Rodent Surgery
Quality Matters

What’s the Problem?
It’s Just A Rat....
The Classic Misconceptions

• It’s Just a Rat…
• Anyone Can Do Surgery on Rats
• They are a “lower species” and therefore just a “replacement” animal
• They’re Tough and They don’t Feel Pain
• and They Don’t Get Infections
The Reality

• Rats can be excellent surgical models
• They are sentient and experience pain and distress
• They are susceptible to post operative infections and can have wound infections, wound dehiscence, and abscesses the same as all mammals
• To have good results and outcomes - good surgical practices are required
Good Surgical Practices

- Surgical Planning
- Good Surgical technique
- Anesthesia and Physiological Support
- Aseptic technique
- Post operative analgesia and care
- Attention to Detail
Good Surgical Practices

• Surgical planning
  – Learn the anatomy
  – Prepare the “operating room”
  – Gather all needed instruments, equipment, supplies and drugs
  – Give a pre-operative exam to the animal (weigh and assess hydration)
Good Surgical Technique

• Appropriate instruments and proper use
• Gentle handling of tissue
  – Crushing of tissue
  – Electro-cautery use
• Keep tissue moist
• Good lighting
  – Focused
  – Non-glare
  – With minimal heat & drying of tissues
Recommend Instruments

- Size ⇒ Fine Surgical Instruments
- #3 handle and use #15 Blades
- Brown-Adsons Tissue Forceps
- Mosquito hemostatic forceps (straight & curved)
- Small “right angle” forceps
- Adson’s Forceps smooth and rat toothed
Recommend Instruments (cont.)

- Iris scissors
- Small metzenbaum scissors
- Sharp-Sharp operative scissors
- Ryder needle holders
- Micro-surgery requires micro-instruments and will need magnification using either “loupes” or surgical microscope
Good Surgical Practices

• Anesthesia and Physiological Support
  – Replace blood loss and counter-act physiological hypovolemia with physiological solution (e.g. lactated Ringer’s) give IV, IP, or SC
  – Prevent heat loss and provide heat to maintain body temperature, 36-37.5°C, during surgery and recovery
Good Surgical Practices

• Examples of Anesthesia
  – Injection:
    • ketamine and acepromazine
    • ketamine and xylazine combinations
    • pentobarbital
  – Inhalation: with oxygen and isoflurane
    • entubation is not too difficult and gas anesthetic machines with mechanical ventilation are available
Good Surgical Practices

• Aseptic technique
  – animal preparation
    • clip fur to bare skin (give a border zone of at least 1-2 cm in all directions from proposed incision)
    • wash skin with disinfectant soap
    • rinse well with sterile water or alcohol
    • paint with disinfectant solution and allow to dry (drying time + time for disinfectant to “work”)
Good Surgical Practices

• Aseptic technique
  – Surgeon preparation
    • Wear clean clothes (if you have handled other rats or rodents – change clothes or wear overgowns)
    • Wear hair covers and face mask
    • Wash hands with disinfectant soap
    • Dry with sterile towel
Good Surgical Practices

• Aseptic technique
  – Surgeon preparation continued
  • Wear sterile gloves
    – Rinse off glove powder using sterile water before starting surgery (glove powder in wounds can cause intra-abdominal adhesions micro-abscesses or granulomas)
Good Surgical Practices

• Aseptic technique
  – Instruments
    • Use only sterile instruments
    • Best practice is to steam autoclave
    • Soaked in cold sterilizing solution (follow manufacturer’s instructions for required time of immersion and rinse well with sterile water before using!)
  – less desirable
    • Soaked in disinfectant (follow manufacturer’s instructions for required time of immersion and rinse well with sterile water before using!)
Good Surgical Practices

- Aseptic technique
  - Prepare a Sterile Field
    - Secure animal rat to a the “table” or trough
    - Cover with sterile drapes in “four corner” technique or fenestrate a drape to expose only the prepared skin area
    - Lay a sterile drape out for instruments, sponges, suture etc
Post operative analgesia and care

- Drugs and dosages appropriate to the demonstrated pain and distress
- Maintain Body Temperature
  - Avoid the use of electrical pads or heat lamps.
  - Provide an area for the rat to move away from or off the heat source.
- Protect eyes with eye ointment (recover on cloth or paper not cage litter)
- Give antibiotics - if known break in aseptic technique or if signs of infection (redness, swelling, discharge, fever)
The “Secrets” of Good Surgical Results

• Pay Attention to Detail
• Monitor your patients
• Examine your post op patient often
• If you think something needs to be done
  – DO IT
• Quality Matters
References

- The Laboratory Rat, 2000, G.J.Krinke
- Ferrets, Rabbits, and Rodents, Clinical Medicine and Surgery, 1997, E.V.Hillyer & K.E.Quesenberry
References


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