# Surgical Savvy

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*Image courtesy of Renjith Krishnan at FreeDigitalPhotos.net*

## ASR MEMBER SPOTLIGHT

### Leslie Stoll, SRS, LATg, RVT

My career in Veterinary medicine and later Laboratory Animal medicine began when I graduated from the L.A. Pierce College Animal Health Technician Program in 1990. I spent my first 8 years as a Veterinary Technician in private small animal practice, which I loved doing for countless reasons, but began suffering from "burn out" like many technicians do. Those of you from private practice can empathize I'm sure.

In 1998 I was invited, by one of the veterinarians I worked with, to join the newly formed surgical team at Sierra Biomedical, specializing in pre-clinical studies exclusively in non-human primates. She had created a surgical position for me and was anxious for me to join her. My first thought was that I wasn't sure if research is where I wanted to be. I knew research was necessary and important but it was a scary unknown and I wasn't positive I wanted to be a participant in performing the research on animals. I decided I would give it a try for 6 months just to see….and I've never looked back.

As a member of a very small team, I was intimately involved in the early development of surgical telemetry

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techniques for CV Safety studies as well as continuous and ambulatory infusion, Diabetes and Parkinson's studies. My first day on the job I monitored anesthesia on a large rhesus for a very involved intracranial dosing procedure for 4 hours. Nothing like being thrown into brain surgery right off the bat! It was amazing.

In 1999, Sierra Biomedical became Charles River Laboratories and I continued my career in surgery as Lead Surgical Technician, maintaining the surgical laboratory, generating surgical records, administering anesthesia, providing post-operative care, scrubbing in to assist with surgical procedures and completing my requirements to sit for the S.R.S exam.

On the airplane headed for the 2003 ASR meeting in Charleston, SC, I calmly read my last required reading book, took a deep breath and took the S.R.S. exam. Back then, there was just one certification with all 3 certification requirements lumped into one. I received my S.R.S. certification and earned the Barry Sauer Award for highest test score that year. ☺

I have now been with Charles River Laboratories, in Nevada for going on 18 years as Lead Technician and primary surgeon. I continue to pride myself in new and established telemetry and infusion techniques in NHPs and canines, Developmental and Reproductive Toxicology studies involving cesarean section, fetal collection and placental transfer studies in NHPs and even a little rodent and rabbit surgery which has been fascinating to learn.

I am always up for learning and being actively involved in new and different techniques, procedures and activities. It is what has made my career in research consistently interesting and fun. I am never afraid to step up and try. I may fall flat on my face, hopefully not in too much monkey poop, but I'm back up again with the same determination and will to succeed.

This industry has taught me so much more than I bargained for. I've met wonderful and incredibly interesting people, made lifelong friends, shared many memories and stories, challenged myself in ways I never thought were possible for me and have fallen head over heels with all my heart for the primates and all the animals in my care.

## TEST TIPS

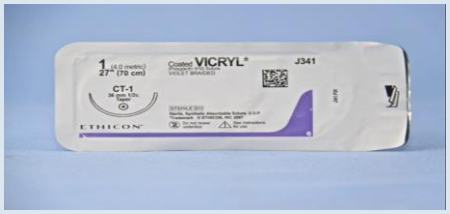
1. What are the factors that must be set correctly to produce a properly exposed radiograph?
   A. Kilovoltage, milliamperage and time of exposure
   B. Focal distance, aperature, kilovoltage
   C. Focal distance, milliamperage, exposure time

2. Oximeters are used to measure_____.
   A. The Iron content of hemoglobin in the blood
   B. The percentage of blood hemoglobin saturated with oxygen
   C. The percentage of muscle myoglobin saturated with oxygen
   D. The partial pressure of oxygen in the blood

3. Signs of impending respiratory failure include:
   A. A decrease in the respiratory rate
   B. A decrease in the tidal volume
   C. A drop in the pulse oxygenation percentage
   D. All of the above
   E. None of the above

*See last page for answers

**Coated VICRYL Suture -** is a synthetic absorbable sterile surgical suture composed of a copolymer made of 90% glycolide and 10% L-lactide. Coated VICRYL Suture is indicated for use in general soft tissue approximation and/or ligation, including use in ophthalmic procedures, but not for use in cardiovascular and neurological tissues.




**PDS II Suture -**is prepared from the polyester, poly (p-dioxanone). PDS II Sutures are indicated for use in soft tissue approximation, including use in pediatric cardiovascular tissue where growth is expected to occur and ophthalmic surgery. PDS II Suture is not indicated in adult cardiovascular tissue, microsurgery and neural tissue. These sutures are particularly useful where the combination of an absorbable suture and extended wound support (up to six weeks) is desirable.


**ETHILON -** is nonabsorbable, sterile surgical monofilament suture composed of the long-chain aliphatic polymers Nylon 6 and Nylon 6,6. ETHILON suture is dyed black or green to enhance visibility in tissue. ETHILON suture is indicated for use in general soft tissue approximation and/or ligation, including use in cardiovascular, ophthalmic, and neurological procedures.

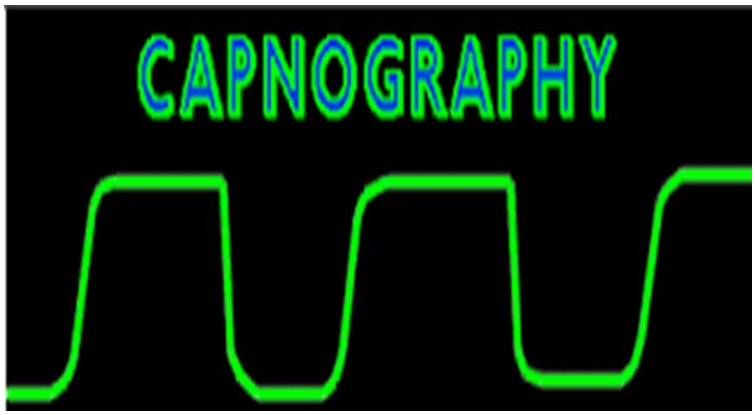




Image courtesy of www.capnography.com

# CAPNOGRAPHY – "THE VENTILATION VITAL SIGN"

Julie Sentz, BS, SRA, LATg

Capnography is an important tool used to monitor patients under anesthesia. Capnography provides information about $CO_2$ production, pulmonary (lung) perfusion, alveolar ventilation, respiratory patterns and elimination of $CO_2$ from the anesthesia breathing circuit and ventilator. It can be used to confirm correct placement of the endotracheal tube, identify equipment malfunction, track decreases in cardiovascular function and monitor improvements in cardiovascular function during resuscitation. Capnography also allows for early detection of adverse respiratory events, such as hypoxia. Understanding how the respiratory system works will provide a better understanding of the information capnography provides.

The major function of the respiratory system is to act as a gas exchange organ. Oxygen is inhaled into the lungs, which in turn introduces oxygen into the arterial blood. The lungs also eliminate carbon dioxide from the body (ventilation) and the uptake and elimination of gas anesthetics when inhalation anesthetics are used. Both oxygenation and ventilation must be assessed to properly evaluate respiratory function. It is important to monitor the respiratory system during anesthesia because many anesthetics suppress respiratory control mechanisms. Observational techniques such as respiratory rate, depth of respiration and mucous membrane color can indicate the state of respiratory function but these parameters provide

little information of oxygenation and ventilation. Monitoring capnography provides much more information of the adequacy of ventilation and oxygenation.

Capnography is the monitoring of the concentration or partial pressure of carbon dioxide in the respiratory gases. A sidestream monitor samples airway gas from a port located from a site on the endotracheal tube interface with the breathing circuit. As the animal exhales and alveolar emptying occurs, carbon dioxide appears in the exhaled gas. The capnograph measures the $CO_2$ in the air that passes through the monitor and displays it in graph form and the end tidal $CO_2$ ($EtCO_2$) concentration (measured in mmHg).

The capnogram is a direct monitor of the inhaled and exhaled concentration or partial pressure of $CO_2$ and an indirect monitor of the $CO_2$ partial pressure in the arterial blood. The illustration below depicts a normal capnogram.

The normal $EtCO_2$ values are 35 – 45 mmHg. The $EtCO_2$ values prove to be indicative of ventilation complications. When $EtCO_2$ values start to measure >45 mmHg, hypoventilation can occur. Hypoventilation occurs when ventilation is inadequate to perform necessary gas exchange. Ventilation is not effectively eliminating $CO_2$ (hypercarbia) and the brain is not responding appropriately to $CO_2$ changes. Hypercarbia can cause acidemia, vasodilation, sympathetic stimulation and splanchnic vasoconstriction. When $EtCO_2$ start to measure <35 mmHg hyperventilation can occur. Hyperventilation occurs when the rate and quantity of alveolar ventilation of carbon dioxide exceeds the body's production of carbon dioxide causing hypocapnia. Hypocapnia can be indicative of a life-threatening decrease in cardiac function, equipment malfunction, excessive anesthesia or pronounced hypothermia.

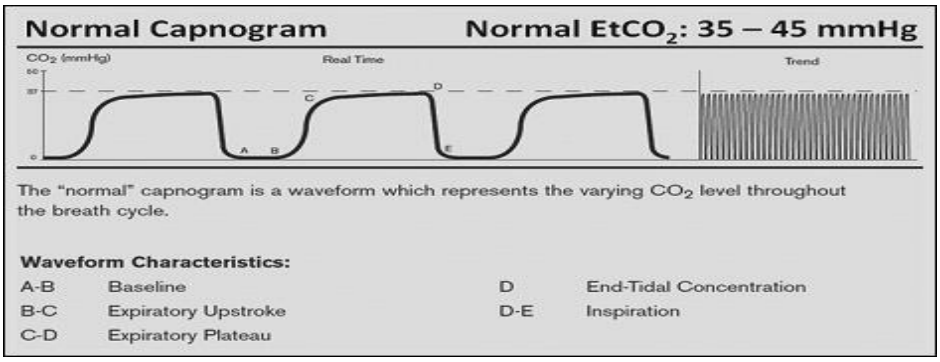


Image courtesy of www.zoll.com

In summary, capnography is an important tool for the early detection of adverse respiratory events, such as hypoventilation and hyperventilation, by providing key information regarding the patient's ventilation. Continuous $EtCO_2$ monitoring can be an early warning sign of hypoxia so that remedial measures can be taken before hypoxia results in irreversible brain damage. Capnography provides a quick method to detect life-threatening conditions.

References:

www.capnography.com. Website produced by Bhavani Shankar Kodali

Jennifer C. Smith and Peggy J. Danneman. "Chapter 6 - Monitoring of Anesthesia". Anesthesia and Analgesia in Laboratory Animal 2nd Edition 2008

Dorland's Medical Dictionary

Websites:

www.capnography.com

www.vetgrad.com

www.veterinaryspecialist service.com

# INTERESTED IN FURTHERING YOUR CAREER WITH A PROFESSIONAL CERTIFICATION

**The Academy of Surgical Research is now accepting applications to sit for the exams. Deadline for submitting your application is April 15, 2016.**

- **Where do I get more information?**

  *surgicalresearch.org*

- **Who do I contact with additional questions?**

  certificationcommittee@surgicalresearch.org

- **Where do I take the exam?**

  Currently, the exam is offered only at the yearly meeting of the Academy. If you qualify to sit for an exam, they will be offered on Thursday, September 29th from 8 AM - noon prior to the start of the ASR 32nd Annual Meeting, September 29 - October 1 in New Orleans, LA.

- **What is the fee for taking the exam**?

  There is a $200 application fee each time the candidate applies to take a new certification exam. There is no fee to retake a failed exam if it is taken the year after the candidate did not pass.

- **Am I required to attend the meeting?**

  You are not required to attend the Annual Meeting but we highly recommend it and to prove that we have reduced the registration fee for all test takers to attend at a rate of $260.

## 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:**

Website: www.surgicalresearch.org

Contact information (Communication Committee):

Jennifer Sheehan:
jennifer.sheehan@envigo.com

Tracy Ziegelhoffer:

tracy.ziegelhoffer@envigo.com

Allison Parlapiano:

aparlapi@ITS.JNJ.com

Devra Olson:

dolson@seagen.com

Liane Pinkos:

LPinkos@sai-infusion.com

# 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: December 1st and June 1st. Please send in Times New Roman font, and attach any pictures as a ".jpg" file format.**

SUBMIT ELECTRONICALLY TO: JENNIFER SHEEHAN

JENNIFER.SHEEHAN@ENVIGO.COM

**Test Tips Answers:**

1. A 2. B 3. D