POST-SURGICAL MONITORING & RECORDS

Verda Antoinette Davis
MBA, MS, LVT, RLATG
Purpose

The purpose of this workshop is to inform and instruct personnel of the required monitoring of post-surgical animals and the required record keeping involved. This workshop will cover the basics of post-surgical care, monitoring, record keeping, as well as offer resources for further learning or assistance.
Definitions

From IACUC Document 102.2.12 – The **postsurgical anesthetic recovery period** begins at the completion of the surgical procedure and continues until the animal has substantially recovered from the anesthetic effects, *generally indicated by the ability of the animal to maintain walk, rise, and ambulate normally*. …“During the anesthetic-recovery period, the animal should be in a **clean, dry area** where it can be **observed often by trained personnel**. Particular attention should be given to **thermoregulation**, cardiovascular and respiratory function, and postoperative pain or discomfort during recovery from anesthesia. Additional care might be warranted, including administration of parenteral **fluids** for maintenance of water and electrolyte balance, **analgesics**, and other drugs; **care for surgical incisions**, and maintenance of **appropriate medical records**.” (Guide p 120) Animals must be frequently observed during the postsurgical period (**at least every 5-10 minutes**) and **may not** be returned to the animal holding room unattended.
Definitions

From IACUC Document 102.2.13 – The **postsurgical period** begins immediately after the animal has substantially recovered from the anesthesia and continues until the surgical intervention is healed. This is usually a 5 – 10 day period (dependent upon the surgical procedure) or when the sutures are removed, if applicable. Monitoring during this period…“**should include attention to the basic biologic functions of intake and elimination and behavioral signs of postoperative pain, monitoring for postsurgical infections, monitoring of the surgical incision for dehiscence, bandaging as appropriate, and timely removal of skin sutures, clips, or staple**” (Guide p. 120). Specific monitoring requirements **should be specified in your approved animal use protocol.** Maintaining complete postsurgical monitoring records is a **regulatory requirement.**
Surgical Monitoring

- **TPR** – temperature, pulse/heart rate, respirations/respiratory rate
- **Color** - skin, mucus membranes
- **Response to stimuli** - palpebral, corneal, toe-pinch reflexes
- **Depth of anesthesia**
Thermoregulation

- Animal on a heat source when anesthetized
  - Recirculating water pad
  - Heating pad
  - Heat lamp (not recommended)
  - Bair Hugger
  - Microwaveable heat sources
  - Body heat wraps
  - Slide warmer
- Animal must be on heat until fully recovered
Thermoregulation

- Monitor!!!
- Never place animal directly on heat source
- Rotate animal
- Allow for animal to escape heat if overheating
Post-Surgical Anesthetic Recovery Monitoring

- Very similar to surgical monitoring
- An animal coming out of anesthesia can be unpredictable
  - Bite
  - Scratch
  - Vocalize
- Vitals should be monitored and recorded every 5-15 minutes (check your IACUC protocol)
Returning to Facility

During the immediate post operative period animals must be observed until they are able to right themselves and maintain sternal recumbancy. The animal must be able to pull itself into sternal recumbancy when laid on it's side before it may be left unattended.
Post-Surgical Monitoring

- Physiological changes
- Temperament
- Behavior
- Vocalizing
- Edema/excessive bleeding
- Cage mates
- Bedding
- Posture/Gait/Body Condition
- Eating/drinking
- Urinating/defecating
- Grooming
- Incision care
- Dehiscing
Physiological Changes

- Take readings & record as dictated in approved IACUC protocol
- **Temperature**
  - take temperature about every 10 minutes during recovery
  - species dependent-difficult with rats and mice
- **Heart rate**
  - take pulse for 10 seconds, multiply by 6 for BPM
  - fast HR can indicate pain/distress
- **Respiratory rate**
  - slow respirations can indicate sedation and fast respirations indicate pain/distress
  - open mouth breathing, pronounced chest movement can indicate respiratory distress
- **Skin color** - cyanotic, pale, or congested mucous membranes or skin (ears, feet, tail)
Temperament

- Attitude - arousal, depression, awareness of surroundings
- Can be a good indicator of need for pain meds
Behavior

• Activity level
  • hypoactivity, hyperactivity, restlessness, lack of inquisitiveness
• Observations without disturbing animal
  • spontaneous vocalization, self-trauma, isolation from cage mates.
• Observations made while animal is disturbed or prodded
  • provoked vocalization, hiding, aggressiveness, minimal response.
• Tremor, convulsion, circling, paralysis, head tilt, coma
Vocalization

- Vocalizing animals after surgery can indicate:
  - Pain
  - Distress
  - Discomfort

- Vocalizing is a good indicator to give pain medication
  - Teeth grinding in pigs, rabbits, sheep, and mice can also indicate pain
Edema or Bleeding

- Some swelling or discharge from the incision is expected
- When to be concerned/ notify Vet Services:
  - If swelling continues for more than 3 days
  - If discharge continues after 24 hours
  - Wound looks “angry” – red, inflamed, swollen
Cage Mates

- Do not place a sedated animal back in a cage with an awake animal
- If multiple animals have same surgery on same day:
  - Monitor closely for over grooming or autophagia
    - Autophagia = eating one’s own flesh (very common in rats with paralysis)
  - Keep an eye on wound clips/suture
    - Cage mates might remove wound clips/suture or might chew on incision
Bedding

- Several types of bedding:
  - Sani-chips
  - Envirodry
  - Paper towels
  - Pelleted paper bedding
  - Diamond soft bedding

- Rats (especially Sprague Dawley) given buprenorphine tend to ingest sani-chip (shavings) bedding, which can cause breathing issues or gastric obstruction. Use the above bedding in these instances (except sani-chips) or go without bedding.
Bedding

www.ssponline.com
Posture

- Hunched back, tucked abdomen; prostrate; head tucked down
- Head -pressing
- Gait, ataxia, lameness, action of each limb, position of tail when ambulating

From ALL, post procedure course
The graphic is taken from Figure 1. of the journal article:
Eating/Drinking, Urinating/Defecating

- Stressed out animals can easily become dehydrated and decrease in body weight
- Urine and fecal output indicate an animal is eating and drinking
- Urine and feces also help to determine health problems
  - Blood in urine/stool
  - Concentrated urine
  - Absence of urine/stool
Assessing Hydration

• Sluggish behavior (red skin)
• Skin tent
• Hair coat
• Eyes (clarity, shape/position in orbit)
Treating dehydration

• Subcutaneous administration of fluids
  • 1-2 ml/25 g mouse and about 5-10 ml/ 250 g rat per day
  • LRS, 0.9 % saline, glucose/saline
  • May begin prior to study & continue once daily (or split into 2 doses a day)
  • Therapeutic fluids should be warmed prior to injection

• DietGel
• HydroGel
Grooming

- Rough hair coats can indicate animals are not grooming themselves
  - Fur and skin unkempt or greasy or dull fur
  - Porphyrin staining around eyes and nostrils
  - Soiled anogenital area
  - Encrustation of eyes
- Animals with rough hair coats can indicate:
  - Pain
  - Distress
  - Discomfort
Incision Care

- Monitor discharge/swelling
- Clean with saline when needed

**Suture vs. Wound Clips**
- Watch for suture reactions
- Remove 7-14 days after surgery
Dehiscence

• Surgical complication in which a wound ruptures along a surgical incision.
  • Inadequate undermining (cutting the skin away from the underlying tissues) during surgery
  • Excessive tension on the wound edges caused by lifting or straining
  • Wound located on a highly mobile or high tension area such as the back, shoulders or legs
• Contact veterinary services for help and re-training on surgical procedures
Surgical Records

- Accurate record keeping is important
- Pink Surgery Cards (supplied by DLAR)- very handy for quick reference when Vet Services needs to contact lab
  - Helps others to know what is expected and what is abnormal
  - Gives emergency contact info
- Surgical notebooks
Intra-Operative Records

- Include:
  - Medication given (time, dose, location)
  - TPR (Temperature, Pulse, and Respiration)
  - Overall how surgery went
    - Excessive bleeding
    - Long anesthesia period
    - Miscalculation of pre-medication dose
    - Any other pertinent information
Post-Operative

- Minimum information required by IACUC
  - Name of surgeon
  - Date and time of procedure
  - Procedure description
  - Anesthesia used
  - Post operative medications and observations
Post-Operative (continued)

- Also Helpful:
  - Emergency contact person and phone number
  - Date and time animal was last checked by lab
  - Projected prognosis (example: animal will have paralysis)
  - Special needs (example: animal will have difficulty reaching wire bar-place food on cage floor and give long tipped water bottle)
  - Place on body where medication was injected
Nutritional Support

Post surgery negative nitrogen balance & quite normal for decreased eating in first couple of days post surgery

• Peanut butter
• Fresh Fruit
• DietGel /AquaGel
• Baby rice cereal
• High protein/high fat drink
• Bacon softies
• Fruit crunchies
• Dough Diet
Returning to Facility

During the immediate post operative period animals must be observed until they are able to right themselves and maintain sternal recumbancy. The animal must be able to pull itself into sternal recumbancy when laid on it's side before it may be left unattended.
Are these Post-OP Day 1 Rats Okay?
In the image, the rats appear distressed. The investigators on this study believed that this was normal for day one postoperatively because the animals were moving. However, one can see head-pressing, no evidence of grooming, and porphyrin staining in these rats. One rat (bottom) does not move his tail in a normal way. A physical exam of this animal revealed low body temperature, hind limb weakness, anemia, pain, and weight loss.
Who To Contact for Assistance

- Verda Davis LVT 323-1958  verda@uky.edu
- Meggie Coleman LVT 257-4592  moja222@email.uky.edu
- Kathy Boaz LVT 323-3093  kaboaz2@uky.edu
- April Davis LVT 323-1547  april.davis@uky.edu
- Dr. Jeff Smiley DVM 323-0289  jsmil2@uky.edu
- Dr. Jeanie Kincer DVM 323-5469  jfkinc2@uky.edu
- Dr. Cheryl Haughton DVM 257-3548  cheryl.haughton@uky.edu
Please be aware that web-based training courses are NOT a replacement for the hands-on workshop.

If you have any questions concerning scheduling your hands-on workshop please refer to our webpage at the following link: http://www.research.uky.edu/dlar/Training.htm

There you will find a listing of all of our current workshops and seminars that are available to you at no charge.

At this time, CEUs for IACUC requirements only apply to hands-on training.