REPRODUCTIVE DISORDERS IN PET HENS

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Learning Objectives
- (Review clinically relevant anatomy and physiology features of the avian reproductive tract)
- Review common reproductive diseases of domestic chickens, including clinical signs, diagnostic tests, medical and surgical treatment options

Anatomy and physiology of the hen reproductive tract

Anatomy
- Left ovary and oviduct functional only
- Ovary
  - Consists of cortex and medulla
    - Cortex: Ova
    - Medulla: blood vessels, interstitial cells, autonomic nerve fibers, smooth muscle
- Oviduct
  - 5 sections with distinct functions:
    - Infundibulum: catches ovum, stores sperm, fertilization, formation of chalaza
    - Magnum: deposition most of the albumin, Na, Mg, Ca
    - Isthmus: inner and outer shell membranes added
    - Uterus ("shell gland"): "plumping" and calcification of shell membranes
    - Vagina: egg expulsion (with the uterus), long term sperm storage
  - Dorsal and ventral ligaments: hold oviduct in place and folded
- Egg
  - Yolk
    - White and yellow
    - Protein and lipids
    - Nutrition for embryo
  - Germinal disc
    - Contains cytoplasm and oocyte
    - Becomes embryo
  - Albumin/albumen
    - Protein (ovomucin) provides nutrition and has anti-bacterial effects
  - Chalaza: suspend yolk in center of egg
  - Inner and outer shell membrane
    - Air cell: transpiration, embryo protection
  - Shell: protection, transpiration, source of calcium for bone formation

Sex hormones
- LH
  - Increases before and during oviposition
  - Stimulates gonadal activity and ovulation
- FSH
  - Stimulates ovarian development
- Estrogen
  - Produced by ovarian thecal and interstitial cells
  - Primes reproductive tract, bone, hypothalamus and pituitary gland for reproduction
  - Pre-ovulatory increase stimulates LH surge
- Progesterone
- Produced by ovarian granulosa cells
- Induces behavior and physiologic changes associated with incubation and brood care

**Prolactin**
- Secreted by anterior pituitary
- Stimulates secretion of crop milk in Columbriformes, incubation and brooding behavior

- **PGE<sub>1</sub> & PGE<sub>2</sub>**
  - Induces smooth muscle relaxation and contraction

- **PGF<sub>2α</sub>**
  - Stimulates production of arginine vasotocin when shell-gland is stretched
  - Stimulates strong uterine smooth muscle contraction

- **Arginine vasotocin**
  - Produced by posterior pituitary
  - Stimulates strong uterine smooth muscle contraction

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**Common Reproductive Problems in Hens**

**Egg binding/dystocia**

- **Definitions**
  - Egg Binding: failure of egg to pass through oviduct at normal rate
  - Dystocia: mechanical impedance to oviposition

- **Causes**
  - Multifactorial
  - Nutritional: Ca, vit. D, vit. E, Se
  - Muscle dysfunction
    - Oviduct, uterus, vagina
    - Excessive egg production
    - Torsion, laceration with stenosis, infection, neoplasia
  - Large or misshapen egg
  - Genetics
  - Age
  - Obesity
  - Lack exercise
  - Abdominal masses
  - Hypo/hyperthermia
  - Environmental stressors

- **Clinical signs**
  - Usually more severe in smaller species
  - Depressed, quiet, lethargic
  - Tachypneic, dyspneic
  - Wide stance, not perching
  - Paresis, paralysis (uni or bilateral)
  - Abdominal or cloacal swelling
  - Palpable mass
  - Straining
  - Change in droppings: reduce size and #, loose droppings

- **Complications**
  - Space occupying effect
    - Circulatory disorders/shock
    - Compression of pelvic nerves
    - Renal compromise
  - Pressure necrosis of oviduct with possible rupture and peritonitis

- **Diagnosis**
  - History
  - Clinical signs
  - Palpable egg
Radiographs: box shot or orthogonal
Ultrasound: good for unshelled egg
Baseline blood tests: check Ca, protein, WBC count, renal and metabolic status

**Treatment**

**Supportive care**
- Should precede any other treatments
- Quiet, dark, humid incubator +/- oxygen
- Fluids: SC, IV or IO depending on severity
- Calcium
  - Needed uterine contraction, shelling, etc.
  - IM calcium gluconate or glubionate
- Nutrition
  - Oral dextrose or feeding formula
  - Vitamins A, E and D
- Antibiotics and analgesics PRN

**Hormone treatment**
- Calcium supplementation necessary BEFORE use
- Contraindicated if suspected ectopic shelled egg, uterine disease (torsion, obstruction) or adhesions
- PGE₂
  - Uterine contraction and vaginal relaxation
  - Place directly into cloaca
- Oxytocin
  - Uterine contraction without vaginal relaxation
  - 5 IU/kg IM, repeat in 30 minutes

- If bird is stable but no egg in 24 hours → manual expression
  - Under sedation or anesthesia
  - Dilate cloaca and vagina and lubricate
  - Slow, steady pressure cranial to egg
  - Watch respirations!!

- If egg cannot be manually removed → ovocentesis
  - Percutaneous or through cloaca opening
  - Use large gauge needle to remove contents
  - Collapse egg
  - Remove fragments or allow to pass (beware of sharp edges)
  - Can flush cloaca/oviduct
  - Confirm complete passage shell (radiograph)

**Salpingohysterectomy**
- Recommended in cases of:
  - Uterine rupture
  - Uterine torsion or constriction
  - Abdominal masses
  - Multiple eggs
  - Cranial eggs
  - Medical management failure

**Prolapsed Oviduct**
- Prolapse of uterus alone (longitudinally striated) or with vagina or cloaca
- Causes:
  - Chronic egg laying
  - Sequela of egg-binding
  - Salpingitis/metritis/hyperplasia
- Can become damaged, devascularized
- Treatment
  - Depends on cause and degree of prolapse (identify cause!)
  - Prognosis is good if short term and/or short length
Damaged and devitalized tissue requires salpingohysterectomy
- 1. Clean, lubricate and keep moist
- 2. Remove egg if present
- 3. Can use sugar or 50% dextrose to reduce tissue swelling
- 4. Replace by gently inverting with Q-tip (may take several attempts)
- 5. Place cloacal stay sutures if necessary (may be kept for 3-4 days)
- 6. Hormonal treatment to interrupt egg laying
- 7. Antibiotic and anti-inflammatory treatments

**Egg Yolk Peritonitis**

- Sterile vs. septic (poor prognosis)
- Caused by release of egg yolk (ovum) into coelomic cavity secondary to:
  - Ectopic ovulation
  - Salpingitis/metritis
  - Ruptured oviduct
  - Stress
- **Diagnosis**
  - History: recent egg laying
  - Clinical signs
    - Lethargy, weakness, depression
    - Anorexia
    - Abdominal swelling
    - Respiratory signs
  - Baseline blood tests: ↑ WBC, Ca, protein, cholesterol
  - Radiographs
    - May see egg
    - Enlarged reproductive tract
    - Poor abdominal detail/ascites
  - Ultrasound
    - Abdominal fluid and fibrin
    - Eggs or uterine enlargement
  - Abdominal Tap
    - Definitive diagnosis
    - Cytology: inflammatory cells, large round yolk droplets
    - C+S
- **Treatment**
  - Medical
    - Supportive care
    - Antibiotics
      - Long term
      - Based on C+S (E. coli, Staph, and Yersinia common)
    - NSAID’s
    - Abdominocentesis
    - Reduce or interrupt hormonal stimulation
  - Surgery
    - Severe accumulation of yolk
    - Treatment primary cause egg yolk peritonitis

**Salpingitis and Metritis**

- **Definitions**
  - Salpingitis- affecting oviduct
  - Metritis- affecting uterus only
- **More common in older hens**
- **Causes**
  - Usually ascending infection
– Also air sacculitis, pneumonia, liver disease
– Common organisms
  • *E. coli*, *Streptococcus*, *Mycoplasma*, *Salmonella* and *Pasteurella*
  • Paramyxovirus (Newcastle disease)

• Clinical signs
  – Usually nebulous
  – Bloody droppings, broody behavior, abnormal shaped eggs, decreased egg laying
  – Embryonic death

• Diagnosis
  – CBC (leukocytosis)
  – Imaging (enlarged oviduct)
  – Cytology and C+S
  – Biopsy

• Treatment
  – Antibiotics (C+S)
  – Reduce/interrupt hormonal stimulation
  – Salpingohysterectomy may be required

Oviduct Impaction

• Occurs secondary to metritis, egg binding, neoplasia, cystic hyperplasia
• Impaction
  – Caseous material
  – Misshapen or partially formed eggs

• Clinical signs
  – May be mild
  – Anorexia
  – Abdominal swelling
  – Constipation vs. diarrhea
  – Egg laying behavior with no eggs
  – Cessation of laying

• Diagnosis
  – Radiographs: may see swelling or partially shelled egg
  – Ultrasound: enlarged oviduct, soft or non-shelled eggs
  – Surgery or endoscopy: may be necessary for definitive diagnosis

• Treatment
  – Supportive care
  – Antibiotics (C+S)
  – NSAID’s
  – Hormonal treatment and reduced stimulation breeding
  – Surgery if/when stable

Neoplasia

• Most common ovarian than oviduct
• Causes
  – Often unknown
  – May be related to chronic egg laying, hormones, etc.
• Complications: egg binding, EYP, oviduct impaction
• Clinical signs
  – Ascites
    • Many tumors are effusive
    • Space occupying effect
  – Coelomic enlargement
  – Dyspnea
  – Paresis/paralysis (usually left due to nerve compression)
• Diagnosis
  – Radiographs
  – Ultrasound
  – Biopsy or FNA
  – Endoscopy
  – Surgery

• Treatment
  – Medical
  – Surgical
  – Salpingohysterectomy, ovariectomy
  – Cryosurgery, anti-angiogenesis

References and Further Reading


Mayer J, Donnelly T. Clinical Veterinary Advisor. Birds and Exotic Pets. Elsevier, St. Louis, Missouri, 2013 (several chapters)
