

Surgical Savvy

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Image courtesy of Renjith Krishnan at FreeDigitalPhotos.net



DID YOU KNOW???

The US Food and Drug Administration (FDA) has finalized a rule banning the use of powdered gloves in medicine because they pose dangers to human health. This ruling was first proposed in March 2016 and went into effect on 19 January 2017.

Specifically, FDA says it will ban the sale, distribution and manufacturing of all powdered surgeon's gloves, powdered patient examination gloves and absorbable powder used to lubricate surgeon's gloves, though it notes the ban will not apply to powdered radiographic protection gloves.

Powder used within all types of gloves has been associated with many potentially serious adverse events, including severe airway inflammation, hypersensitivity reactions, allergic



reactions (including asthma), lung inflammation and damage, granulomas, and peritoneal adhesions.

This is only the second time FDA has banned a medical device since banning prosthetic hair fibers in 1983.

For more information, visit:

<http://www.raps.org/Regulatory-Focus/News/2016/12/16/26391/FDA-Bans-Powdered-Gloves/#sthash.14GH2EQM.dpuf>

<http://www.medscape.com/viewarticle/873394>

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Wound Healing 101

First, or Primary Intention

A surgical incision, or a clean trauma that receives medical intervention within a few hours of occurrence. Wound edges are sharp and clean and there is little microbe contamination. If the time to closure is short (e.g. 4-6 hours), there is reduced contamination and inflammation that allows for a close approximation of the wound. This is the ideal situation for a wound to heal quickly, with little chance of infection and potential scarring.

Second Intention

Wound edges cannot be easily approximated. This can be seen in certain traumas that cause significant tissue loss, and in surgical incisions where the closure (e.g. suture, glue etc.) has failed to keep the wound closed. Allowing a wound to heal by second intention may be necessary in very dirty or compromised wounds. The wound will heal from “the inside out” with granulation occurring from deeper in the wound. This will result in a thicker, more visible scar than first intention. This healing process is also more prone to infection.

Third (Tertiary) Intention

A wound that needs to be left open for a considerable amount of time post initial injury. This may be required for drainage of fluids. A wound healing by secondary intention but then becomes infected may need to heal by third intention. Wounds that are severely compromised due to lack of blood flow, necrosis, infection, foreign body (dirt, sand, etc. seen in trauma cases) contamination, large loss of tissue resulting in an inability to successfully approximate the wound edges, etc. may all need to heal by tertiary intention. These wounds need the ability to drain, have debridement performed, anti-microbial treatments (e.g. chlorhexidine and/or saline flush), etc. in order to heal successfully. Granulation again occurs from “the inside out”, and there may be a greater amount of scarring seen in these types of wounds.

REDUCING POST-OPERATIVE STRESS IN RODENTS

Nicole Stevens, ALAT

The Guide for the Care and Use of Laboratory Animals says, “The proper use of anesthetic and analgesics in research animals is an ethical and scientific imperative. Fundamental to the relief of pain in animals is the ability to recognize its clinical signs in specific species.” The U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training state that: “In general, unless the contrary is known or established, it should be considered that procedures that cause pain in humans may also cause pain in other animals”. Even though they may appear unaffected, rodents should be treated as if they experience pain equivalent to a rabbit, sheep, or human.

Analgesia is required to address the pain caused by surgery. Maintaining therapeutic plasma levels of analgesia during the recovery period is crucial to the welfare of the animal. Things to consider include but not limited to: choosing the right analgesia to

manage the post-operative pain, the length and nature of surgical or pain inducing procedure, the effects of specific agents on different organs, dosing at the intervals necessary to maintain therapeutic levels, monitoring for signs of pain and distress, and ending dosing when it is no longer beneficial to the animal.

In an effort to refine animal care and minimize post-surgical manipulation of mice, different analgesics and methods of delivery may be used. In the case of minor survival surgeries, where the procedure does not expose a body cavity and causes little or no physical impairment (e.g. suturing, vessel cannulation, biopsy, etc.), NSAID (nonsteroidal anti-inflammatory drugs) analgesics delivered orally may be more appropriate. Manual restraint for injection can be stressful to mice and, when avoided after a surgical procedure, may reduce discomfort and speed healing. NSAIDs are widely available, reliable, and long-lasting. They provide good analgesia for visceral and somatic

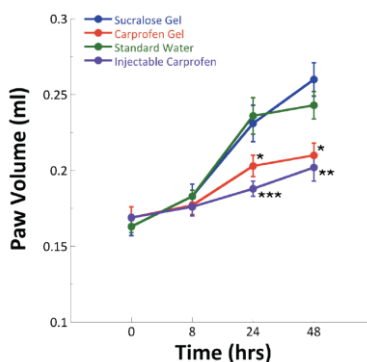
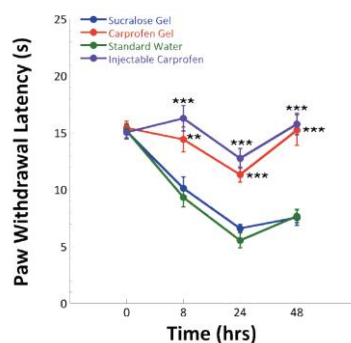
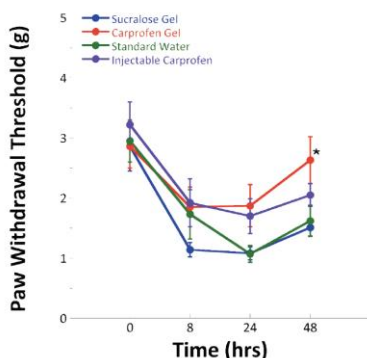
(skin and muscle) pain.^{2,3} NSAIDs are routinely used orally to alleviate mild to moderate pain from conditions such as skin lesions, fight wounds, and eye abscesses.

Rodent MD's™
Rimadyl (2 mg/Tablet)



Carprofen has a low to moderate blood clearance rate, indicating that it is a suitable candidate for oral administration in mice. Carprofen can be administered to mice 12 to 24 hours prior to painful procedures in drinking water, in medicated gel, or by chewable tablet.^{2,3} Pre-emptive analgesia increases intraoperative patient stability and enhances postoperative care and well-being by reducing postoperative pain. Since mice are nocturnal, medications placed in drinking water, gel or

tablets are consumed more at night and less during light hours. Also, mice are neophobic and pre-dosing allows them to acclimate to gel before surgery when they are less stressed.



Comparison of injectable and gel carprofen to vehicle gel and vehicle water using tactile threshold, withdrawal latency and paw inflammation volume from a ClearH2O AALAS poster presented in 2011.² In all readouts, the Carprofen gel delivered orally was comparable to the injectable analgesic.

When an anti-inflammatory is not required, the use of acetaminophen for pain relief is acceptable but requires rigorous behavioral monitoring. Some concerns with only using acetaminophen are the faster clearance rate (2 hours), palatability, and inadequate consumption medicated gel or water to maintain therapeutic levels.⁸

Opioids are recommended for pain management for major survival surgery where 1) the body cavity is penetrated, 2) substantial impairment of psychological or physiological function occur, or 3) severe pain or bone/joint pain occurs. Non-invasive administration of buprenorphine via voluntary ingestion has been found to improve post-operative recovery.⁷ Buprenorphine, when administered in drinking water is bitter, which can deter mice from consuming it. As an alternative, it can be added to Nutella® or flavored Medigel® to make it more palatable for mice.⁷ Buprenorphine dosed in Nutella should be given to mice individually as there is a high risk of the dominant mouse consuming all of the Nutella

with the possibility of overdose. Buprenorphine can cause pica when dosed too high. Buprenorphine SR is an extended release injectable analgesic which is dosed every 48 to 72 hours, as opposed to every 12 hours, for post-operative pain management, reducing the need for frequent handling.¹

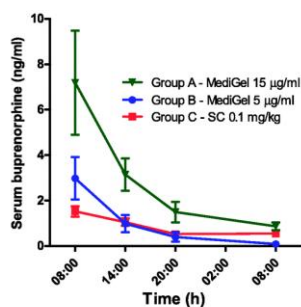
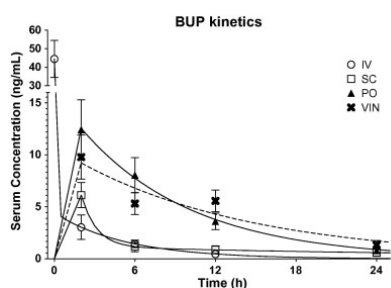
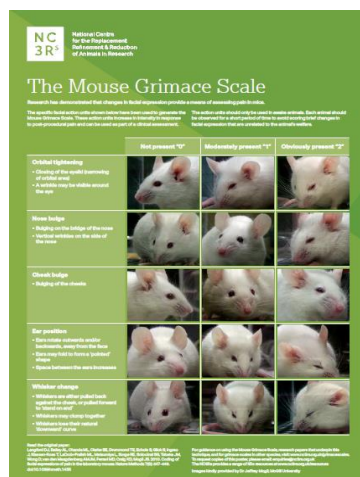


Figure 3. The serum concentration of buprenorphine 15–39 h after presentation of the MediGel-buprenorphine mixture ingestion or 1–25 h after subcutaneous (SC) injection.

Comparing the serum levels of buprenorphine delivered by different routes. The left figure shows IV administration to have the highest initial serum concentration with the fastest clearance, while the oral routes show slower elimination and higher serum concentration at later time points⁷. The right figure shows 5 µg/ml orally administered MediGel to yield similar buprenorphine serum concentration to 0.1 mg/kg dosed subcutaneously⁵.

Recovering mice should be monitored frequently during,

immediately after, and 24 hours post-procedure and a reasonable effort should be made to ensure mice ingest oral analgesic if it is used (pain assessment according to the mouse grimace scale). Mice may not have an immediate and observable alteration to distress which makes it challenging to gauge how much pain or discomfort they are experiencing. Changes in facial expression alluding to pain include assessing orbital tightening, nose bulge, cheek bulge, ear position and whisker changes in the mouse. These are noted as not present, moderately present, or obviously present to determine the level of pain and discomfort. Other signs of pain and distress include rapid or labored respiration, seclusion from the group, periorcular or nasal porphyrin discharge, piloerection, hunched posture, and immobility.



Different analgesia has different dosing regimens, side effects, and cost. These are all things that need to be considered, in addition to whether it is major or minor procedure, when choosing an appropriate analgesia. The mouse grimace scale is a helpful tool to use when monitoring post-surgery and determining if the analgesia is working properly. Using the most appropriate analgesia and delivery method for the procedure will benefit the mouse and the scientist with faster recovery and reduced stress to the animal.

References:

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- <https://www.ncbi.nlm.nih.gov/pubmed/24602545>

Surgical Tools to up Your Game



Vein Pick- This simple disposable tool aids surgeons with the introduction of catheters into vessels with ease. The tapered tip of the Vein Pick is inserted into an incision previously made in a vessel. The catheter then easily slides into the vessel by threading the catheter tip below the grooved underside of the Vein Pick. The Vein Pick is then removed allowing the catheter to be advanced to the desired position. Perfectly sized for small and large animal surgeries.



Trocars- This tubular surgical instrument can be used for many applications, and depending on the procedure being performed, the species being used, and surgeon preference will determine what length, diameter, tip geometry you will use, and whether you want to use a stylet or not. Trocars are most commonly used for tunneling to offer a quick and easy method to route catheters, implants, and electrodes etc. to the desired location. All SAI Trocars are customizable with different lengths, diameters and tip geometries with or out without a stylet to suit your needs.

Check out these products and more at www.sai-infusion.com

TEST TIPS

SEE LAST PAGE FOR ANSWERS

- (SRA) If the respiratory rate or volume is too high, the CO₂ levels in the blood will be lowered, causing respiratory acidosis.
 - True
 - False
- (SRA) Which one of the following statements is true?
 - Hypocapnia is present if the ETCO₂ is greater than 40mmHg.
 - Hypercapnia is present if the ETCO₂ is less than 30mmHg.
 - Hypercapnia is present if the ETCO₂ is greater than 40mmHg.
 - None of the above
- (SRT) A skin graft that is taken from a mouse and placed on a rat is called a(n):
 - xenograft
 - autograft
 - allograft
 - spot graft
- (SRT) Which two materials have the highest biocompatibility and are recommended for use as vascular catheters?
 - tygon and polyurethane
 - polyurethane and silicone
 - silicone and polyethelyne
 - polyurethane and polyethylene
 - silicone and tygon
- (SRS) Which of the following mechanisms is preferred for abdominal viscera retraction?
 - moistened laparotomy sponges
 - Allis tissue retractors
 - Weitlaner retractors
 - Balfour retractors
- (SRS) Which of these instruments is not used in cardiovascular surgery?
 - Finochietto retractor
 - Satinsky clamp
 - Doyen clamp
 - Cooley clamp

WHAT DO YOU WANT TO TALK ABOUT??

Send us a tech tip or article to share your knowledge with other members! CEU's are awarded!

Submission deadlines: November 1st and May 1st. Please send in Times New Roman font, and attach any pictures as a ".jpg" file format.

SUBMIT ELECTRONICALLY TO: JENNIFER.SHEEHAN

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Academy of Surgical Research: Advancing Medicine through Information Exchange

Founded in 1982, the Academy of Surgical Research promotes the advancement of professional and academic standards, education and research in the arts and sciences of experimental surgery.

The Academy interfaces with medical and scientific organizations, and governmental agencies in establishing and reviewing ethics, theories, practices and research pertaining to surgery and promotion of the results for clinical application.

If you would like to be involved:

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Test Tips Answers:

1. B, 2. C, 3. A, 4. B, 5. A, 6. C



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The organizers of the 33rd Meeting of the Academy of Surgical Research (ASR) welcome the submission of abstracts

Abstract Submission Topics

- Animal models
- Cardiovascular
- General, soft tissue
- Orthopedic
- Dermatological
- Ophthalmic
- Transplantation
- Education, policy, ethics, or regulation
- Other

Deadline for submission: June 30, 2017

Please submit your abstract at <http://surgicalresearch.org/>
Questions Email – Tracy.Ziegelhofer@envigo.com