July 2010

Academy of Surgical Research

Surgical Savvy

Scrubbing In With... **What's Next** **Tech Tips Procedures**

Scrubbing In With.....

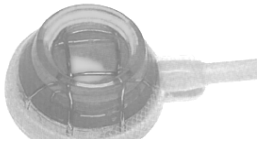
Renée Engberg, BS, SRS

I started my career in research as an Animal Care Technician at Charles River Laboratories (CRL) in 2001. I worked part-time while attending Becker College, where I graduated in 2005 with my Bachelors in Veterinary Science. During my senior year I switched departments at CRL and became a full-time surgical technician. In 2007 I left Charles River Laboratories and started working for Genzyme Corporation in the Department of Comparative Medicine's surgical group. I have worked here for almost 3 years and am very happy. I have great mentors that allow me to continue to further my goals while at Genzyme. I have finally found my passion and hope to continue to have the opportunity to work closely with others in the surgical research community.

Connie Kliwinski, MLAS, BS, SRS

My name is Connie Kliwinski, I received a BA from Rider College in Journalism/Communications in 1980 and my MLAS degree from MCP Hahnemann University in 2000. I was first introduced to animal research when I took a part-time job back in 1981 caring for animals in a small facility on the weekends and the rest as they say is history. I became fascinated and started a lifetime of learning becoming certified by AALAS as an LATg in 1990 and by the ASR as an SRS in the second year that testing became available. After spending close to 16 years at Deborah Cardiovascular Research Institute and eventually becoming Supervisor of Experimental Surgery, I joined the Immunology Department at Bristol Myers Squibb as a research scientist working in the areas of transplantation and arthritis. For the past 6 years I have worked at Centocor, a J&J company, as a Senior Research Scientist involved in projects requiring surgical expertise.

What's Next? How do you access a Vascular Access Port in a Pig?



By Renée Engberg and Lindsey Kist

Vascular Access Ports (VAP's) are a surgically implanted device used to provide long-term vascular access for test article infusion and blood collection. In pigs the catheter connected to the VAP is placed in the jugular vein and the metal port is secured in the subcutaneous space on the side of the neck. We found that the OmegaPort[u] from Access Technologies worked best with the very thick skin of the pig (see picture below). This port allowed for access from 360° which worked great in the pigs. Since it is hard to palpate the VAP due to their thick skin, there was less guess work with the increased surface area of the port than with a typical VAP that only has a small centered septum.

To maintain patency of the VAP and catheter system, port maintenance was conducted at 3 – 5 days post surgery, 7 – 10 days post surgery, and monthly thereafter or as designated by the study protocol. The pig was manually restrained either by use of a sling or with treats and a patient assistant. Prior to surgery the pig was acclimated to the sling in case it was needed during blood collection and maintenance. During any manipulation the pigs were given treats for enrichment. The best way we found to keep the pigs occupied was by feeding them treats on the outside of their pen while the accessing technician was inside with the pig. We had a few large 60 ml catheter tip syringes filled with flavored diet gel and the assisting technician would feed the pig from the outside, mostly keeping the pigs focused on the food and not the accessing technician. We also used this technique while the animals were acclimated to the sling so they got used to eating from a syringe. Pigs are intelligent animals that respond well to positive reinforcement, so every attempt was made to access the VAP without the use of a sling, as long as it was safe for the pig and the handlers.

Since the VAP gives direct access into the vein, care was taken to prevent any contaminants from entering the site through needle puncture. The site was shaved if necessary, followed by three consecutive wipes of alternating povidone-iodine surgical scrub and 70% alcohol. A final prep with povidone-iodine solution was performed, which was allowed to dry while a sterile field was prepared. Sterile gloves were opened and the inside packaging was used as a sterile field to place all sterile supplies. These supplies included a right angle Huber needle with extension attached, an injection cap, a few empty syringes with needles, and Medi-sepps™ (or equivalent povidone-iodine solution swab). Sterile gloves were donned and the injection cap was attached to the Huber needle, which was then flushed with sterile saline.

Holding one hand steady on the pig, the Huber needle was advanced through the septum of the VAP. Care was taken to avoid accessing the VAP through the same spot every time to prevent scabbing and irritation of the site. To ensure proper placement, the Huber needle was rotated to be sure it was hitting the metal of the VAP. An empty syringe with needle was then placed in the injection cap and the locking solution/frank blood was then aspirated to a volume at least twice that of the dead space of the catheter system, which was determined during surgery. The catheter system was then flushed with sterile saline using alternating pressure until the injection cap was cleared. The VAP was then locked by infusion of taurolidine-citrate solution (TCS), same as that of the dead space. All accessing materials (Huber needle, injection cap, and infusion syringe) were withdrawn as one unit while infusing the locking solution with continuous pressure.

Most VAP's were easy to access and never had any problems. However some catheters were positional, in which case the head was rotated and the area around where the jugular catheter was placed was massaged while trying to aspirate. If the VAP was still not working it was infused with sterile saline and aspiration of blood was attempted again. This was done a few times being sure to vigorously flush in attempt to break the clot loose from the catheter. If troubleshooting of the VAP was still unsuccessful Cathflo™, an agent used to loosen up clots, was used. This solution was left within the catheter system for at least 24 hours before attempting to open the system again. If the system was still not patent the animal was scheduled for surgery to remove the non-patent VAP and to place a new one on the opposite side.

Tech Tips

By Connie Kliwinski

A treat can be more than just a tasty morsel!

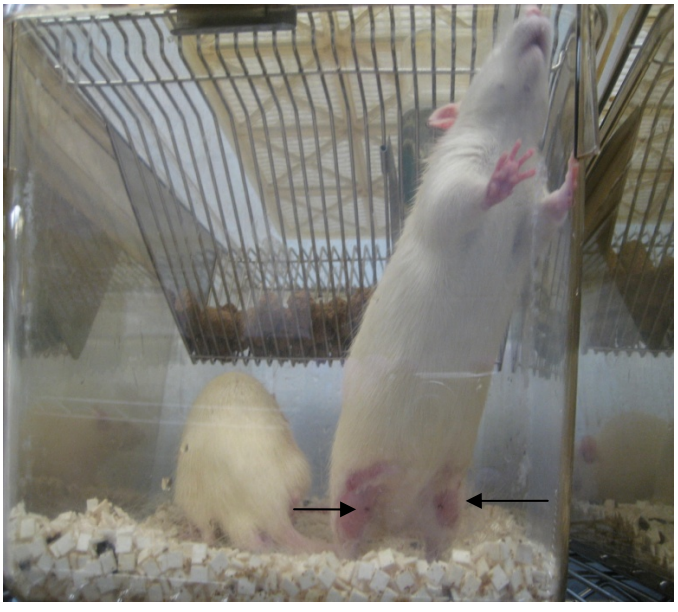
I attended the recent annual ASR meeting and there was much discussion related to rodents, analgesia, and pain evaluation. There are no hard and fast guidelines to follow as yet and the complexity of this topic leads me to believe that they will not be forth coming any time soon. However, the issue is being addressed by investigators and labs on an individual basis and it was interesting to hear of possibilities for improving the health and wellbeing of our research animals.

*I*t appears that a large part of the problem arises from the fact that there are not only major variations regarding pain as a result of the diverse procedures performed but species and strain differences make universally acceptable guidelines for the evaluation and treatment of pain almost impossible. But that doesn't mean we are off the hook as investigators or caretakers. There are things that we can do to evaluate and improve upon obviously painful situations. Many of these remedies are antidotal, based upon trial and error; however, it is important to share our individual solutions if we are to make progress in this area. In an attempt to 'practice what I preach' so to speak, I would like to relate a brief account of one of my experiences relating to rodents and recovery surgery which may help others struggling to find a solution to a similar situation.

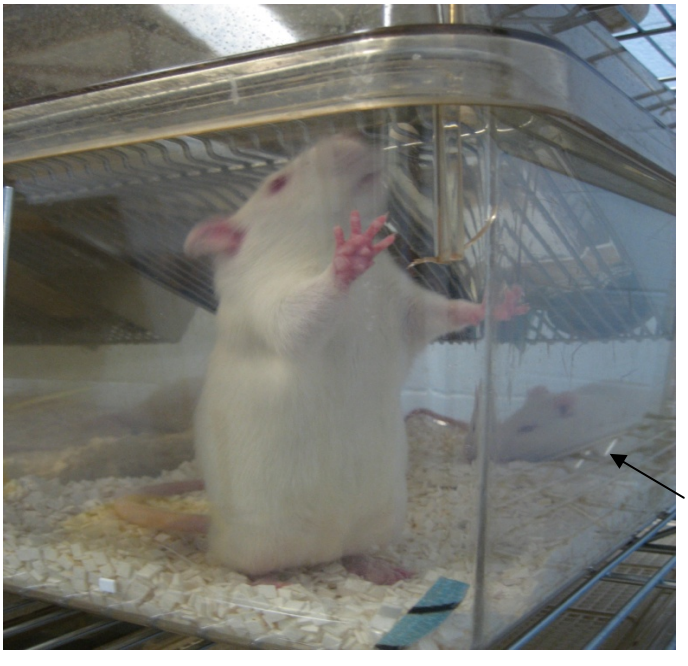
I performed a meniscal tear procedure on the knees of rats and mice to mimic osteoarthritic injuries. Post-op evaluation of these animals for excessive pain is not always easy, especially in the rats which are naturally more sedentary. The mice are usually awake within a few minutes and hanging from their cage tops doing back flips, oblivious to the procedure they just underwent; so assessing their ability to move around without too much discomfort is not usually an issue. Rats, however, tend to move around a lot less in general, so assessing their ability to walk around post-operatively is not as easy. In an effort to address this problem I have begun to employ a little trick which it turns out serves multiple purposes.

*I*mmediately after surgery I start to provide edible treats in the front of the cage. I am currently using 'Fruity-Gems' and Bacon Yummies, from BIO-SERV, Frenchtown NJ, but I have used other treats or flavors in the past with similar success. The rats seem to enjoy them so they;

(1) Fill a requirement for enrichment
(2) As pica behavior is known to be associated with recovering from anesthesia and following administration of Buprenorphine, rather than ingesting bedding the rats tend to eat the treats
(3) Instead of concentrating on their sutures they are also more interested in the treats, allowing time for their incisions to heal unbothered. As weight loss usually occurs immediately after surgery and persists for a few days
(4) The addition of treats encourages the rats to eat and helps combat the initial post-operative drop in weight, allowing them to rebound quicker. In subsequent post-op days, the rats get used to receiving treats
(5) Rats come to the front of the cage in anticipation and stand on their hind legs in wait. This is my goal, as now I can see their knee, assess their incisions and see if they are putting weight on the joints, all without removing them from the cage, handling them, or causing any other stress
(6) Medications and/or vitamins can also be added to the treats if needed.



Notice the stitches on the shaved knees of the standing rat, easily assessed for bleeding, swelling, or other complications, as well as use and range of motion.



Rat in front of cage is sniffing at treats while its cage mate is lying in the back uninterested which may indicate post surgical discomfort, alerting that a closer look at this animal is required.

This technique is not time consuming, providing an efficient method for follow-up in large scale studies. The rats are almost universally interested in the treats so if any animals do not come forward after a minute or two it raises a red flag indicating a need for closer observation and possibly additional analgesia or extended care.

Answers to technical problems don't have to be complicated. Simple solutions should not always be disregarded as second rate; some are obviously effective! This trick may work for you with other species and other surgical situations. If nothing else you will have happy research subjects.

As a side note, I should mention that care should be taken to ration the treats as you don't want to influence study parameters by having your animals gain weight from ingesting an excessive amount of snacks. You want to make sure rats continue to consume their normal diet. They may also lose interest in the treats if you provide an unlimited supply. Using certified treats from a reputable company permits monitoring of extra calories if necessary. Prior to administering treats to study animals always get permission from the Principal Investigator!

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