McGill

STANDARD OPERATING PROCEDURE #201

RODENT SURGERY

1. PURPOSE

The intent of this Standard Operating Procedure (SOP) is to describe procedures for survival rodent surgery.

2. RESPONSIBILITY

Principal investigators (PI) and their staff, veterinary care staff or any individual performing surgery on rodents, or assisting in those procedures.

3. MATERIALS

3.1. Sterile isotonic solution for injection (e.g. 0.9%saline)

3.2. Analgesics

3.3. Anesthetics

3.4. Sterile ophthalmic ointment

3.5. Electric razor

3.6. Gauze

3.7. 70% Alcohol

3.8. Chlorhexidine 2% solution or povidone-iodine solution

3.9. Heating disc, warming pad or warm-water circulating pad (do not use electric heating pads)

3.10. Sterile surgical instruments

3.11. Sterile gauze

3.12. Suture material or wound clips (Autoclips)

3.13. Dry bead sterilizer or cold sterilization agents (e.g. glutaraldehyde) and 70% alcohol (as a rinsing agent)

4. PROCEDURES

4.1. Document the details of the surgical procedure in the Rodent Procedure Log.

4.2. Perform pre-operative procedures at a safe distance from the surgical environment in order to prevent contamination with hair.

4.3. Pre-operative Care:

4.3.1. Administer general analgesic according to Rodent Analgesia SOP.

4.3.2. Anesthetize the animal according to Rodent Anesthesia SOP.

4.3.3. Apply ophthalmic ointment in both eyes to prevent corneal desiccation. Reapply as needed.

4.3.4. Administer from 0.2 to 0.5mL/10g body weight of isotonic fluids, subcutaneously.

4.3.5. Remove hair over the surgical area with a clipper, depilatory cream or by plucking allowing a perimeter of at least 1cm around surgical site. Remove loose hair with gauze.

4.3.6. Wash the surgical site with 2% chlorhexidine solution or povidone-iodine solution. Be careful not to wet the animal.

4.3.7. Bring animal into surgical area.

4.3.8. Apply 70% alcohol with gauze or swabs. Be careful not to wet a large area on the animal as the evaporation of alcohol will lead to heat loss.

4.3.9. Apply 2% chlorhexidine solution or povidone-iodine solution with gauze or swabs.

4.3.10. For long incisions and/or long surgeries, repeat steps 4.3.8 and 4.3.9 twice.

4.3.11. Surgeon's preparation:

4.3.11.1. Wash hands.

4.3.11.2. Wear a surgical mask and a clean gown.

4.3.11.3. Use aseptic technique.

4.3.11.4. Wear sterile or alcohol-asepticized gloves.

4.3.11.5. The surgeon must avoid touching non-sterile surfaces.

4.3.12. Cover the animal with a sterile drape for surgeries involving long incisions or prolonged surgical time, and, to prevent sutures from coming into contact with hair and skin around the surgical area.

4.3.12.1. For minor incisions, the drape can be placed only when suturing the wound.

4.3.12.2. Surgical drapes must be sterile for the first animal, and may then be transferred to the following animal during serial surgeries. The top surface of the drape must never come in contact with non-aseptic areas, and must not be soiled.

4.3.12.3. Glad® Press'n Seal® wrap can be used as a surgical drape to cover the animal. As it is transparent, it allows for easier monitoring of the animal.

4.4. Surgical Principles/Aseptic technique:

4.4.1. Ensure that all the available materials are at hand.

4.4.2. Begin surgery with clean and sterile surgical instruments, handle them aseptically.

4.4.3. Designate a sterile area on the working surface for the sterile material (instruments, suture material, drapes, gauze, etc).

4.4.4. Prior to surgery, verify depth of anesthesia by loss of animal's pedal withdrawal (toe pinch) reflex.

4.4.5. Use a scalpel blade or scissors to make the smallest possible incision.

4.4.6. Avoid contact of tissues with fingers by using the tip of instruments.

4.4.7. Infiltrate the wound with a local anesthetic, e.g., mixture of lidocaine and bupivacaine, prior to closing the skin. Refer to Rodent Analgesia SOP.

4.4.8. Close the different tissue layers separately, such as peritoneum/abdominal muscles layer together then subcutaneous tissue and finally skin. For some surgeries, subcutaneous tissue may need to be sutured independently from the skin to prevent dead space. Skin sutures or staples must be removed after 7-10 days.

4.4.8.1. Peritoneum/abdominal: Catgut, Vicryl, PDS, or Polypropylene; size 3-0 or 5-0.

4.4.8.2. Subcutaneous tissues: Catgut, Vicryl, PDS; size 5-0.

4.4.8.3. Skin: Polyamide-nylon, PDS, Vicryl; size: 3-0 or 5-0. Wound clips (Autoclips); 7mm or 9mm.

4.4.9. Disinfect the instruments between each animal by dipping them in a hot glass bead sterilizer for approximately 30 seconds after removing any blood and debris (let cool completely) or in liquid sterilizing solution (e.g., glutaraldehyde or equivalent) for a few minutes (>5 minutes) and then rinsed with 70% alcohol. For liquid sterilization, it is recommended to use two alternating surgical kits in order to increase contact time with the solution.

4.4.10. Dip suture material in 70% alcohol between each animal.

4.5. Surgical Monitoring and Supportive Care:

4.5.1. Surgeries exceeding 15 minutes for mice or 30 minutes for rats require a contact heat source to prevent hypothermia.

4.5.2. Adjust the depth of anesthesia according to monitored parameters (presence of reflexes, the respiratory rate and breathing pattern, and when available, the heart rate).

4.5.3. In the case of respiratory arrest, stop anesthesia, administer oxygen and compress the thorax rapidly.

4.6. Post-operative Care:

4.6.1. Post-operative care begins immediately following surgery and extends for up to 10 days.

4.6.2. Post-operative animals should be identified with a Post-Procedure cage card.

4.6.3. Do not return animals that have not completely recovered to an animal room.

4.6.4. Observe the animal until it regains righting reflexes. Observe respiration and coloration of the eyes (for albinos), mucous membranes and skin.

4.6.5. Prevent heat loss and maintain the animal in contact with a heat source until it regains righting reflexes.

4.6.6. Administer oxygen if necessary.

4.6.7. Repeat analgesics post-surgically and for the next few days (usually for 72 hours), according to Rodent Analgesia SOP 101.

4.6.8. For surgeries exceeding 60 minutes, administer again between 0.2 and 0.5mL/10 g body weight of isotonic fluids, subcutaneously, immediately. Fluids can be administered on the following days, to maintain the preoperative body weight.

4.6.9. Moist food can be provided at the bottom of the cage during the post-operative period.

4.6.10. Examine the wound daily for signs of inflammation or infection such as redness, swelling or purulent discharge for at least 5 days. For invasive surgeries, measure body weight daily.

4.6.11. Remove the sutures or staples after 7 to10 days.

SOP REVISION HISTORY

DATE	PREVIOUS VERSION	NEW VERSION
2015.09.20	4.3.12.3 (NO TEXT)	4.3.12.3 **Glad® Press'n Seal® wrap can be used as a surgical drape to cover the animal. As it is transparent, it allows for easier monitoring of the animal.**

Rodent Procedure Log

Investigator:	Protocol:
Procedure:	Performed by:

Instructions: complete this log for rodent procedures requiring anesthesia, analgesia or post-procedure care (ex. surgeries, experimental infection). Keep the log in the housing room while active and in your files for 3 years for future review by the Quality Assistant and/or the FACC.

ANALGESIA

☐ carprofen: mouse: 20mg/kg, rat: 5-10 mg/kg, SC, every 24 hrs

☐ buprenorphine: mouse: 0.1mg/kg SC or IP every 4-8 hrs; rat: 0.05mg/kg, SC or IP, every 8-12 hrs

☐ lidocaine/bupivacaine (local analgesic)

☐ other:_____

ANESTHESIA

☐ isoflurane 2-2.5%

☐ ketamine/xylazine/acepromazine*: mouse: 100 mg/kg (K)- 10 mg/kg (X)- 3 mg/kg (A) IP rat: 50 mg/kg (K)- 5 mg/kg (X)- 1 mg/kg (A); IP or IM

☐ other:_____

OTHER AGENTS ADMINISTERED

☐_____

☐_____

☐_____

	Animal ID	Date	Anesthesia		Analgesia		Other _____		Heat Source Provided		Recovery time	Comments/observations	Initials
			dose	time	dose	time	dose	time	procedure	recovery			
1									☐	☐			
2									☐	☐			
3									☐	☐			
4									☐	☐			
5									☐	☐			
6									☐	☐			
7									☐	☐			
8									☐	☐			
9									☐	☐			
10									☐	☐			
11									☐	☐			
12									☐	☐			
13									☐	☐			
14									☐	☐			

Comments/footnotes:

*Dose can vary with the sex, the age, the strain, and the body condition of the animal.

Revised: 2014-01-06

Rodent Procedure Log

Comparative Medicine Animal Resources Centre

McGill

ANALGESIA

☐ carprofen: mouse: 20mg/kg, rat: 5-10 mg/kg, SC, every 24 hrs

☐ buprenorphine: mouse: 0.1mg/kg SC or IP every 4-8 hrs; rat: 0.05mg/kg, SC or IP, every 8-12 hrs

☐ OTHER_____

Initial the appropriate boxes when completed

	Animal ID	Date	Analgesia			SC fluids			Wet food			Time			Remove Sutures (Day 7-10)
			Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															

Comments/footnotes: