Calcium Oxalate Urolithiasis

-Many breeds are predisposed to calcium oxalate stones, include the Shih Tzu, Bichon Frise, Miniature Schnauzer, and Yorkshire terrier

Recommended Diagnostics

- CBC and Serum Chemistry
  - Not a priority if trying to save money and patient is well otherwise
  - Consider renal panel if unwell or inappetent or if urine specific gravity is <1.020
  - If confirmed calcium oxalates, check ionized calcium to rule out hypercalcemia as a cause
- Urinalysis
  - Calcium oxalates typically form in urine with pH <6.5
  - Crystalluria may not be present even in the presence of a urolith.
- Urine culture
  - Calcium oxalate stones are usually sterile
- Abdominal radiographs
  - About 30-40% of nephroliths in dogs are calcium oxalates

Treatment

- Calcium oxalates cannot be dissolved but medical management may prevent them from recurring or enlarging. Removal of existing stones via surgery or voiding urohydropropulsion is recommended.

- Urinary diet
  - Maintenance diet for calcium oxalate: Royal Canin SO, Purina UR ST/OX, and Hill's w/d
  - Use canned food or soak dry kibble to increase water consumption/promote urine dilution
- Urinary alkalinizers
  - Potassium citrate may be needed along with maintenance diet to achieve urine pH of 7.0-7.5
    - 50-75 mg/kg PO q12h
- Increased water consumption
  - Canned food

    - Add water to food
    - Aim for a urine specific gravity goal of <1.020

- Antibiotics if culture positive
    - Treat based off MIC for a minimum of 4-6 weeks in presence of stones
    - Cheaper antibiotic options are usually available per the MIC
        - Remember Enterococci are inherently resistant to most cephalosporins
- Voiding urohydropropulsion
    - Successful for stones measuring 1-3 mm in male dogs and 10-15 mm in female dogs
    - Consider if owner cannot afford surgery and stones of unknown type are not dissolving with diet trial OR if they are known to be calcium oxalates
    - Procedure: Under anesthesia, catheterize bladder and remove urine. Then distend bladder with saline and invert patient (legs in air) while squeezing the bladder to force the stones out.
        - Always submit for analysis. It's cheap!

Monitoring/Prevention

- Recheck urine and culture 1 week after finishing antibiotics for UTI
- Perform abdominal radiographs if crystals present in sediment to check for stones
- Recheck urinalysis every 3 months
    - Keeping urine pH 7.0-7.5 is key to prevention
        - Avoid any acidifiers (Vitamin C, cranberry, etc)
        - Recurrence is common with calcium oxalates
            - Possible reasons for recurrence are hyperadrenocorticism, increased consumption of leafy greens and nuts (contains oxalate), metabolic acidosis, vitamin B6 deficiency, or hypercalcemia. Consider testing for or addressing these with recurrent calcium oxalate stones.
            - Other things to try for recurrent calcium oxalate stones
                - Hydrochlorothiazide 2-4 mg/kg PO q12h
                    - Do not give if hypercalcemic
                - Vitamin B6 2 mg/kg PO daily
                - Probiotics (some bacterial species degrade intestinal oxalate)

**If finances are severely limited and stone type is unknown, may try a month of amoxicillin, cephalexin, ciprofloxacin, or TMS and either Hill's s/d diet or a urinary acidifier. If stone is not smaller in one month, stone is likely not struvite. **