THE URINARY SYSTEM

ANIMAL AROMATHERAPY SPECIALIST CERTIFICATION LEVEL 2 TRAINING

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THE URINARY SYSTEM - AGENDA

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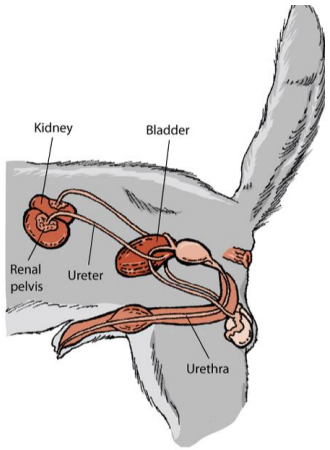
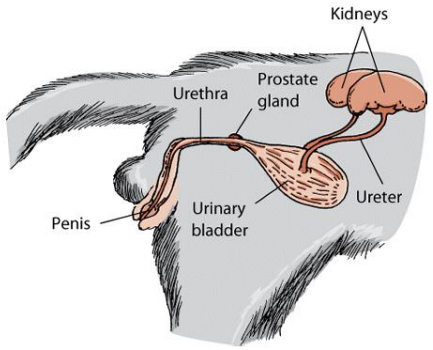
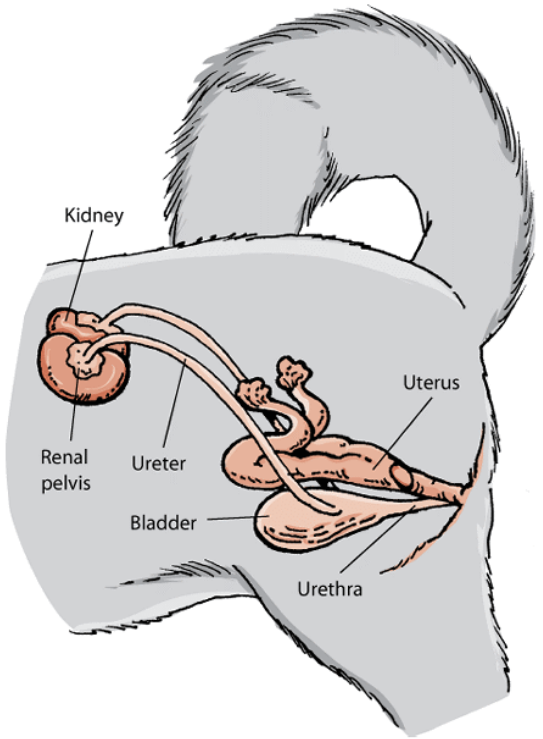
THE URINARY SYSTEM - INTRODUCTION

- Consists of Kidneys, Ureters (Kidney to bladder), Bladder, and Urethra.
- Functions
  - Eliminates waste products of metabolism
  - Maintains constant extracellular environment through conservation and excretion of water and electrolytes
  - Production of hormones erythropoietin and renin which regulate blood cell production, blood pressure, and sodium reabsorption
  - Metabolism of Vitamin D







INFORMATION HELPFUL TO OBTAIN WITH THE URINARY SYSTEM

- Complete history including
  - Current medications and supplements
  - Appetite
  - Diet
  - Changes in body weight
  - Previous illness or injury
  - Drinking habits
  - Urination frequency and amount
  - Appearance of urine | Smell
  - Changes in behavior
- Physical Exam | Observations
- Rectal Exam (Veterinarians only)
- Veterinary Testing
  - CBC
  - Blood Chemistry
  - Urinalysis +/- Urine Culture & Sensitivity
  - Blood gas analysis for acid-base status
  - Blood Pressure
  - Radiographs and/ or Ultrasound
  - Etc.

INFECTIOUS DISEASES

- Common organisms: E. coli, Staphylococccus, Enterococcus, Streptococcus
- Less common: Klebsiella, Proteus, Pseudomonas, Candida (chronic antibiotics or immunocompromised)
- Leptospirosis, Blastomycosis, Aspergillosis, Protothecosis – kidney is a common site for these systemic infections
- **Predisposing Factors**: Urine Retention, immunocompromised, inadequate urine concentration, glucosuria, concurrent diseases such as Cushings or Diabetes, Recent birthing, Decreased water consumption (winter)
- **Cystitis** – inflammation and infection of the Urinary Bladder (aka: Bladder infection, UTI)
  - Blood in urine, increased frequency of urination, difficulty urinating, urinating in inappropriate places, urinating small amounts
- **Pyelonephritis** – infection of the kidneys (ascending from the bladder usually although systemic circulation possible)
- **Kidney Worm** – parasite – often requires significant management in the breeding program to eradicate (swine)
- **Acute Interstitial Nephritis, Glomerulonephritis, and Vasculitis** – Leptospirosis, Leishmaniasis, Lyme Disease, occasionally Toxoplasmosis.
- Oils to use: Antibacterial, Antifungal, Antimicrobial oils depending on what is causing the infection – Lemongrass, Cedarwood, Geranium, Bergamot, Juniper Berry, Sandalwood, Thyme, Oregano, Marjoram, Cinnamon, Clove, Basil. Anti-inflammatory oils – Frankincense, Copaiba, Turmeric

NON-INFECTIOUS DISEASES

- Bladder tear or rupture (foals) – Trauma (often from birth) – surgery required
- Renal Dysfunction – Azotemia is having excess nitrogen in the blood which may be pre-renal (dehydration, CHF, Shock), Renal, Post-renal (disruption of the urinary tract such as obstruction or bladder rupture) or mixed
- Chronic Kidney Disease – progression (over months to years) of renal structure. 4 stages (next slide)
- Acute Kidney Injury – toxins such as ethylene glycol, hypercalcemia, aminoglycoside antibiotics, ischemia due to coagulation issues, NSAIDS, etc.
- Addressing Renal problems in animals:
  - #1 – Diet – Moderate proteins with high biological value, LOW in Phosphorus, LOW salt (hypertension), potassium supplementation, focus on maintaining body weight, low in Vitamin D
  - Renal support oils: Diuretics and Anti-inflammatory oils such as Juniper Berry, Copaiba, Sandalwood, Cedarwood, Frankincense
  - Water – Increased dietary water (Subcutaneous fluids may be needed depending on the stage of disease)

Disease Stage	Physical Conditions	Signs	Treatment
Stage I	Damage to the kidney is occurring, but waste chemicals in the blood are not abnormally elevated (azotemia not present).	No easily visible signs. Laboratory or other tests required but may not show abnormalities.	Identify and treat cause of kidney disease and any complications (such as high blood pressure or urinary tract infections). Ensure adequate water intake.
Stage II	Slowing of waste filtering to <25% of normal. Buildup of waste chemicals and imbalance of water in urine.	Dog may be urinating more than previously, but other clinical signs of kidney disease are not yet present. Tests show increased amount of waste chemicals in blood.	Treat underlying cause and complications of the condition. A change of diet may be required (such as a low salt or other special diet). Ensure adequate water intake.
Stage III	Further loss of kidney filtering ability; blood and urine show further buildup of waste chemicals.	Excessive thirst and urination.	Support dog with kidney disease diet, monitor for infections, and treat underlying cause and complications of kidney disease.
Stage IV	Severe loss of kidney filtering ability. Toxic chemicals build up in blood and affect other organs in the body.	Vomiting, depression, loss of appetite, weight loss, dehydration, mouth sores, diarrhea. Young dogs may lose teeth. Bones can become soft and easily breakable.	Provide special diet. Treat underlying conditions. Provide comfort care. Administration of intravenous or subcutaneous fluids may be necessary. In severe cases, kidney dialysis or a kidney transplant might be possible.

STONES | CRYSTALS

- Crystals are microscopic but are mineral solutes that may aggregate and grow to a size that can be seen via ultrasound or microscope and then they are referred to as uroliths, calculi or stones.
- Urolithiasis is a general term referring to stones located within the urinary tract – they can develop in the Kidney, Ureter, Bladder, or Urethra.
- Made up of different minerals – which require different diets aimed at altering the pH of the urine – **ALL of them require more water in the diet** due to increased concentration of urine which potentiates the crystal and stone formation. Stone common in dogs:
  - **Struvite**: Urine too alkaline often caused by too much grain or vegetable in the diet – recommend red meat based diets to acidify the urine
  - **Calcium Oxalate**: Urine too acidic and concentrated – recommend more water in diet and poultry based – low oxalate, low protein, and low sodium diet, with possible potassium citrates supplementation and B vitamins.
  - **Urate**: common in dalmatians or dogs fed too high of protein in their diets with liver issues. Urine too Acidic – recommend supplementation with potassium citrate, and a low purine, low protein diet
  - **Cystine**: Urine too acidic – give Protein restricted alkalinizing diet
  - **Silica Stones**: Diets too high in plants that are high in silica – add diuretic oils and salt and water to the diet. Avoid plant proteins in diet.
- Oils to help: Diruetic oils, Anti-inflammatory oils, Analgesic Oils

FLUTD (FELINE LOWER URINARY TRACT DISEASE – AKA FELINE UROLOGIC SYNDROME)

- Blood in the urine, increased frequency of urination, and difficulty urination = classic FLUTD
  - May be caused by UTI, Neoplasia, Sterile cystitis (stress related often), Trauma, Urethral plugs, etc.
- Stones common in cats:
  - Calcium Oxalate
  - Struvite
  - Ammonium Urate
  - Uric Acid

- Oils for FLUTD – if underlying cause is known, start there
  - Melissa, Frankincense, Juniper Berry, Copaiba
  - Calming oils to decrease stress in the environment

OBSTRUCTIONS

- This requires veterinary intervention and should be considered and emergency in any species.
- Urolithiasis in horses: less common than small ruminants or steers, usually Calcium Carbonate – not observed until they become a problem and require surgery
- Urolithiasis in Ruminants: Cattle, Sheep and Goats commonly occur. When they cause an obstruction, usually in the Urethra of castrated males, it can cause abdominal pain, perforation or bladder rupture, and death by uremia or septicemia.
  - Diets high in calcium (clover) result in calcium carbonate stones
  - Ruminants grazing on silica-rich soil are predisposed to form silica uroliths
  - Castration of young males predisposes them to urolith-induced urethral obstruction by removing hormonal influences necessary for mature development of the penis and urethra
- Passing a catheter and possible surgery is required by a veterinarian in these cases.
- Oils after veterinary intervention should be focused based on the type of stone present, diuretic and anti-inflammatory oils.

INCONTINENCE

- Disorder of Micturition = incontinence
- May involve the nervous system and/or the musculoskeletal system as well
- Dysfunction in the storage or voiding of urine
- Failure of voluntary control of urination either with constant or intermittent unconscious passage of urine.
  - Don't know it's happening usually
  - May leave a pool of urine where they have been lying or dribble urine while walking
- Failure of urine storage may be due to failure or bladder relaxation, urethral incompetence, anatomic defects (usually seen at a fairly young age) or overflow of stored urine.
- Urge incontinence is often seen with muscle inflammation, cystitis.
- Decrease in sex hormones in spayed females = hormone responsive urethral incontinence
- Neurologic causes may be due to lesions in the spinal cord, muscle innervation, brain or brain stem lesions, or other causes.
- Oils to stimulate the nervous system and detrusor and sphincter muscles: Helichrysum, Lemongrass, Copaiba, Marjoram
- Oils to support the urinary system: Copaiba, Juniper Berry, Lemongrass, Sandalwood
- Diuretic oils: Cypress*, Celery Seed, Lemon, Rosemary

NEOPLASIA

- Usually in middle aged to older animals – primary renal neoplasms are rare
- Renal Carcinoma – metastasize early – both kidneys, lungs, liver and adrenals are commonly involved
- Nephroblastoma – seen in young animals and are often diagnosed at less than a year of age – more common in males than females
- **Transitional Cell Carcinoma** may occur anywhere in the urinary tract
- Other rare primary renal neoplasms: Hemangiosarcoma, fibrosarcoma, leiomyosarcoma, and squamous cell carcinomas
- The kidney as a filtering organ makes it a common site for metastasis of other neoplasms – lymphosarcoma has renal lesions approximately 50% of the time in dogs and cats
- Symptoms of renal neoplasia: weight loss, anorexia, depression, fever
- Lower Urinary tract neoplasia: Transitional Cell Carcinoma is by far the most common, SCC, Adenocarcinoma, fibrosarcoma and others have also been found.
  - Symptoms of Lower urinary tract neoplasia: blood in urine, painful urination, difficulty urinating, increased frequency of urination
- Essential Oils that may help
  - **Anti-tumoral oils**: Frankincense, Sandalwood, Pink Pepper, Copaiba, Lemongrass
  - **Anti-inflammatory** or Analgesic oils for inflammation and pain: Lavender, Frankincense, Copaiba, Turmeric, Helichrysum, Yarrow, Ginger, Lemongrass, Bergamot, Roman Chamomile
  - **Antioxidant Oils** – Clove, Thyme, Marjoram, Chamomile, Lavender, Rose

Differential effects of selective frankincense (*Ru Xiang*) essential oil versus non-selective sandalwood (*Tan Xiang*) essential oil on cultured bladder cancer cells: a microarray and bioinformatics study

Mikhail G Dozmorov,[1] Qing Yang,[2] Weijuan Wu,[2,3] Jonathan Wren,[1] Mahmoud M Suhail,[4] Cole L Woolley,[5] D Gary Young,[5] Kar-Ming Fung,[2,6,7] and Hsueh-Kung Lin[2,3,8]

The effects of frankincense and sandalwood essential oils on J82 cells and UROtsa cells involved different mechanisms leading to cancer cell death. While frankincense essential oil elicited selective cancer cell death via NRF-2-mediated oxidative stress, sandalwood essential oil induced non-selective cell death via DNA damage and cell cycle arrest.

Frankincense oil derived from *Boswellia carteri* induces tumor cell specific cytotoxicity

Mark Barton Frank,[1] Qing Yang,[2] Jeanette Osban,[1] Joseph T Azzarello,[2,3] Marcia R Saban,[3] Ricardo Saban,[3] Richard A Ashley,[2] Jan C Welter,[4] Kar-Ming Fung,[5] and Hsueh-Kung Lin[2,3,6]

STELLA

- Stella had 1 large stone that took up a large portion of her bladder, seen on x-ray. With this protocol, it broke into 3 smaller stones and then completely resolved without surgery!
- Beef and organ meat raw diet with digestive enzymes, probiotics (raw kefir) 2 oz of organic vegetables twice a day, Vitamin C (ascorbic acid) supplementation, Omega 3 supplementation, Urinary Gold from Pet Wellbeing, Cranberry* supplementation and a multivitamin.
- 2 drops each of Frankincense, Copaiba and Turmeric and 1 drop each of Zendocrine blend and OnGuard blend in a capsule twice daily.
- Juniper Berry, Copaiba, Frankincense topically 2-3 times daily at 3% dilution
- Adding water to meals

*** Cranberry helps inhibit the attachment of bacteria and assists voiding of any contaminants with normal urination**

GOUT IN BIRDS & REPTILES

- Gout is the abnormal deposit of uric acid crystals in in the body. Uric Acid is produced by the liver and excreted by the kidneys. When uric acid builds up in the body, it crystallizes and can damage tissues with this build up.
- Common in Parrots and Reptiles like turtles that are being fed an unbalanced diet
  - Too much protein in the diet (over 20-25%)
  - Diets too high in calcium or Vitamin D3
  - Diets too low in Vitamin A
- Place animal on a low protein diet
- Anti-inflammatory oils, analgesic oils, and oils to support liver and kidney: Copaiba, Juniper Berry, Frankincense, etc.

QUESTIONS?