

# DLAR Post-Surgical Monitoring and Record Keeping

# 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



# Post-Surgical Anesthetic Recovery

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.

- 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

# Post-Surgical Recovery

Begins immediately after the animal has substantially recovered from the anesthesia and continues until the surgical intervention is healed.

- ***Usually a 7 – 10 day period*** (dependent upon the surgical procedure) or when the sutures are removed

Monitoring ***should include:***

- ***Attention to the basic biologic functions of intake and elimination***
- ***Behavioral signs of postoperative pain***
- ***Postsurgical infections***
- ***Surgical incision for dehiscence, bandaging as appropriate***
- ***Timely removal of skin sutures, clips, or staple***

(Guide pgs. 119- 120)

Maintaining complete postsurgical monitoring records is a  
***Regulatory Requirement***



# Post-Surgical Anesthetic Recovery Monitoring

Very similar to surgical monitoring

- Temperature
- Pulse/ Heart Rate
- Respirations/ Respiratory Rate

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)

# Thermoregulation During Post Surgical Anesthetic Recovery

Animal ***must*** be on a heat source ***Until Fully Recovered***

- Recirculating water pad
- Heating pad
- Heat lamp (not recommended)
- Bair Hugger
- Microwaveable heat sources
- Body heat wraps
- Slide warmer



# What to Lookout for during 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

## Temperature

- Take temperature about every 10 minutes during Anesthetic 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
- 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)

**Take readings & record as dictated as approved in IACUC protocol**



# Temperament

## Attitude

- Arousal
- Depression
- Awareness of surroundings

**This is a good indicator 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

Animals Vocalizing 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 post surgery
- 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 chew on incision

# Bedding

Several types of bedding:

- Sani-chips
- Pelleted Paper Bedding
- Envirodry
- Diamond Soft Bedding
- Paper towels

***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 Examples



# Posture

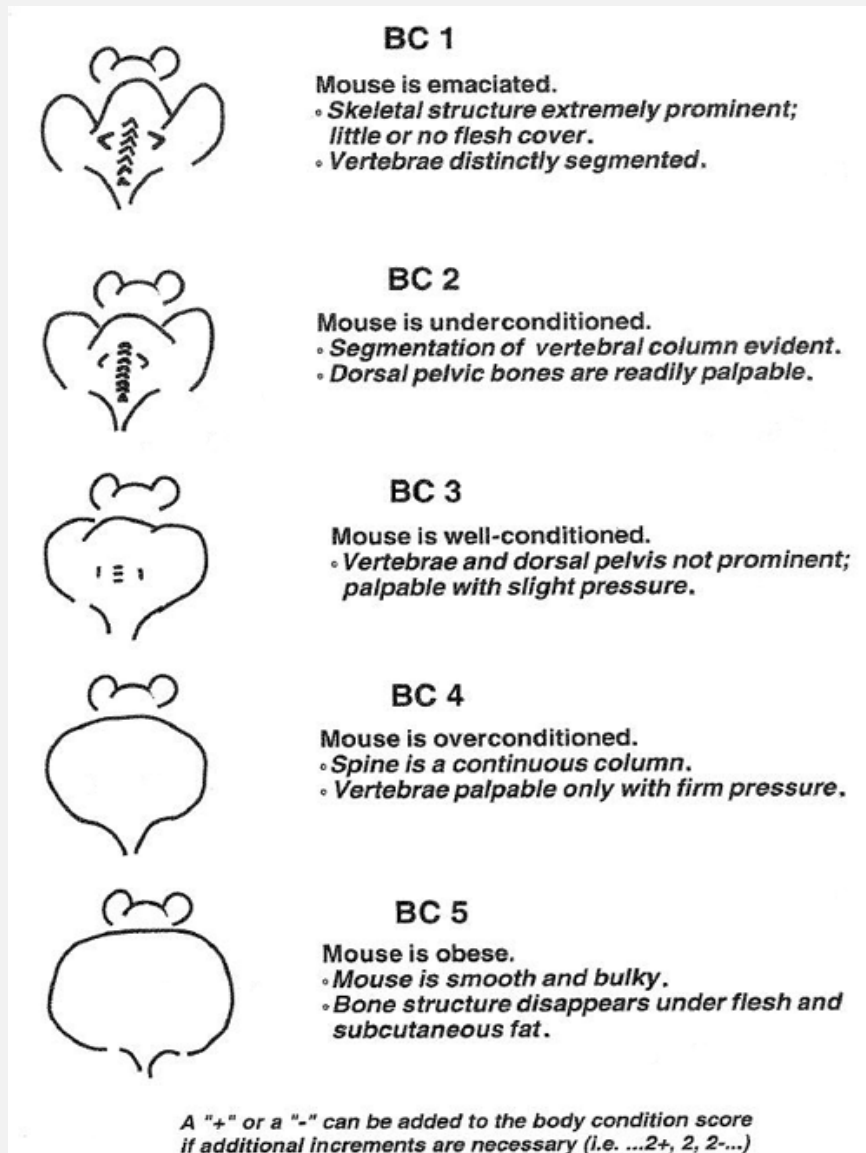
Hunched back  
Tucked abdomen  
Prostrate  
Head tucked down  
Head-Pressing

Gait:

- Ataxia
- Lameness
- Action of each limb
- Position of tail when ambulating



# Body Condition Score



The graphic is taken from Figure 1. of the journal article:

Ullman-Cullere, M.H. and Foltz, C.J. Body Condition Scoring: A Rapid and Accurate Method for Assessing Health Status in Mice. Lab. Animal Science; 49 (3) 319-323, 1999.

# Eating & Drinking

Stressed out animals can easily become dehydrated and decrease in body weight

## **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*

## Other Methods

DietGel      HydroGel

# Urinating & Defecating

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



# 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):

- Handy for quick reference when Vet Services needs to contact lab
- IACUC Requirement
- Helps others to know what is expected and what is abnormal
- Gives emergency contact info

Surgical notebooks

Date/Time	Surgical Site OK?	Alert Responsiveness	Drugs Administered, Comments	Initials
	Y N	Y N		
	Y N	Y N		
	Y N	Y N		
	Y N	Y N		
	Y N	Y N		
	Y N	Y N		
	Y N	Y N		

Additional Notes:

\* Please report to veterinarian if uncontrolled pain or surgical complications suspected \*



# Intra-Operative Record

## Items to 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 Records

## **Minimum information required by IACUC:**

- Name of surgeon
- Date and time of procedure
- Procedure description
- Anesthesia used
- Post operative medications and observations



# Post-Operative Records

## Helpful Information:

- Emergency contact person and phone number
- Date and time animal was last checked by lab
- Projected prognosis:  
*(Animal will have paralysis)*
- Special needs:  
*(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 & decreased eating in the first couple of days post surgery is quite normal**

**Recommend subsidizing with:**

- 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 recumbency

The animal must be able to pull itself into sternal recumbency when laid on it's side before it may be left unattended



# Are these Post-OP Day 1 Rats Okay?



# Are these Pos-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.

# QUESTIONS & SUPPORT

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