

Improved Standards of Anesthetic Care and Patient Safety

- WHERE HAVE WE BEEN?
- WHERE ARE WE NOW?
- WHERE ARE WE GOING?



Where WERE We?



“...You are here to learn the subtle science and exact art of potions. I don’t expect you will really understand the beauty of the softly simmering cauldron with its shimmering fumes, the delicate power of liquids that creep through...veins, bewitching the mind, ensnaring the senses...” Professor Snape, The Potions Master, Hogwarts School

Where Are We Now in Anesthesia and Pain Management?

We stand on the
shoulders of giants!

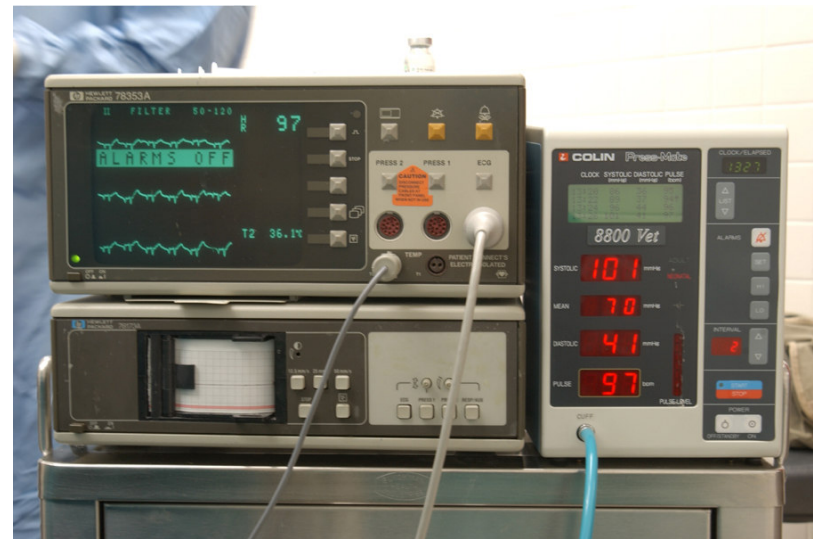
Success through:

- Ambition
- Innovation
- High Expectations



Advances in:

- Inhalant Anesthetics
- Injectable Agents
- Pain Management
- Patient Monitoring
- Physiologic Support
- Patient Safety



Advances in Inhalant Anesthesia:

- Ether, Chloroform, Nitrous Oxide
- Methoxyflurane
- Halothane
- Isoflurane
- (Desflurane)
- Sevoflurane

SevoFlo™
(sevoflurane)

THE DAWN
OF THE
NEXT GENERATION
IN ANESTHESIA

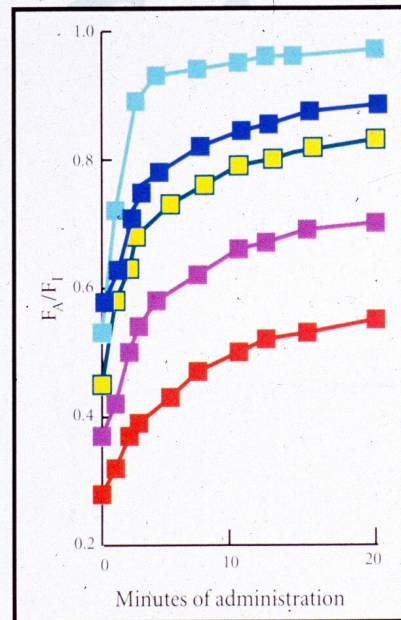
SevoFlo™ (sevoflurane) represents a new alternative in selecting an anesthetic for dogs.

The advertisement features a central image of a bright sun rising over a dark horizon, creating a warm, golden glow. To the right of the text, there is a small image of the Sevoflurane product packaging, including a yellow box and a clear glass bottle with a white label. The overall design is clean and professional, emphasizing the 'new dawn' theme.

Properties of Sevoflurane:

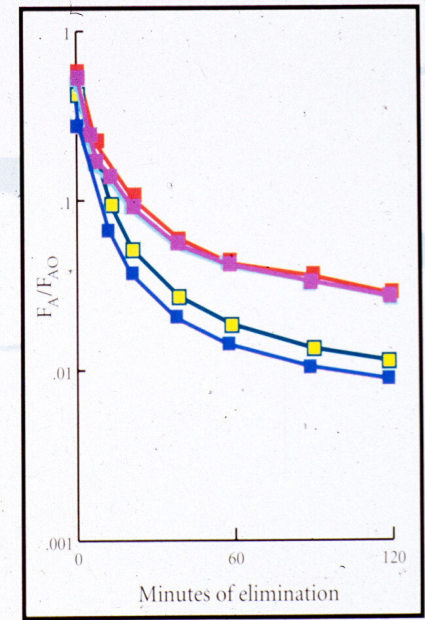
- Low Blood /Gas Coefficient: (0.68)
- Rapid inductions and rapid recoveries

RAPID UPTAKE¹



Adapted from reference 1.
 F_A = End-tidal anesthetic concentration.
 F_I = Inspired anesthetic concentration.

RAPID ELIMINATION¹



Adapted from reference 1.
 F_A = End-tidal anesthetic concentration.
 F_{A0} = Alveolar concentration immediately before discontinuation of anesthetic.

Properties of Sevoflurane:



- Nonpungent odor & Nonirritating to the respiratory tract
 - Easier mask/chamber inductions
 - Less hypersalivation/bronchospasm
- Rapid control of anesthetic depth
 - Quick adjustment for changing needs

Practical Use of Sevoflurane:

- Introduction to sevoflurane is an easy step for those currently using isoflurane.
- The improvement can be quite dramatic indeed for those currently using halothane or methoxyflurane!



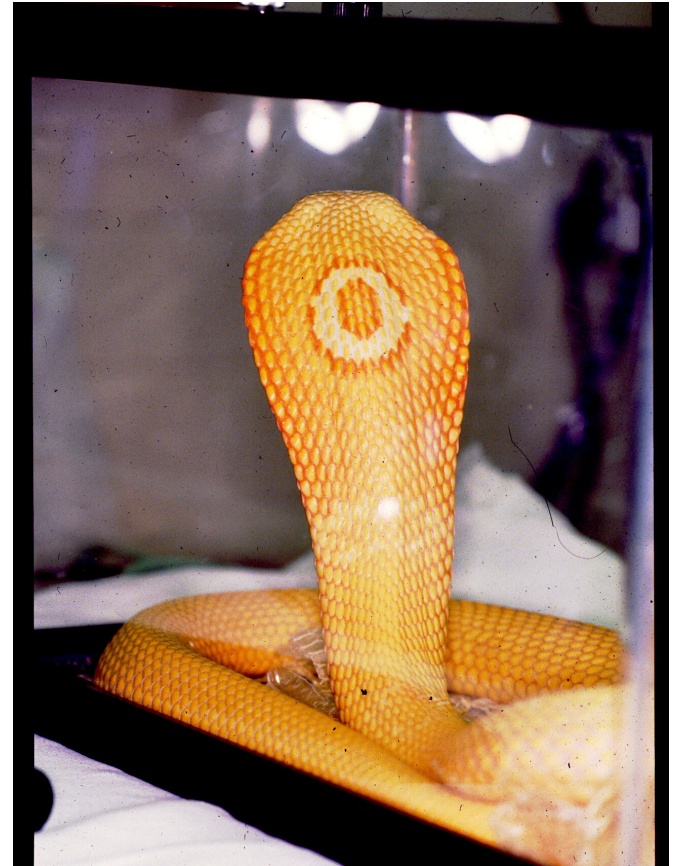
Practical use of Sevoflurane:

- Easier, less stressful, mask inductions
- Easier, less stressful, chamber inductions



Practical use of Sevoflurane:

- Safer mask inductions
- Safer chamber inductions



Practical Use of Sevoflurane:

- Compound "A" toxicity in research conditions.
- Safety shown in millions of cases.
 - Most popular inhalant for human patients.



Clinical introduction of Sevoflurane:

- Availability of agent-specific vaporizers for sevoflurane



Advances in Injectable Anesthesia:

- Barbiturates
- Dissociatives
- Etomidate
- Propofol



Advances in Injectable Anesthesia:

- Etomidate
 - (Amidate)
 - Non-barbiturate imidazole derivative
 - Extreme safety margin
 - Excellent induction agent for cardiac patients



**Amidate:
An Induction Agent
For Compromised
Patients.**

Advances in Injectable Anesthesia:

- PropoFlo
 - (Propofol)
- The best induction agent we've ever had!
- Smooth, fast, reliable, ...and reported to be a "pleasant" experience for the patients!



Propofol Anesthesia:

- Induction agent
- Rapid induction
- Very rapid, yet smooth, recovery
- Excellent for “out-patient” uses
- Respiratory depression as major side effect





Propofol Anesthesia:

- Suitable for combination with all other anesthetics
- Little specific organ toxicity
- No cumulative effect – rapid and complete clearance
- No irritation to perivascular tissues
- Extensive experience/literature

Propofol Anesthesia:

- Infusions (c.r.i.) or intermittent boluses for brief procedures
- Limit repeated uses in cats
 - (phenol compound)
- Lack of preservative
 - Use it or toss it!



Advances in Patient Restraint:

- Pharmacologic tools:
 - Telazol
 - Sevoflurane
 - Oral Buprenorphine (cats)
- Behavioral tools:
 - Skilled & Trained Staff
 - Patience for Patients





The value of tranquilization:



Advances in Tranquilizers:

- Acepromazine
- Butyrophenones
 - Droperidol
 - Lenperone
 - Azaperone
- Benzodiazepines
 - Diazepam (Valium)
 - Midazolam (Versed)



Advances in Sedative/Hypnotics:

- Xylaxine (Rompun)
 - Yohimbine
 - Other antagonists
- Detomidine (Dormosedan)
- Medetomidine (Domitor)
 - Atipamezol (Antisedan)
- Dexmedetomidine



Advances in Opioids:

- Morphine
- Oxymorphone
 - Naloxone (Narcan)
- Hydromorphone
- Fentanyl (Duragesic)
Butorphanol
 - (Torbutrol, Torbugesic, Stadol)





Advances in Local Anesthetics:

- Drugs used:
 - Lidocaine
 - Bupivacaine
- Applications:
 - Regional, Specific Nerve Blocks, Infiltration
 - Neuroaxial
 - Epidural, Spinal
 - Intravenous (Lidocaine C.R.I.)
- Very cheap, Very effective!

Local Anesthetics:

- Many excellent uses of bupivacaine:
 - Regional
 - Specific Nerve Blocks
 - (e.g. maxillary n.)
 - Infiltration





Advances in NSAID's:

- Aspirin
- Phenylbutasone
- Ketoprofen
- Carprofen
- Etodolac
- Deracoxib
- Previcox
- Other NSAID's
- (Acetaminophen)



Advances in NSAID's:

- Recognition of tremendous individual patient variability in efficacy AND safety of various NSAID's, and it changes!
- Skill in application and management
- Limitation of toxicities
 - Cox-2 selectivity
 - Cytoprotective measures



Advances in Pain Management:

1. Acute Pain
 - Operative and Trauma Care
2. Chronic Pain
 - Arthritic Pain
 - Cancer Pain
3. Critical Care Analgesia

1. Acute Pain and Perioperative Pain Management:

- Acute Pain
 - Operative and Trauma Care
- Great progress in our approach and success.



Neuroaxial Analgesia:

- Epidural Morphine
- Epidural Bupivacaine
- Epidural Morphine plus Bupivacaine
 - 12-24 hours of substantial analgesia
 - A “crowd pleaser”



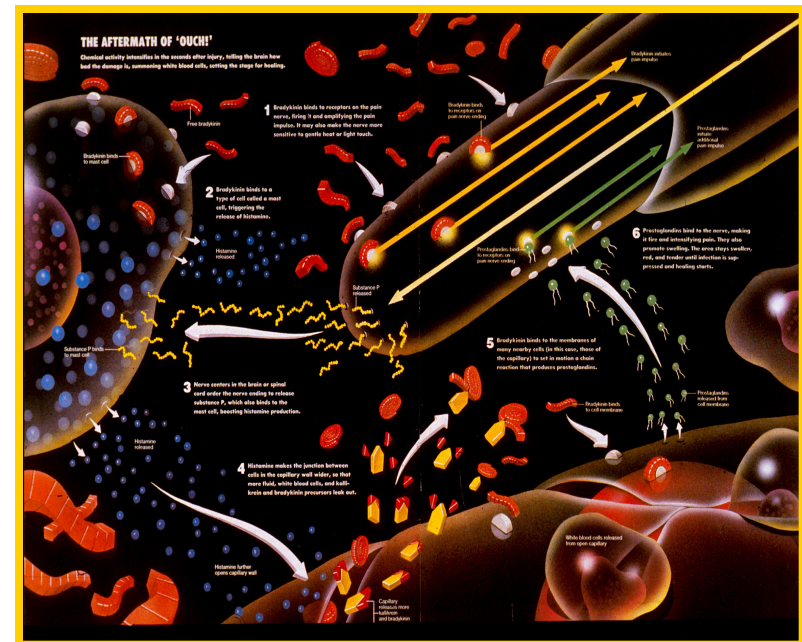
Fentanyl (Duragesic) Patches

- Can be very useful for providing a consistent (basal) level of strong opioid analgesia (3-5 days)
- Alternative to sustained release morphine
- Strictly "off-label"
- Precautions important
- Gaining popularity in many veterinary applications



2. Chronic Pain, Arthritic Pain, and Cancer Pain

- Perhaps the most obvious improvements in veterinary pain management.
- For example, have you heard of “Rimadyl”?
 - >3M dogs in US alone!!!





Cancer Pain Management:

- Understand the disease and extent
- Recognize the causes and importance of each pain
- Consider diverse management options
- Staged pain management approach
- Titrate, adjust and balance care to maintain the most appropriate control
- Tremendous service for patients and clients



WHO Treatment Strategy

- Relies on intensity and severity rather than mechanism and etiology
- Individualized and titrated management
- Escalation of analgesic strategies
- Three (or four) levels of intervention
 - mild, moderate, severe, (refractory)

WHO Analgesia Ladder

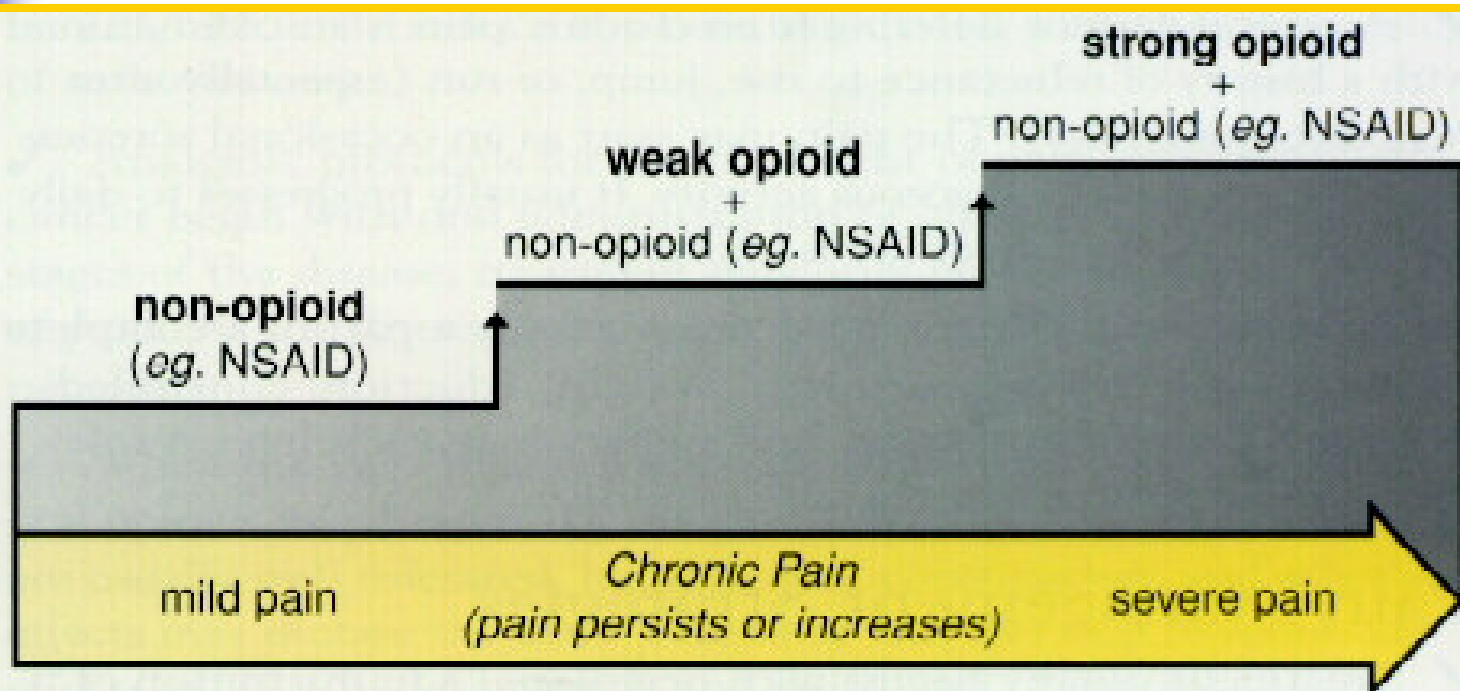


Figure 5-3
Schematic of World Health Organization ladder for cancer pain management

3. Critical Care Analgesia:

- Well defined advantages.
- Mechanisms documented.
- Tools available.
- Application of these too often lags. Same is unfortunately true in human medicine.





Analgesic Therapies Available:

- Thorough Nursing Care
- Alteration of the Environment
- Distraction and Relaxation Technique
- Opioids
- Local or Regional Anesthesia
- Alpha-2 Agonist
- Others

Principles in Pain Management

1. Preemptive analgesia
2. Balanced analgesia
3. Dose to effect





1. Preemptive analgesia

- a) Dose early
- b) Dose before "the knife hits the flesh"
- c) Dose before the patient hurts.
- d) Dose before the last dose wears off.



2. Balanced Analgesia

- Similar to "balanced anesthesia"
- Combination of complimentary methods or drug classes
- Maximize effectiveness and minimize side effects



3. Dose to effect

- "Give until it helps!"
- Medicate smartly. Make the most of your analgesic strategy.
- Inadequate analgesia is wasteful and counter productive.



Advances in Monitoring:

“ACVA Suggestions for monitoring anesthetized veterinary patients”

These guidelines were approved by the Diplomates of the ACVA in December of 1994, and published in the Journal of American Veterinary Medical Association on April 1, 1995. (JAVMA, Vol. 206, No. 7, 936-937.

Available on the website: acva.org

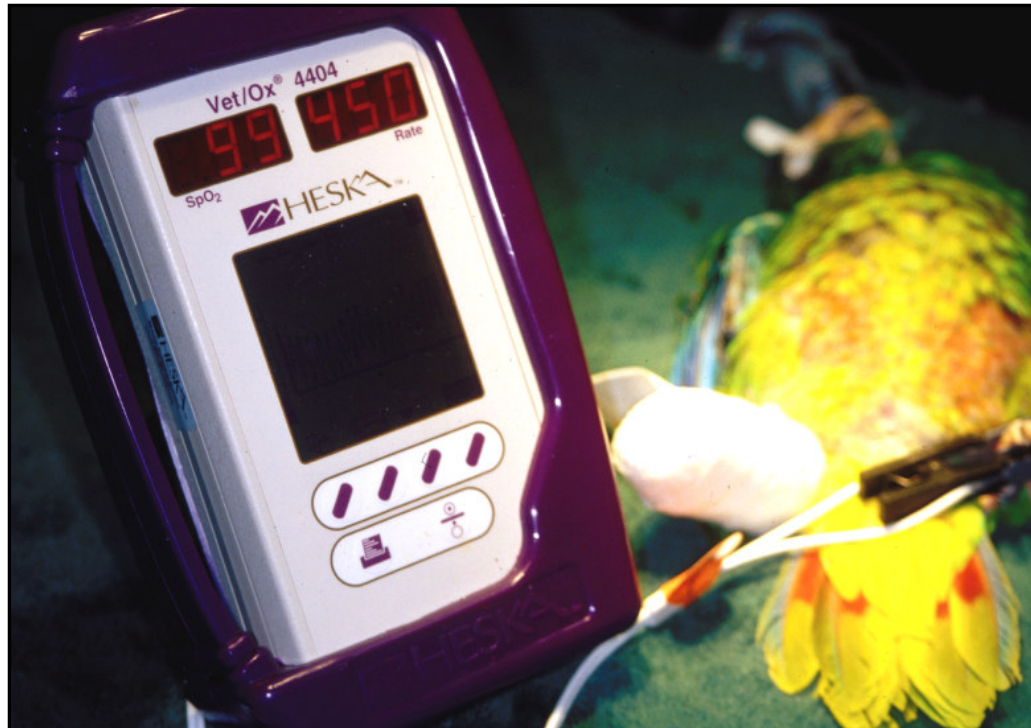
Advances in Monitoring:

- Pulse Oximetry
- Blood Pressure
 - Doppler, NIBP
- Airway Analysis
- Ventilation



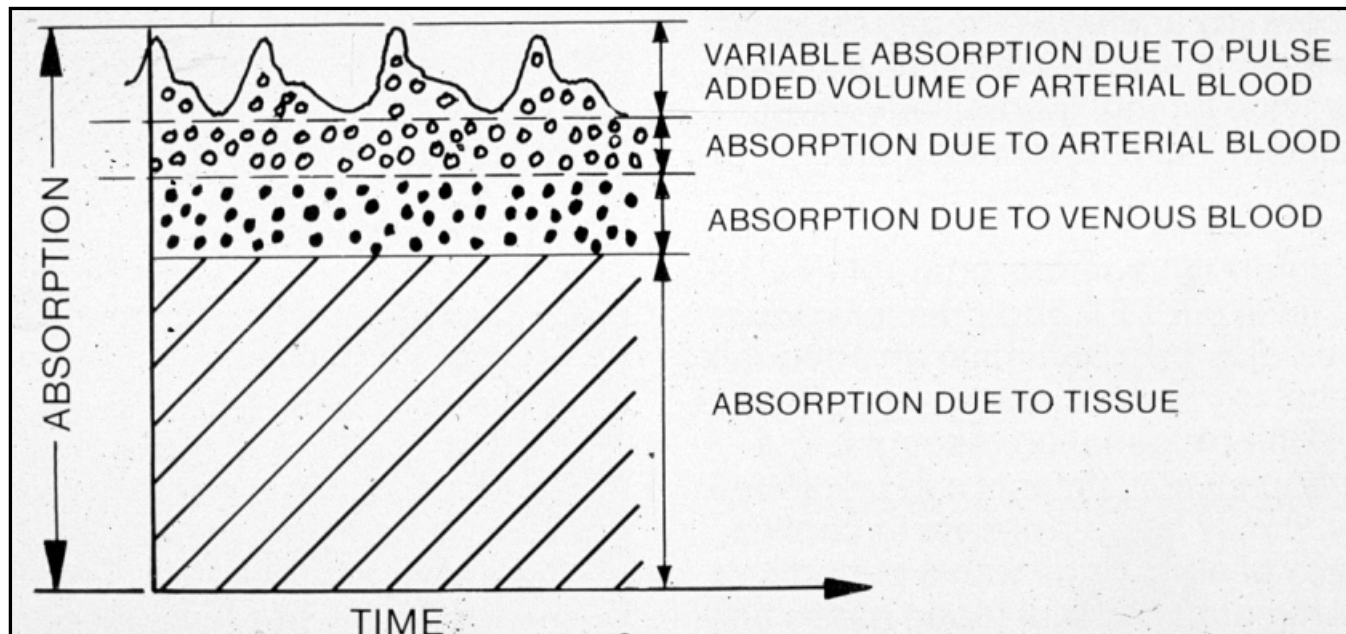
CV Monitoring (perfusion of tissues)

- Pulse Oximetry



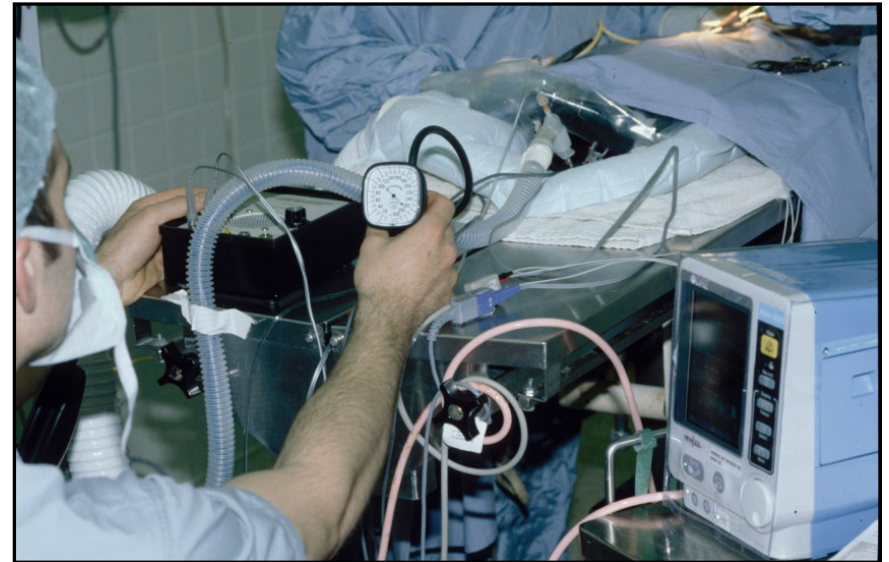
Pulse Oximetry

- Waveform analysis and display of the differential light absorption of the pulsatile component of tissue blood flow:



Monitoring Blood Pressures:

- Indirect pressure measurement
 - Noninvasive methods
 - Doppler ultrasound
 - Oscillometry
 - Related methods



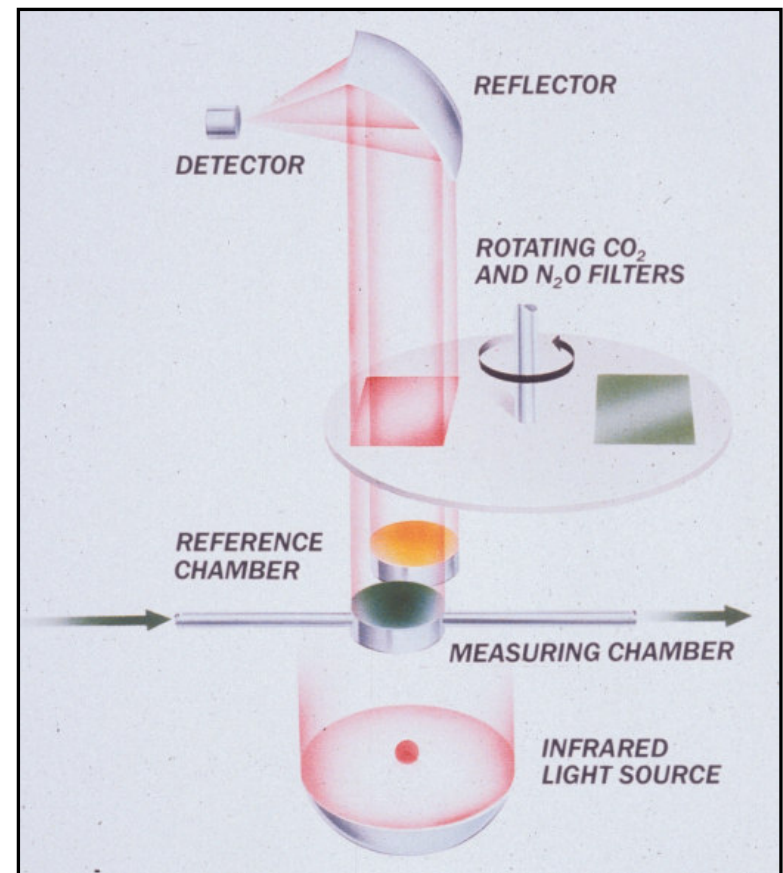


Respiratory Monitoring:

- Pulse Oximetry
- Arterial Blood Gas analysis
- Capnometry and Capnography

Capnometry and Capnography

- Infrared spectroscopy
- Measurement and graphic display of respiratory CO_2
- End-Tidal carbon dioxide (mmHg or %)



Capnometry and Capnography

“Mainstream” or “Sidestream”





Monitoring equipment is not “smart”!

- The veterinarian using these tools must be.
- Proper application, proper function, (calibrated and verified equipment), and appropriate interpretation of the data obtained are essential.
- Otherwise, “Garbage in, garbage out.”

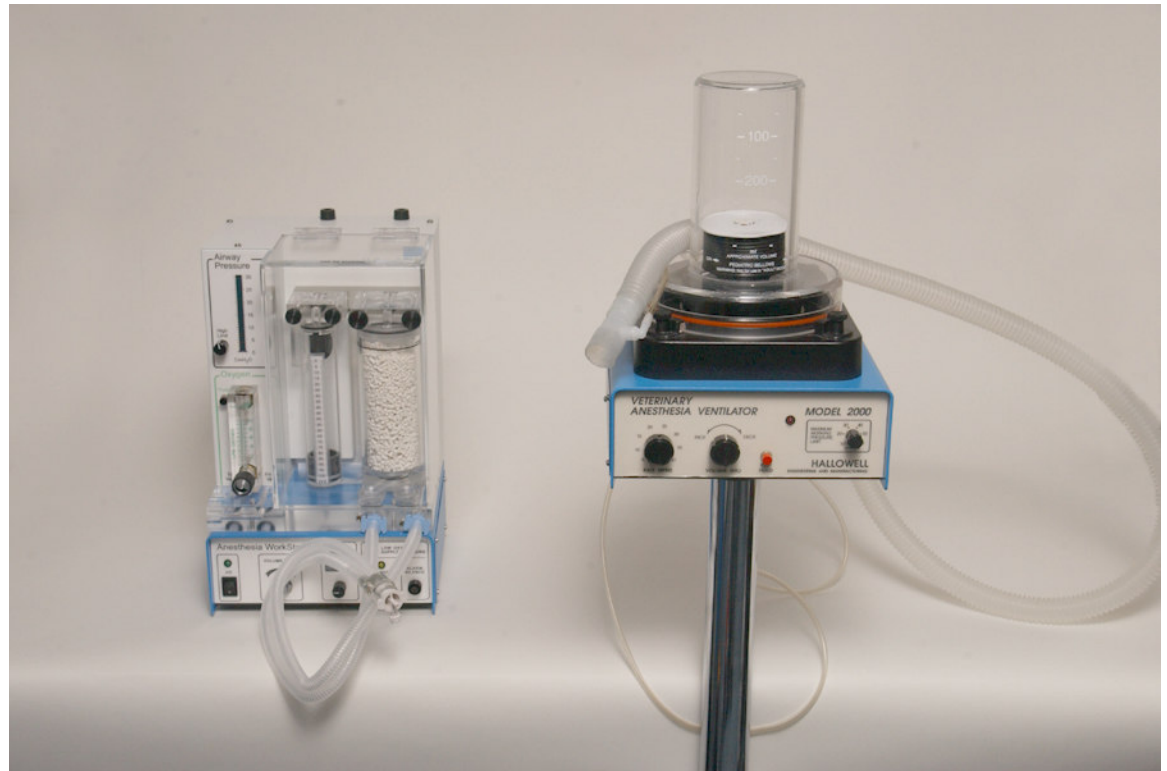


Advances in Patient Support:

- Oxygen
 - I.M.V.
- IV Fluids
- Ventilators
- Warming devices
 - Water blankets (K-pads)
 - Warm Air Blankets (Bair Huggers)

Advances in Patient Support:

- Ventilators



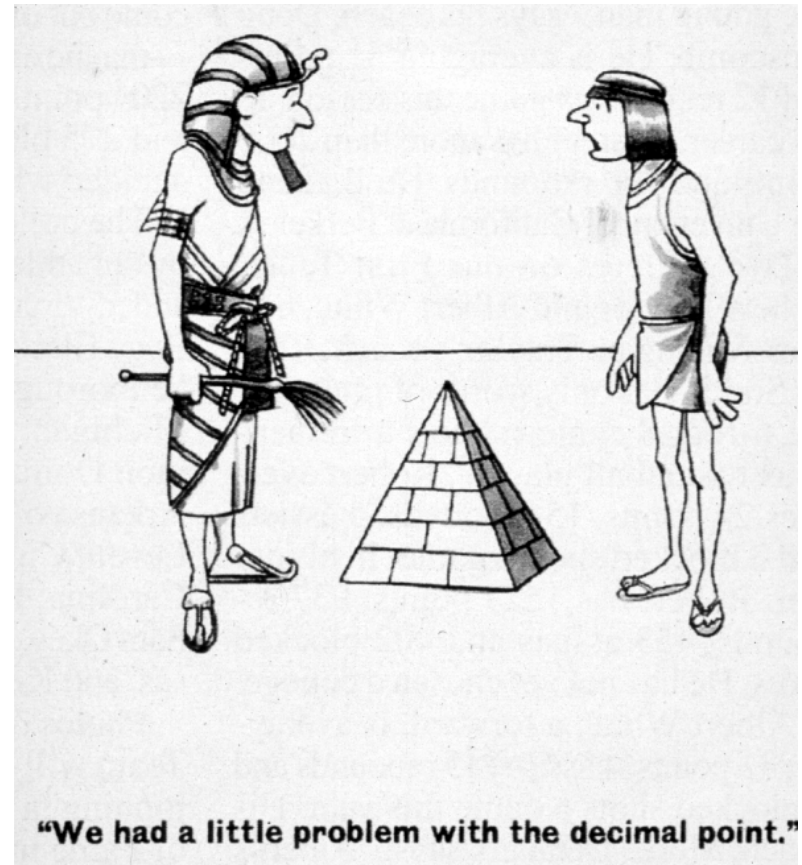
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Advances in Patient Safety:

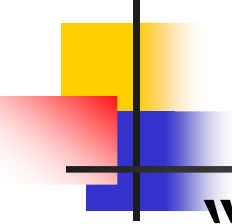
- “Safer Anesthetists”
 - Tools
 - PDA’s to reduce errors
 - Techniques
 - Training
 - more qualified staff
 - licensed / certified
 - new options



Advances in Patient Safety:

- Training
 - Technicians
 - VTAS
 - Students
 - Interns
 - Residents
 - Graduate Veterinarians





“There are no safe anesthetic agents;
there are no safe anesthetic
procedures;
There are only safe anesthesiologists.”

-Robert Smith



The “safe” anesthetist

- All anesthetics are poisons
- Nobody likes an adventurous anesthetist

- Three principles of medical care...
 - Do no harm
 - Do something
 - Don't make a bad situation worse



WHERE DO WE WANT TO GO?

HOW DO WE GET THERE?