


Otitis Externa: Diagnostic and therapeutic updates

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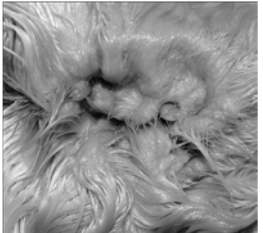


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Top 10 Most Common Medical Conditions

Top Dog Conditions


1. Skin Allergies
2. Ear Infection
3. Non-cancerous Skin Mass
4. Skin Infection
5. Arthritis
6. Upset Stomach/Vomiting
7. Periodontitis/Dental Disease
8. Diarrhea/ Intestinal Upset
9. Bladder/Urinary Tract Disease
10. Soft Tissue Trauma
(Bruise or Contusion)



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Minimize client frustration

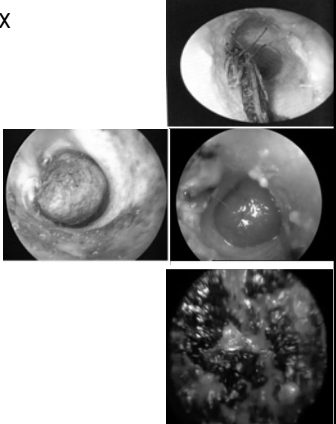
- ACVD client survey
 - clients give general practitioners three (3) attempts at controlling/resolving skin issues before seeking another opinion from another general practitioner or a specialist.
- 10 Steps to successful treatment of otitis externa



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1. Address easiest to ID/TX underlying etiologies:

- Foreign bodies
- Trauma
- Abnormal anatomy
- Ear canal tumours
- Parasites
- Excessive moisture
- Atopic dermatitis
- Adverse reaction to food
- Hypothyroidism



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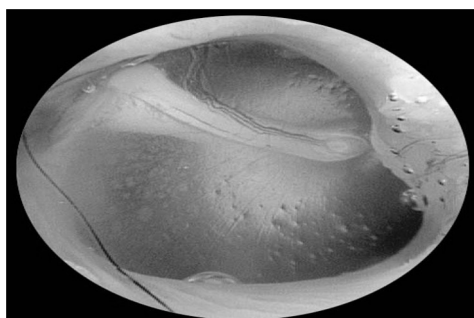
Diagnostic Tools

- Complete history and dermatologic exam
- Smell ☹️ and visual appearance of discharge??
- Visual inspection
 - Hand held
 - Use of larger instruments e.g. culettes w/surgical head
 - Video-otoscopes
 - Welch Allyn Digital Macroview Vet Otoscope, Schering-Plough
 - MDScope® MS 101, Borderlink
 - Video-otoENDOScope, MedRx or Storz
 - Capture view for telemedicine consultation and client CE



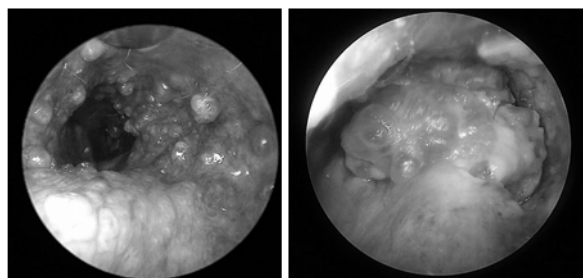

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Video-otoendoscopy



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Inflammatory Polyps vs Ceruminous gland adenoma



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Isoxazolines address ALL ectoparasites including Otodectes cynotis



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2. Address next top 3 underlying etiologies for chronic recurrent otitis externa

- ❑ Foreign bodies
- ❑ Trauma
- ❑ Abnormal anatomy
- ❑ Ear canal tumours
- ❑ Parasites
- ❑ Excessive moisture
- ❑ Atopic dermatitis
- ❑ Adverse reaction to food
- ❑ Hypothyroidism



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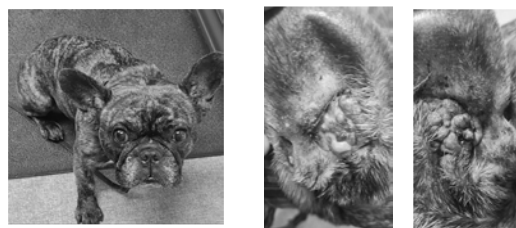
Adverse Food Reaction



24% of food allergic patients present with otitis externa as the ONLY presenting clinical sign

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Proliferative Otitis Externa On Apoquel and Cytopoint



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Proliferative Otitis Externa

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The "4-week" Dietary Trial

- Increase owner acceptance
- GOAL**
- At least 50% reduction of clinical signs in 4-weeks
 - ▣ If NOT → Change the diet
 - ▣ If positive response noted → owner is more willing to continue for total of 8-12 weeks
- 100% restriction REQUIRED

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Unusual signs of Hypothyroidism

- Muscle atrophy
- Facial nerve paralysis
- Acral lick granuloma
- **Ceruminous otitis externa**
- ACL rupture
- Laryngeal paralysis/voice
- Megaesophagus
- Corneal lipid deposits
- Cardiomyopathy
- Peripinnal hyperkeratosis

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Hypothyroid - Peripinnal hyperkeratosis

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3. Cytology is the pillar to successful treatment of otitis externa

- ▣ Ear cytology best diagnostic tool to ID microbes

Peggy's Cove Lighthouse , Nova Scotia, Canada

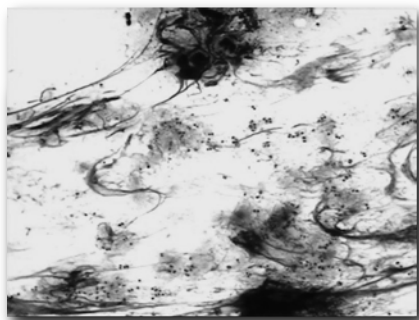
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Diagnostic Otology

- Cytology ★★★★★
 - ▣ Heat fix and DiffQuik®
 - ▣ Provides information about the inflammatory response
 - ▣ Helps direct appropriate therapy
- ▣ **Cocci:** generally Staphylococcus or Streptococcus
- ▣ **Rods:** generally Pseudomonas>>Coryne, Proteus>>E. coli
- ▣ **Yeast** is typically Malassezia, but can be Candida.
- ▣ **Drug Reaction** w/neutrophils and no bugs
- Radiography
 - ▣ CT scan (e.g. VetCat®, Xoran) is best option
 - Biopsy
 - ▣ To diagnose a tumour or confirm proliferative tissue

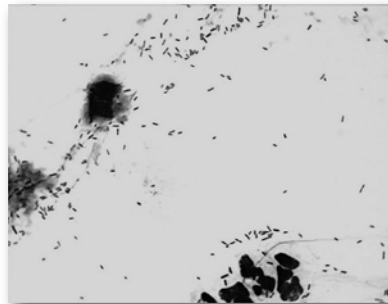
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Cytology - cocci, neutrophils, 1 yeast



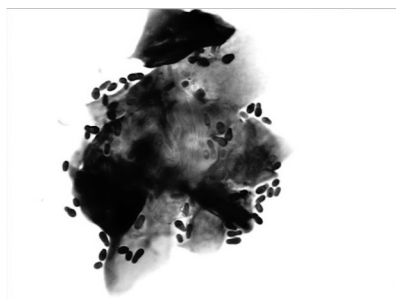
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Cytology – rods, neutrophils



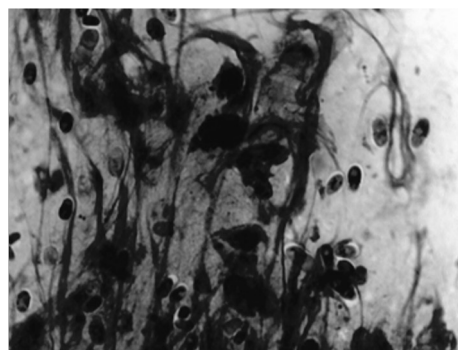
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Cytology - Malassezia



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Cytology - Yeast engulfed in neutrophils... likely Candida albicans



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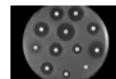
4. Don't fall into the C&S trap



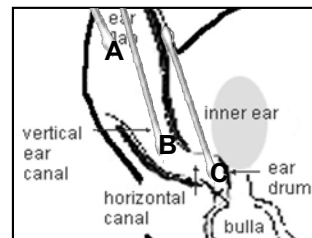
Floating Iceberg off the coast of Newfoundland, Canada

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The Culture Debate



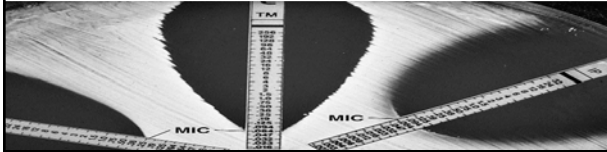
- Sampling issues
 - ▣ Location; location; location
 - ▣ transport/sample processing
- Laboratory issues
 - ▣ Culture technique
 - ▣ Heteroresistance
 - ▣ Lack of repeatability
- Interpretation issues
 - ▣ Cytological + culture consistency → clinical relevance
 - ▣ Request drugs you are using
 - ▣ Sensitivity = serum drug level NOT topical meds



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Topical Otic Product Sensitivity Testing

- TOPS Study at OVC
 - ▣ Testing of "resistant" Pseudomonas and MRSP otitis patients
 - ▣ E-Testing various antibiotic concentrations from:
 - Aminoglycosides (Gentamicin, Mometamax®; neomycin, Tresaderm®)
 - Fluoroquinolones (Marbofloxacin, Aurizon®; enrofloxacin, Baytril Otic®)
 - Fusidic acid (Canaural®), polymyxins (Surolan®), Triz-EDTA®, others
 - ▣ TOPS panels versus Kirby-Bauer/MIC to select topicals



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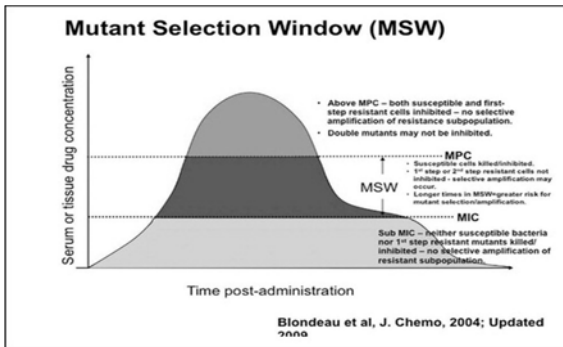
Pseudomonas

MRSP

Strain Number	Enrofloxacin (µg/ml)	Fluoroquinolones (µg/ml)	Gentamicin (µg/ml)	Marbofloxacin (µg/ml)	Neomycin (µg/ml)	Polymyxin B (µg/ml)	Spectinomycin (µg/ml)	Strain Number	Enrofloxacin (µg/ml)	Fluoroquinolones (µg/ml)	Gentamicin (µg/ml)	Marbofloxacin (µg/ml)	Neomycin (µg/ml)	Polymyxin B (µg/ml)	Spectinomycin (µg/ml)
BC1	1	1	1	1	1	1	1	BC1	1	1	1	1	1	1	1
BC2	1	1	1	1	1	1	1	BC2	1	1	1	1	1	1	1
BC3	1	1	1	1	1	1	1	BC3	1	1	1	1	1	1	1
BC4	1	1	1	1	1	1	1	BC4	1	1	1	1	1	1	1
BC5	1	1	1	1	1	1	1	BC5	1	1	1	1	1	1	1
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BC40	1	1	1	1	1	1	1	BC40	1	1	1	1	1	1	1

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Topical otic therapy achieve antibiotic concentrations that well EXCEED **Mutant Prevention Concentrations**



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TOPS testing – prelim Conclusions

Product Name	Antibiotic	Concentration of Antibiotic (µg/mL)
Canaural	Diethanolamine fusidate	5000
Baytril Otic	Enrofloxacin	5000
Mometamax	Gentamicin	3000
Posatex	Orbifloxacin	8500
Tresaderm	Neomycin	3200
Panalog	Neomycin	2500
Surolan	Polymyxin B	529.3

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Otitis

- So when should you sample using current culture techniques?
 - ① ▣ Chronic/recurring infections
 - ① ▣ Severe infections
 - ① ▣ Rods on cytology
 - ① ▣ Inflammatory cells on cytology
 - ① ▣ Topical treatment failure
 - ① ▣ Systemic treatment



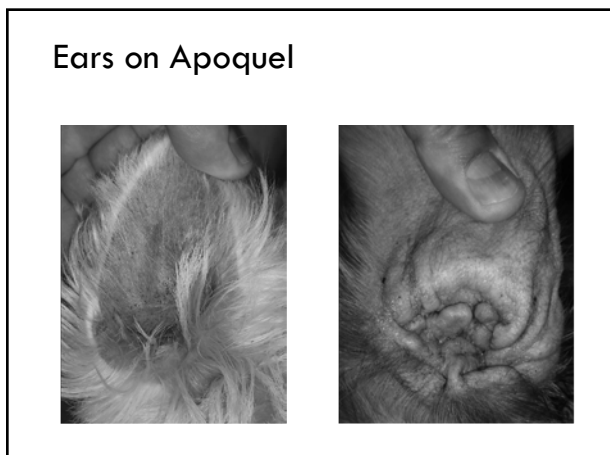
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5: Calm the microenvironment

- ▣ Steroids and/or Atopica – NOT Apoquel/Cytopoint
- ▣ Deliver appropriate volumes
- ▣ Claro or Osrurnia first line - helps improve compliance
- ▣ Vit E - 20 IU/kg TID - minimizes transient hearing loss



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Calming the microenvironment

Systemic:

- Dexamethasone – 0.05-0.1 mg/kg/d
- Prednisolone – 1-2 mg/kg/d
- Cyclosporine – 5 mg/kg/d

Topical corticosteroid safety ranking

1. Hydrocortisone, Mometasone
2. Prednisolone
3. Betamethasone
4. Fluononide, Triamcinolone
5. Dexamethasone

SAFEST
↓
GREATEST SIDE EFFECTS

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6. Breakdown Virulence factors *Pseudomonas*

- Gram negative rod
- Saprophytic
- Ubiquitous
 - Stagnant water, taps, drains, ear cleaners, solutions
 - Individual pipette cleansers
- Opportunistic
 - Immunocompromised patients
 - Allergies
 - Endocrinopathies
 - ChemoRx Medications

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Pseudomonas resistance

- Virulence factors:
 - Low cell wall permeability; B-lactamases; efflux pumps
 - Plasmid, transposon and bacteriophage transfer mutations
- Improper use of antibiotics selects for resistance
 - Failure to reach **effective concentrations** at tissue level
 - **Premature discontinuation** of antibiotics
 - Lack of **owner compliance/adherence** is important

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Tris-EDTA to breakdown biofilm

- Licensed for use in dogs AND cats
- Active ingredient
 - Salicylic acid 0.2% w/w
- Inactive ingredients
 - Diethylhexyl sodium sulfosuccinate
 - **Trometamol edetate disodium**
 - Chloroxyleneol
 - Propylene glycol
 - Hydrochloric acid
 - Pleasant fragrance

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Tris-EDTA mechanism of action

- Tris = Surfactant product → peptidoglycan breakdown
- EDTA = chelates Ca++ → porin channels open
- Instill 15 minutes prior to medicating

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7. Knowledge of Ingredients & VOLUME is Key Drop versus cc equivalent

WITH THESE FACTS IN MIND, WE RECOMMEND ADMINISTERING THE FOLLOWING TO ACHIEVE SUFFICIENT CONTACT AND CONCENTRATION OF EAR MEDICATIONS WHILE TREATING AN INFECTION:

Small dog or cat	e.g., Yorkshire terrier	0.25 ml	10 drops
Medium breed dog	e.g., Cocker spaniel	0.5 ml	20 drops
Large breed dog	e.g., Golden retriever	0.75 ml	30 drops
Giant breed dog	e.g., Newfoundland	1.0 ml	40 drops

- Opposite active ingredients
 - Effective against Pseudomonas
 - Switch withOUT duplication
 - Switch if adverse reaction
- Bottle/Syringe delivery
 - Volume coats canal
 - Dispense exact volume
 - Owner can see product
 - ALL meds given SID

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8. Use of MONTH-long topical otics

- The more you give a client to do,
The less compliance you will achieve
The more resistance we will see
- Take ear treatment out of owners' hands
 - Residual otics as FIRST LINE treatment for otitis externa
 - Allergy Tx is complicated, minimize client confusion

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Claro® (Elanco)

- FIRST LINE TREATMENT
 - Florfenicol **16.6mg/ml** (vs 10mg/ml)
 - Terbinafine **16.6mg/ml** (vs 10mg/ml)
 - Mometasone furoate **2.2mg/ml**
- Liquid formulation - ideal for stenotic ears
- ONE and DONE

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Administration

- Clean and dry the ear canal
- Shake the dropperette before use
- Remove the cap while holding the dropperette upright
- Turn the cap over and use it to break the seal
- Screw the applicator onto the dropperette
- Insert tip of dropperette into affected external ear canal
OR DRIP INTO EAR CANAL
- Use **0.5-1.0 ml** depending on size of pet's ears
- Massage base of ear to allow distribution

****Dr. Yu's adjustments**

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Case Selection

Claro® is indicated for the bacteria and yeast most commonly associated with otitis externa

Cytology


- Yeast: *Malassezia pachydermatis* (Most common/ routine)
- Cocci: *Staphylococcus pseudintermedius* (Most common/ routine)
- Rods: *Proteus mirabilis/ Pseudomonas* (EXTRA LABEL)

CLARO concentrations: 0.3cc, 0.4cc, 0.5cc, 0.6cc

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Osrurnia® - Dechra

- Florfenicol 10mg/ml
- Terbinafine 10mg/ml
- Betamethasone 1mg/ml
- 0.5-1ml per ear
 - Applied Day 0 and ????
 - Recheck 28 days after Day 7
- Staphylococcus
- Malassezia
- Pseudomonas only if...



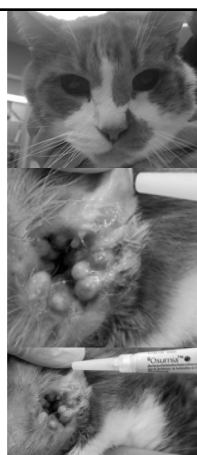
0.3cc
0.4cc
0.5cc
0.6cc

EXTRA LABEL

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Osrurnia®, Dechra

- 235 dogs with otitis externa
 - Double-masked field
 - N=159 OSURNIA; N=76 Vehicle
 - 64.78% vs 43.42% (p=0.0094) @ day 45
- Transient loss of hearing
 - Consider Vitamin E ~20 IU/kg TID PO esp 8y+
 - Oishi N et al. Orototoxicity in dogs and cats.VCNA. 2012;42(6):1259-1271
- EXTRA LABEL use in cats
 - ½ tube per ear



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Bercovitz GR, et al Long-lasting otic medications may be a rare cause of neurogenic keratoconjunctivitis sicca in dogs. JAVMA 2023; 261(1): 97-103

- **Retrospective study**
 - N = 29 patients - 76% small breed dogs
 - Onset neurogenic KCS within 1 day after application
 - Documentation of low STT (< 15 mm/min)
- **Findings:**
 - Return of clinically normal tear production = 24/29
 - Median time 86 days (19 to 482 days)
 - Corneal ulcer was diagnosed in 68% (20/29)
 - associated with a longer time to STT ≥ 15 mm/min.
- **CLINICAL RELEVANCE**
 - Good prognosis for return of normal tear production within 1 year.
 - Possibly 1.0ml too much for small breed dogs - vesiculation of TM??

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9. Three pronged approach to Yeast Otitis Externa

- 1) **Calm the microenvironment**
 - Oral steroid or cyclosporine
 - Potent topical steroid
 - Not absorbed systemically
- 2) **Address any infection**
 - Appropriate antimicrobial
 - Malassezia vs Candida
- 3) **Address underlying etiology**
 - HypoT4, Atopy, Food allergy



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Antifungal products

- MALASSEZIA spp.
 - Clotrimazole (Mometamax®, Aurizon®)
 - Enilconazole (Imaverol®)
 - Miconazole (Surolan®)
 - Silver Sulfadiazene (Baytril Otic®)
 - Posaconazole (Posatex® - USA)
 - Terbinafine (Osrurnia®, Claro®)
 - Systemic: ketoconazole, itraconazole, fluconazole, terbinafine
- CANDIDA spp.
 - Nystatin
 - (Canaural®, Panalog®)



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10. Maintenance Otic Therapy

- Pending cytology findings
 - If cytology has abnormal levels of yeast or bacteria
 - Monthly Claro
 - Monthly Osrurnia
 - If cytology is normal and ear canals are inflamed
 - Twice weekly Cortavance
 - Daily to every other day Burow's HC
 - +/- Monthly Claro or Osrurnia

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What about Burow's HC solution

- Karl August Burow (1809-1874)
- Surgeon and anatomist
- Burow's Solution, Compounded
 - 1% Hydrocortisone
 - 2% Burow's solution (aluminum acetate)
 - Propylene glycol (NOT acetic acid)
- Good for maintenance
- Anti-inflammatory
- Some antimicrobial



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Can topical hydrocortisone aceponate effectively control allergic otitis externa and reduce the risk of recurrence? A double-blinded, placebo-controlled, prospective study

BERGVALL KE et al, ESVD 2017 page 251

- 0.5 ml HCA once daily for 7 to 14 days then...
- HCA or placebo - 2 days/week for 16 weeks
 - 41 dogs (100%) in treatment improved
 - 38 dogs went onto maintenance
 - 82% of HCA - free of clinical signs
 - No adverse events of long-term HCA



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ONCE MONTHLY TOPICALS

- Consider using Claro/Neptra or Osrurnia monthly
- Future direction for Dechra and Elanco:
 - Claro-M - with mometasone only
 - Claro-MT - with mometasone and terbinafine
 - Osrurnia-B - with betamethasone
 - Osrurnia-BT with betamethasone and terbinafine

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Questions?

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6 Themes

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- Dermatology and One Health
- Immunodermatology
- Innovations in Dermatology
- Otolaryngology
- Skin Biology in Health and Disease

We invite you to join us!
WAVD
WORLD ASSOCIATION FOR
VETERINARY DERMATOLOGY

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