careful monitoring of the animals for a period of time after the experimental procedure/s. The purpose of post-procedural monitoring is to ensure that animals do not experience pain or distress while still allowing the scientific objectives of a study to be met. Appropriate monitoring will enable the investigator to identify animals that require veterinary attention (which could prevent the unnecessary death of animals) and those that need to be removed from a study early (e.g. the decision to employ humane endpoints and euthanize an animal).

1. Post-Operative Monitoring

It is the responsibility of the principal investigator/surgeon to maintain accurate records regarding any and all surgical procedures and post-operative care and monitoring. The intensity and type of monitoring necessary will vary with the species and the procedure, and might be greater during the immediate anesthetic recovery period than later in postoperative recovery. For USDA covered species (warm blooded vertebrates including hamsters, rabbits, dogs, cats, swine, nonhuman primates, but not rodents and lower species), individual medical record charts must be used to document the dates, personnel, and pre-, peri- and post-surgical details and condition of the animal (see relevant IACUC Guidelines for USDA covered species). For non-USDA covered species (including rodents, frogs, fish), group records that detail the date of the procedure, identification of the animals, procedure, anesthesia, analgesia and surgeon can be used.

Regardless of species, frequent monitoring (at least every 15 minutes) during the immediate post-operative period should be conducted until the animal has completely recovered from anesthesia (e.g. achieved sternal recumbancy). During the anesthetic recovery period, the animal should be in a clean, warm, dry area where it can be observed by trained personnel. Particular attention should be given to thermoregulation, cardiovascular and respiratory function and postoperative pain or discomfort during recovery from anesthesia. Postoperative care typically includes administration of parental fluids for maintenance of water and electrolyte balance, use of warming devices, and administration of analgesic drugs.

After the animal has fully recovered from anesthesia, post-operative monitoring should be done daily (at a minimum) and observations recorded until the post-operative period has formally ended (e.g. when sutures are removed and surgical wounds are adequately healed – typically 7 to 10 days). Depending on the type of surgery (major or minor), analgesics are required for either 48 or 24 hrs, respectively. PIs may develop their own standard form for post-surgical monitoring, or can modify the example shown for their own use. All records must be readily available to the veterinary staff, the IACUC, and Federal regulatory or accreditation officials, and must be retained for at least 3 years.
EXAMPLE: Surgery Record & Post-Operative Monitoring Form (may vary with species/procedure)

<table>
<thead>
<tr>
<th>Protocol #:</th>
<th>Procedure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal #:</td>
<td>Species:</td>
</tr>
<tr>
<td>Breed/Strain:</td>
<td>Sex:</td>
</tr>
<tr>
<td>PI:</td>
<td>Phone:</td>
</tr>
<tr>
<td>Surgeon:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assistant(s):</td>
</tr>
</tbody>
</table>

Pre-operative Physical Examination Notes: Temperature:_________
______________________________________________________________________
______________________________________________________________________

Medications/Drugs Used (drug, dose, route of administration)

Anesthetics:____________________________________________________________

Supportive Therapy (fluids, oxygen, etc):____________________________________

Anesthesia Start Time:_______________________ Surgery Start Time:____________

Description of Operative Procedure and Findings/Complications:
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________

Surgery Completion Time: ___________
Recovery Time (Sternal Recumbancy): ____________________________

Analgesic Medications (drug, dose, route of administration, frequency, notes):
______________________________________________________________________
______________________________________________________________________

Surgeon’s Signature: ______________________________________________________
2. Post-Procedural Monitoring of Non-Surgical Animals

There are many experimental procedures which are non-surgical but that could result in the development of pain or distress to an animal. If such procedures are performed, the investigator must ensure that post-procedure monitoring is appropriate to identify any animals that may be experiencing problems. The objective is to avoid or reduce pain or distress. Among the types of non-surgical procedures for which careful post-procedural monitoring is indicated are:

- Whole-body irradiation
- Chemically induced toxic effects (e.g. toxins that destroy brain regions; drugs/agents that induce diabetes, seizures, paralysis or other)
- Experimental infections
- Experimental tumors
- Chronic inflammation models
- Use of stressors as an experimental variable (e.g. sleep deprivation, dietary restrictions, unusual housing conditions)
- Use of painful stimuli (e.g. electric shock or other aversive conditioning)
- Genetically modified animals where the removal, addition or modification of a gene has known (or yet unknown) consequences.
- Prolonged restraint

It is recommended that the PI, working with the veterinary staff, develop standardized forms for monitoring such animals.

3. Routine Observation of Experimental Animals

Use of a general checklist is suggested for routine monitoring of experimental animals. Even when procedures are non-invasive, animals may become distressed or unhealthy as a result of the experimental activities, or due to unknown causes. Checklists, such as the example shown below, are meant to identify any animals that are not healthy, or that may be in pain or distress for known or unknown reasons. The use of such checklists help to ensure that appropriate veterinary action can be taken and that experimental results are not confounded by the inclusion of unhealthy animals in a study.

EXAMPLE: Animal Monitoring Form

1. Activity Level: ___________________
   e.g., hypoactivity (hunched, huddled, lethargic), hyperactivity.
2. Attitude: _______________________
   - e.g., arousal, depression, hiding.
3. Behavior, Spontaneous _____________________
   - e.g., vocalization, self-trauma, isolation from cage mates. These observations are made without disturbing the animal.
4. Behavior, Provoked _____________________
- e.g., vocalization, hiding, aggressiveness, minimal response. These observations are made when the animal is prodded or disturbed.

5. Body Condition ___________________________
   - e.g., emaciation, obesity, missing anatomy, body condition score.

6. Food and fluid intake ___________________________
   - e.g., measurements/estimates

7. Condition of Fur and Skin ___________________________
   - e.g., unkempt fur; porphyrin (red tears) staining around eyes and nostrils; cyanotic, pale, or congested; lesions; soiled ano-genital area.

8. Eyes ___________________________
   - e.g., clarity/condition of lens, cornea; position of globe (e.g., sunken in orbit or protruding); condition of eyelids, encrustation.

9. Posture ___________________________
   - e.g. hunched back, tucked abdomen; prostrate; head tucked down.

10. Locomotion ___________________________
    - e.g., gait, ataxia, lameness, action of each limb, position of tail when ambulating.

11. Neurological ___________________________
    - e.g., tremor, convulsion, circling, paralysis, head tilt, coma.

12. Vital Signs ___________________________
    - e.g., respiratory distress (open mouth breathing, pronounced chest movement).

13. Other clinical parameters ___________________________
    - e.g., possible infection or wounds from fighting with cage-mates, etc.