IACUC Challenges –
Surgeon Training Using Large Animals

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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;)

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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 (OBGYN; 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

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
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

Post-op Monitoring Record (If approved for survival)
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 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?