



IACUC Challenges – Surgeon Training Using Large Animals

Overview

- Examples of Surgeon Training Using Large Animals
- IACUC Challenges
 - Alternatives
 - Species Justification
 - Survival/Non-survival
 - Numbers
 - Qualifications of trainers
 - Veterinary Care
 - Expired materials
 - OHS for participants
 - Misc. (respect for animals; animal welfare concerns; PAM; photography; tissue sharing; carcass disposal;)

Surgeon Training Using Large Animals (examples)



- To prepare surgeons to do surgical techniques on humans
 - Advanced Trauma & Live Support (ATLS); battlefield trauma
 - New methods (stapled anastomosis; minimally invasive surgeries;)
 - New devices (instruments, harmonic scalpel, laser)
- Laparoscopic Surgery (video-assisted)
 - Cholecystectomy (late 1980's to mid-1990's)
 - GI procedures (Nissen-fundoplication; bowel resection; colostomy)
 - Other (OB/GYN; hernia repair; nephrectomy; lumpectomy)
- Thoracoscopic Surgery (video-assisted)
 - Lung lobectomy or resection
 - Cardiovascular (PDA; coronary artery bypass)
- Orthopedic Surgery (spinal; etc.)
- Robot-assisted Surgery



Laparoscopic Surgery Training



Robot Assisted Surgery Training



Da Vinci



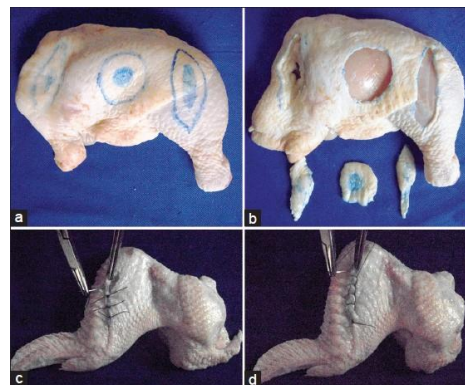
IACUC Challenges



Alternatives

- What is the justification for using animals?
 - more natural surgical experience?
 - hemostasis?
- Can they use the following instead of or along with . . . ?
 - Animal parts
 - Inanimate training devices/mannequins
 - Simulator (computerized?)
 - Animal Cadavers
 - Human cadavers and cadaver parts

Alternatives – for Beginners



Trauma Training Mannequin



Alternatives - Simulators



e.g., “black boxes” – especially for initial training/practice

Simulation - Robotic Assisted

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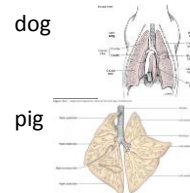


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Animal Species (justification)

- Dogs
 - replaced by pigs (less public opposition)
 - bowel and lung anatomy more useful than pig
- Pigs
 - most commonly used
 - cardiovascular issues, since fibrillate readily
- Goats or Sheep
 - religious preferences?
- Rabbits
 - preferred for pediatric surgery training

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Non-survival versus Survival



- Usually non-survival surgery
 - Euthanized while still under general anesthesia
 - Easier to justify
 - Less skilled surgeon errors
 - Multiple procedures
 - Extensive trauma
- Survival Surgery
 - Hard to justify
 - Why put the animal through a recovery process?
 - Return to stock for reuse?
 - Return to supplier (farmer)?
 - Food chain?



Numbers



- Number of trainers
 - If not enough trainers to help each table, then possible wastage
 - Demonstrations by trainers?
- Plan for losses/attrition?
- Animal to surgeon ratio (4:1 to 1:1)?
 - Usually no more than 4 surgeons per table
 - Will each surgeon do every procedure (or just assist on some)
 - Same animal all day or morning set and afternoon set
- Number of procedures per animal?
 - fewer procedures if survival
 - multiple procedures if non-survival (as many as possible?)



Qualifications of Outside Trainers



- Who is the PI (from inside or outside your unit) M
- Who is doing the training
- Surgeons or salesmen?
 - Have they used animals before?
 - Are they familiar with the anatomic differences of the species?
 - Are they willing to comply with SOPs, etc.?
- IACUC to review credentials/qualifications of trainers (how detailed?)
- Last minute changes to faculty/trainers
 - may occur (Allowed?, How?)



Veterinary Care



- Animal procurement
- Acclimatization period
- Anesthesia/Analgesia (Inhalant, injectable (bolus or infusion), NMB?)
- Vet or Vet technical staff involvement (planning, conduct)?
- Aseptic versus Clean
- Peri-operative monitoring
- Euthanasia



Intra-operative Monitoring Record



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Surgical and Post-Operative Evaluation Record

PI: _____
IACUC #: _____ Surgeon: _____
Animal #: _____ Species: _____ Sex: _____
Pre-Operative Weight: _____ kg Age: _____ Date: _____
Project Title: _____
Procedure: _____

PRE-OPERATIVE PREPARATION AND EVALUATION

Pre-Operative Physical Examination (CNS, Temp)	Pre-Operative Temperature	Pre-Operative Fasting	Pre-Operative Fluids	Pre-Operative Water deprivation	Pre-Operative N/A
Complete Blood Count	Temperatures	Fasting	Fluids	Water deprivation	N/A
Administration	Diag.	Pre-Operative Medications (antibiotics/analgesics)	Route	Time	
MASK					
Trach tube	min				

ANAESTHESIA
ANALGESIC INDUCTION

Drug	Dose	Route	Time

GAS ANAESTHESIA Ventilation: Assisted: Self-Respiration:

Start Time: _____ Procedure ended: _____

Time	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	
SpO2																					
ETCO2																					
Temp																					
RR																					
HR																					
Bp (Systolic)																					

SURGICAL PROCEDURES AND INTRA-OPERATIVE MONITORING

Intra-Operative Monitoring: (Include observations used to monitor depth of anaesthesia, e.g. limb-spreaders, toe pinch, corneal reflex)

Other Intra-Operative Drugs: (Include doses, routes, and frequency of administration)

Description of Procedures: _____

Fluid Administration (if applicable): _____

Intra-Operative Complications: _____

Recovery Observations: _____

Other Observations/Remarks: _____



Post-op Monitoring Record (If approved for survival)



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Animal # _____ IACUC # _____ Date of Surgery: _____

POST-OPERATIVE MONITORING AND EVALUATION

Date:											
Attending Vet											
Medications:	(Include name, dose, route, and time(s) of administration.)										
Analgesia:											
Antibiotics:											
Other fluids/drugs:											
Clinical Observations/ Adverse Effects: (e.g., activity, grooming, respiration, vocalization, eating/drinking, urination/defecation, cachexia, gait impairment/paralysis)											
Body Weight: (If weight loss occurs, include % change from pre-operative body weight)											
Incision Monitoring: (e.g., redness of swelling around/under incision, exudate from surgical site)											
Suture/Wound Clip Removal:											
Other Notes:											



Monitoring Challenges

- Numerous stations (8-14?)
- How many anesthetized animals can one monitor?
- Crowded conditions (challenging to access animal for monitoring)



- CO₂ insufflation of abdomen/thorax
 - High pressure can compromise venous return and respiration, plus arrhythmias
 - 10 cm Hg or less preferred
- Special/unexpected requests

Expired Materials

- Expired suture for non-survival?
- Expired consumables? (needles, syringes, sponges, etc)
- Expired drugs?
 - Anesthetics/Analgesics/Euthanasia solution – **NO!!!**
- Non-Pharmaceutical Grade Compounds?

Occupational Health and Safety



- Hazards
 - Zoonotic disease
 - Strep. suis; Lepto; Hepatitis E; etc.
 - Injury
 - Sharps
 - Accidents
 - Ergonomics
- Risk assessment and risk mitigation
- Engineering
- Procedures
- PPE



Miscellaneous Considerations



- Respect for animals
 - (to discuss during didactic session)
- Animal Welfare Concern Reporting (signage)
- Post-Approval Monitoring (PAM)
- Photos/Video
- Tissue Sharing
- Carcass Disposal



Conclusions



- Use of large animals for surgeon training can be justified
- Animal use should not be to the sole method used for training
- Suitability of the animal species should be considered, based on the surgical procedures to be performed
- Many of the IACUC challenges can be addressed during the review process, but post-approval monitoring should also be considered



Questions?

