

## 1 ☐ **The Cats of the Large Animal World: How to Handle Individual Pigs in your Practice**

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## 2 ☐ **A Brief Bio**

- ▶ Graduated from Iowa State University with a B.S. in Microbiology
- ▶ Earned my DVM from Iowa State University
- ▶ Earned a MS in Population Sciences in Animal Health
- ▶ Mom to two little boys and a girl
- ▶ "Heifer-developer" herself

## 3 ☐ **Outline**

- ▶ Anesthesia
- ▶ A note on epidurals
- ▶ Surgical procedures
- ▶ GI stasis
- ▶ Gastrointestinal ulcers
- ▶ Vaccinations
- ▶ Parasitology
- ▶ Nutrition
- ▶

## 4 ☐ **Types of Individual Pigs in Practice**

## 5 ☐ **Anesthesia Tips**

- ▶ REVERSIBILITY IS KEY!
  - ▶ SHORT ACTING IF NOT REVERSIBLE
- ▶ WARM WARM WARM!
  - ▶ .....But not too warm
- ▶ MALIGNANT HYPERTHERMIA
  - ▶ Don't be as afraid of Iso as you think
  - ▶ Monitor temperature every minute during induction then down to 5
- ▶ NPO 12 hours
  - ▶ Aspiration pneumonia
- ▶ GI stasis does happen quickly. Be prepared
- ▶ [https://trace.tennessee.edu/cgi/viewcontent.cgi?article=1053&context=utk\\_largpubs](https://trace.tennessee.edu/cgi/viewcontent.cgi?article=1053&context=utk_largpubs). Great article to have for a reference

## 6 ☐ **Anesthesia**

- ▶ TKX- Telazol Ketamine, Xylazine
  - ▶ Most commonly used
  - ▶ Telazol- Dissociative/Benzodiazepine, Ketamine- Dissociative, Xylazine- Alpha 2 agonist
  - ▶ DOSE: IM or IV 1 bottle dry Telazol with 2.5 mL Ketamine (100mg/mL) and 2.5mL Xylazine (100 mg/mL)
    - ▶ 0.02-0.04 mL/kg or 1 mL/100 lbs.. or 0.1mL/10 lbs.
    - ▶ Additional dose: 1 bottle Telazol 4 mL Ketamine (100 mg/m) and 1 mL Xylazine (100 mg/mL) same dose as above
  - ▶ Duration: 20 to 30 minutes

- ▶ Risks:
  - ▶ Prolonged recovery time
  - ▶ Vomiting
  - ▶ GI stasis
  - ▶ hypoxia

## 7 ☐ Anesthesia

- 1 ▶ Midazolam: benzodiazepines
  - ▶ Dose: 0.2-0.5 mg/kg IM, IV, SC or IN
  - ▶ Duration: 15-20 minutes
  - ▶ Risks:
    - ▶ Hypothermia
    - ▶ Unpredictable anesthesia- when used alone
- 2 ▶ Ketamine: Dissociative
  - ▶ Don't use alone
  - ▶ Dose: 1-10 mg/kg IM, IV, SQ
  - ▶ Risks:
    - ▶ Tachycardia
    - ▶ Cardiac arrest
    - ▶ Respiratory arrest
    - ▶ Anaphylaxis

## 8 ☐ Anesthesia

- ▶ Butorphanol
  - ▶ Opioid
  - ▶ Mixed
- ▶ Reversibility
- ▶ Dose: 0.1-1.0 mg/kg IM/IV
- ▶ Risk:
  - ▶ GI STASIS
  - ▶ Respiratory depression
  - ▶ Excitement

## 9 ☐ Anesthesia

- ▶ Isoflurane
  - ▶ Can be used as masked induction
    - ▶ However pre-medicating helps MAC sparing/hypotension risk
  - ▶ Relatively rapid recovery once off.
  - ▶ Dose 1-5% Induction 1-3% maintenance
  - ▶ Risks
    - ▶ Malignant Hyperthermia
    - ▶ Hypotension
    - ▶ Respiratory depression

## 10 ☐ Malignant Hyperthermia

- ▶ Genetic condition: PSS

- ▶ Can be PSS Negative but still occur
- ▶ Occurs under general anesthesia
- ▶ Clinical signs
  - ▶ Rapid rise in body temperature (4+\* Temperature Jump in 30 seconds-minute)
  - ▶ Opisthotonos
  - ▶ Muscle fasciculations
- ▶ Pig breeds:
  - ▶ Heavy muscled, Landrace, Pietrain, Yorkshire, Hampshire, Poland China
- ▶ Dantrolene:
  - ▶ 2-5 mg/kg 6-8 hours prior to induction or 2-10 mg/kg IV at the onset of anesthesia

#### 11 ☐ Epidurals

- ▶ Lumbosacral is target
- ▶ Visual posterior paralysis within 5 minutes
- ▶ 0.5-1 mg/kg 2% Lidocaine +/- Epinephrine reported
- ▶ General Rule of thumb:
  - ▶ 1 mL for 10lb pig
    - ▶ 1.5 inch 18 g needle for 10 lb pig
  - ▶ 3 mL for 60 lb pig
    - ▶ 4 inch x 18 g
  - ▶ 6 mL for 300 lb sow
    - ▶ 10 inch x 18 g
- ▶ 1-1.5 hour of analgesia
  - ▶ Inguinal region and posterior
- ▶ Complications: Pithing leading to paralysis, too far cranial leads to respiratory distress
- ▶ Possible reduction of malignant hyperthermia incidence?
  - ▶
  - ▶

#### 12 ☐ Inguinal/Scrotal Hernia

- ▶ "Rupture"
- ▶ Hereditary
  - ▶ Typically see it in crossbred show pigs (anecdotally)
- ▶ Soft tissue swelling (reducible) anterior to and or within the scrotum unilateral or bilateral
  - ▶ Bulge test
- ▶ Ideal age: 2-3 weeks
  - ▶ Still on mom
  - ▶ ~10-25 lbs.
- ▶ If left uncastrated intestinal strangulation may occur
- ▶ LEAVE NO PRISONERS BEHIND!
  - ▶
  - ▶

#### 13 ☐ Procedure

- ▶ Epidural
- ▶ Prep (scrub) dorsal recumbency

- ▶ With a 10-hook blade scalpel, excise over the entire length of the hernia to the inguinal ring, just the skin
- ▶ Blunt dissect down to vaginal tunic
- ▶ Exteriorize testicle
- ▶ Milk intestines down and twist the spermatic cord
- ▶ Clamp
- ▶ Ligate using 2-0 monofilament or polydioxanone transfixation ligature below clamp do not cut suture
- ▶ Remove testicle
- ▶ Close inguinal ring/ subcutaneous tissue with attached suture using a simple continuous pattern
- ▶ Continuous Horizontal Mattress for the skin
- ▶ No prisoners left behind
- ▶

#### 14 ☐ **Post-op**

- ▶ Plug in on Mom
- ▶ Flunixin Megulamine-s
  - ▶ 2 ml/100 lbs. single IM administration W/D 12 days
- ▶ +/- Swine Ceftiofur(s) or Ampicillin
  - ▶ 1 ml/44 lbs. IM, W/D 14 days

#### 15 ☐ **Complications**

- ▶ Intestinal Strangulation
- ▶ Re-herniation
- ▶ Suture reaction
- ▶ Infection

#### 16 ☐ **Cryptorchidism**

- 1 ▶ Retained testicle unilateral or bilateral Found during castration
  - ▶ "One nutter"
  - ▶ Client communication: do not castrate normal testicle
  - ▶ Hereditary
  - ▶ Ideal size: 30 lb pig
  - ▶ If left uncastrated or hemi-castrated boar taint occurs

#### 17 ☐ **Procedure**

- ▶ Lumbosacral epidural
- ▶ Prep (scrub) dorsal recumbency
- ▶ Skin and abdominal muscle incision with 10 scalpel blade (TENT TENT TENT) paramedian/inguinal approach
  - ▶ 1-2 inches in length
- ▶ Blunt dissect peritoneal layer
- ▶ Brief abdominal explore
- ▶ Testicle typically retains: inguinal ring, medial ventral abdomen, or by kidney
- ▶ Ligate as far anterior as possible using 1-0 to 1 monofilament or polydioxanone transfixation ligature
- ▶ Remove testicle

- ▶ Abdominal muscle layer/inguinal ring simple continuous with 1-0 to 1 monofilament or polydioxanone Skin layer closed in continuous horizontal mattress.
- ▶ Leave no prisoner behind

#### 18 ☐ **Post-op**

- ▶ Leave in pen alone or with a buddy that has undergone a procedure of the same size
- ▶ Swine Ceftiofur(s) or Ampicillin
- ▶ Flunixin Megulamine-s

#### 19 ☐ **Complications**

- ▶ Herniation
- ▶ Suture reaction
- ▶ Infection

#### 20 ☐ **Umbilical hernia**

- ▶ "Belly bust"
  - ▶ Presents: as a soft protruding mass in the umbilical region
    - ▶ Ddx: umbilical hernia vs abscess vs. preputial diverticulitis
    - ▶ Herniation is typically soft, reducible, not warm, and can digitally palpate a opening in the abdomen through the skin. Could ultrasound for confirmation
  - ▶ Hereditary/weight increase
  - ▶ Ideal weight: 30 lbs.
  - ▶ Not fixed: intestinal strangulation recommend cull market roaster pig

#### 21 ☐ **Procedure**

- ▶ Mask down with isoflurane (temperature checks q. 5 min)
  - ▶ Pre-Med if needed
  - ▶ Prep (scrub) dorsal recumbency
  - ▶ Lidocaine line block around hernia
  - ▶ Elliptical incision around the skin using 10 scalpel blade
  - ▶ Blunt dissect until hernia is reached (do not open peritoneal sack!)
  - ▶ Reduce hernia into the abdomen
  - ▶ Freshen edges (scratch to make them bleed) 0 or 2 depending on size suture continuous, interrupted, or vest over pants
  - ▶ Skin layer 1-0 to 1 monofilament or polydioxanone continuous horizontal mattress

#### 22 ☐ **Post-op**

- ▶ Oxygen until awake
- ▶ Reversal if needed
- ▶ Swine Ceftiofur(s) or Ampicillin
- ▶ Flunixin Megulamine-s
- ▶ Keep in pen by itself for at least 7 days ideal
- ▶ Limit feed for two weeks

▶

23 ☐ **Complications**

- ▶ Failure to close hernia
- ▶ Re-herniation
- ▶ Anesthetic death
- ▶ Infection
- ▶ Suture reaction

24 ☐ **Preputial Diverticulectomy**

## 1 ▶ "Piss Pocket"

- ▶ Preputial diverticulum
  - ▶ Masturbation pocket in male +/- intact
- ▶ Can cause an infection if not expressing appropriately
- ▶ DDX: Preputial diverticulitis vs. abscess vs. herniation
  - ▶ Preputial diverticulitis: soft swelling above the prepuce, expressible with brown to green malodorous sludge
- ▶ Ideal size: 50-60 lbs.

▶

25 ☐ **Procedure – "Open Method"**

## 1

- ▶ Mask down with isoflurane (temperature checks q. 5 min)
  - ▶ pre med
- ▶ Lavage and express prepuce/diverticulum with dilute iodine (tea color)
- ▶ Prep (scrub) dorsal recumbency
- ▶ Line block dorsal to preputial orifice
- ▶ Distend preputial diverticulum with dilute iodine
- ▶ Excise skin only over distended preputial diverticulum (more dorsal than ventral)
- ▶ Visualize distended preputial diverticulum
- ▶ Blunt dissect around preputial diverticulum separating connective tissue
- ▶ Transfixation ligature around neck of preputial diverticulum 1-0 monofilament or polydioxanone
  - 1-0 monofilament or polydioxanone simple continuous subcutaneous tissue
- ▶ 1-0 monofilament or polydioxanone Continuous horizontal mattress

▶

▶

26 ☐ **Procedure – "Closed Method"**

- ▶ Mask down with isoflurane (temperature checks q. 5 min)
  - ▶ pre med
- ▶ Lavage and express prepuce/diverticulum with dilute iodine (tea color)
- ▶ Prep (scrub) dorsal recumbency
- ▶ Distend preputial diverticulum with dilute iodine
- ▶ Place curved hemostat into preputial opening and into the diverticulum, clamp
- ▶ Apply slow gentle traction with multiple clamps until diverticulum is completely removed
- ▶ Place ligature 1-0 monofilament or polydioxanone at the base of it and remove it

- ▶ Replace it.

- ▶

## 27 ☐ **Post-op**

- ▶ Oxygen until awake
- ▶ Reversal if needed
- ▶ +/- Swine Ceftiofur(s) or Ampicillin
- ▶ Flunixin Megulamine-s
- ▶ Keep isolated for at least 7 days

## 28 ☐ **Complications**

- ▶ Incontinence
- ▶ Infection
- ▶ Anesthetic death
- ▶ Suture reaction

## 29 ☐ **Cesarean Section**

- 1 ▶ Indications:
  - ▶ Retained piglet palpable
    - ▶ More than an hour interval
  - ▶ Prolapse vaginally
  - ▶ Historical (littermate bred same had issues)
- ▶ Client education is HUGE!!
  - ▶ Call quickly on onset or pre-schedule
  - ▶ Expectations
  - ▶ Post operative
- ▶ Goal: save piglets, get colostrum, and get cull sow price
- ▶

## 30 ☐ **Procedure**

- ▶ Epidural
- ▶ Prep (scrub) Place in lateral recumbency (right or left)
- ▶ Lidocaine line block paramedian dorsal to the mammary chain
- ▶ Excise 10 scalpel blade skin, subcutaneous fat, and abdominal muscle layer
- ▶ Blunt dissect peritoneum (observe peritoneal fluid)
- ▶ Locate uterus and excise over piglet close to uterine bifurcation
- ▶ Go fishing (Cords snapped=hand off, Excise=clamp/knot)
- ▶ Utrecht pattern close uterus with 2 PDS and rinse incision with sterile saline
- ▶ Check birthing canal before closure
- ▶ Simple continuous 3 PDS abdominal muscles and subcutaneous tissue
- ▶ Running horizontal mattress with 3 PDS

## 31 ☐ **Post-op**

- ▶ +/- Oxytocin 1-2 mL
- ▶ Swine Ceftiofur(s) or Ampicillin
- ▶ Flunixin Megulamine-s
  - ▶ Pain control is key!

▶ GET HER TO EAT!!!!

▶ BELLY RUBS!

### 32 ☐ **Complications**

▶ Infection/Dehiscence

▶ Anorexia

▶ Incontinence

▶ Unable to milk

▶ Unwilling to let pigs nurse

▶ Hypovolemia???

### 33 ☐ **Signs to Move to a Terminal C-section**

▶ "Been at 'er for 4+ hours doc with the help of my neighbor, wife, brother, sisters cousins uncle....  
We got one but it was a hard pull"

▶ Sow attitude

▶ Torn uterus on vaginal exam (friable/spiderweb)

▶ Uterine fluid observed with peritoneal fluid

▶ Friable uterus on suturing

▶

▶

▶

### 34 ☐ **Ovariohysterectomy, Why?!**

▶ Pet pigs

▶ Older pigs can develop ovarian tumors

▶ Clinical presentation: vaginal discharge

▶ Pyometras also but not as common

▶ Hormonal behaviors

▶ Mixed gender groups

### 35 ☐ **Ovariohysterectomy**

1

▶ General anesthesia

▶ Dorsal recumbency

▶ Incise ventral midline between caudal 1<sup>st</sup>- 3rd teat

▶ TENT TENT TENT

▶ Spay hook for uterus

▶ There is no ligament to break down

▶ Ligate each ovarian pedicle close to broad ligament as possible (monofilament or polydioxanone)

▶ Can also be done with a Ligasure

▶ Ligate utero-ovarian artery

▶ And any other blood vessel you question.

▶ Ligate uterine body and uterine artery separately!!

▶ Close using muscle layers (monofilament or polydioxanone) simple continuous and Continuous  
Horizontal Mattress (monofilament or Polydioxanone)

### 36 ☐ **Complications**



- ▶ GI Stasis
- ▶ Dehiscence
- ▶ Internal Hemorrhage
- ▶ Seroma
- ▶ Herniation
- ▶

### 37 ☐ **Castration-Show pig/Conventional**

- 1 Show pig
- 2 ▶ Prescrotal incision
  - ▶ Blunt dissect down to spermatic cord
  - ▶ Exteriorize testicle
  - ▶ Excise if small
  - ▶ Ligate/excise if greater than 30 lbs.
- 3 Conventional
- 4 ▶ Scrotal incision
  - ▶ Exteriorize testicles
  - ▶ Pull if small

### 38 ☐ **Neuter**

- ▶ General anesthesia or lumbosacral epidural
- ▶ Dorsal recumbency
- ▶ Pre-scrotal incision
- ▶ Exteriorize testicles
- ▶ Place ligature around each testicular cord
- ▶ Palpate inguinal ring and close if open
- ▶ Close: subcutaneous dead space (monofilament or polydioxanone) simple continuous and skin horizontal continuous mattress (monofilament or polydioxanone)
- ▶

### 39 ☐ **Complications**

- ▶ Herniation
- ▶ "Serous" cord
- ▶ Urinary retention
- ▶

### 40 ☐ **Odds and ends Requiring Anesthesia/Analgesia**

- ▶ Foot trim
- ▶ Third dew claw removal

### 41 ☐ **GI Stasis**

### 42 ☐ **Intestinal ileus**

- ▶ Initial complaint
  - ▶ Vocalizing when defecating
  - ▶ Straining to defecate
  - ▶ Small hard pebbles

- ▶ Vomiting
- ▶ History
  - ▶ "Was in the trash"
  - ▶ "New toy"
  - ▶ "New environment" "New Food"
  - ▶ "Surgery" "Pain" "Injury"
  - ▶ "I blinked at it wrong"
- ▶ Differential: True intestinal ileus vs. obstruction
  - ▶

#### 43 ☐ **Intestinal ileus**

- ▶ Radiograph!!!!!!!
- ▶ +/- Blood work
- ▶ If obstructed: surgery
- ▶ If ileus/obstipated:
  - ▶ Stool softeners, MiraLAX, pumpkin, isotonic oral fluids
  - ▶ Enema
  - ▶ Metoclopramide 0.4mg/kg PO for three days

#### 44 ☐ **Gastric Ulcers**

#### 45 ☐ **Gastric Ulcers**

- 1 ▶ Rapid feed changes
- ▶ Prolonged NSAID/Steroidal Use
- ▶ Diagnostics:
  - ▶ Fecal occult test
  - ▶ Blood work
  - ▶ GI scope
- ▶ Treatment:
  - ▶ Bland large particle diet, a slow transition back to a normal diet
  - ▶ Repair perforated ulcer If caught in time/value
  - ▶ Omeprazole 40 mg/pig PO

#### 46 ☐ **Vaccinations**

#### 47 ☐ **Note on Vaccinations**

- ▶ Assume the worst
- ▶ Goal is shared exposure: show pigs
- ▶ Vaccinate per label instructions

#### 48 ☐ **Pot-Belly/Pet Pigs-Core**

- ▶ Can add leptos/Parvo if breeding stock and administer pre-breeding
  - ▶ Leptospirosis and Parvovirus
- ▶ Rabies (extra label) dependent on State requirements if exposure in Iowa still would be Euthanized.

#### 49 ☐ **Show Pigs-Core**

- ▶ Influenza type A
  - ▶ Based on Show Requirements
- ▶ PRRSV
  - ▶ Porcine respiratory and Reproductive Virus
  - ▶ At weaning or at purchase +/- mid summer booster
- ▶ Lepto (6 way)
  - ▶ Leptospirosis
  - ▶ Check show requirements

#### 50 ☐ **Other Vaccinations**

- ▶ Lawsonia intracellularis
- ▶ Haemophilus parasuis
- ▶ Salmonella
- ▶ Streptococcus suis,
- ▶ E.coli
- ▶ Rota/Coronavirus

#### 51 ☐ **Parasites**

#### 52 ☐ **Parasite Control**

- ▶ There is no one size fits all
- ▶ No prescription required
  - ▶ But veterinary insight can be warranted on strategy
- ▶ Must be used in conjunction with clean environment, proper nutrition, etc.
- ▶ Fecal samples helpful for diagnosis and targeted therapy
- ▶ Follow labeled directions
  - ▶ EPA vs. FDA
    - ▶ Topicals=EPA, FDA=injectable/oral products
  - ▶ Animal vs. Barn
- ▶

#### 53 ☐

#### 54 ☐ **Parasite Control**

- ▶ Internal or "De-worming" schedule
  - ▶ Outdoor pigs have an increased risk compared to indoor conventional
  - ▶ Adult pigs (non-gestating) - every 6 months
  - ▶ Gestating adult pigs- 2-3 weeks prior to farrowing
  - ▶ Growing pig (8+ weeks)- Once every 2 months
- ▶
- ▶ Follow label instructions
- ▶

#### 55 ☐

#### 56 ☐ **Parasite Control**

- ▶ External Parasite control schedule

- ▶ On arrival
- ▶ As needed
- ▶ Follow label Instructions

## 57 ☐ **Nutrition**

## 58 ☐ **Nutrition**

- ▶ Balance is key!
- ▶ Slow gradual changes
- ▶ Particle size
  - ▶ 700 microns minimum
- ▶ Consult a Nutritionist!!

## 59 ☐ **Nutrition-pet pig**

- ▶ Neonatal:
  - ▶ Commercial milk replacer or 2%/Whole milk
    - ▶ 1 ounce every 4-6 hours from a bottle
- ▶ Conversion to feed takes 14 days
- ▶ Growing pig <8 months of age
  - ▶ Growing pig-formulated POT BELLY Pig Diet
- ▶ Adult pig >8 months of age
  - ▶ Maintenance pot belly pig diet
- ▶ Snacks include
  - ▶ Lettuce, various vegetables, grass, grass hay
- ▶ Treats include
  - ▶ Fruit
- ▶ Remember NO GARBAGE FEEDING

## 60 ☐ **Citations**

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## 61 ☐ **Questions**

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