Tricks for tricky ears: treatment, complications and management of chronic otitis

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IDEXX

Disclosure Ariane:
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The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical exam and presentation, and laboratory data. With respect to any drug therapy or monitoring program, you should refer to a product insert, for complete description of dosage, indications, interactions, and cations, Diagnosis, treatment, and monitoring should be patient specific and is the responsibility of the veterinarian providing primary care.

ILOs

- To identify strategies to avoid complications from otitis

- To understand what information is provided in the microbiology report and how it can be used in treatment of otitis

- To develop treatment regimens adapted to the individual patient

- To recognize the role of analgesia in the management of ear disease

Otitis

Very common clinical presentation

Common reason to change practice

Acute vs chronic

Unilateral vs bilateral

Can be extremely painful !

→ fear aggression/avoidance common!

Otitis clinical signs

- Head shaking
- Smell
- Scratching ear
- Acute moist dermatitis behind ear
- Head tilt
- Rubbing ear
- Increased discharge

Pain
Fear agression
Behavious hanges
→ Get it right first time!

Dermatological Examination

Palpate ear canal

Otic discharge

- Brown coffee ground
  - Ear mites
- Pale yellow waxy
  - cocci, yeast, demodex
- Pale brown waxy
  - cocci, yeast
- Purulent maloderous
  - Pseudomonas
- Black watery or thick
  - Pseudomonas
- Thick chocolate colour
  - cornification defect/Malassezia & biofilm

Otoscopy

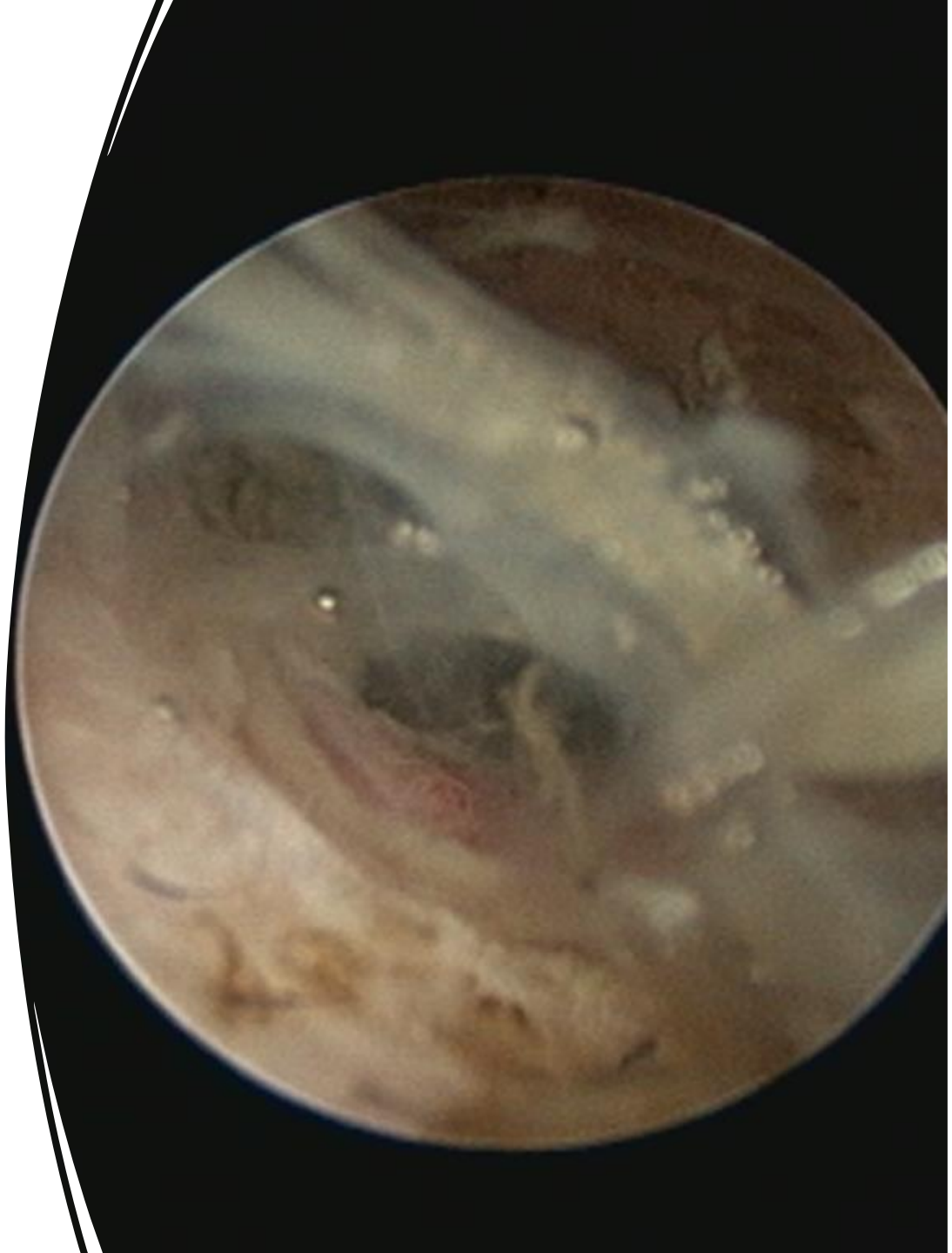
- Important way to examine patients with otitis
- Ask owners to train dogs from puppyhood
- Use in conjunction with other techniques (cytology)

- Warm up cone
- Nose down, pinna up

- Might require analgesia/sedation/GA if painful

- Pre-treatment with GCS to “open up” if needed

Pseudomonas



Cytology- Materials

Good quality microscope

Stain (Romanowsky-type, Methylene blue)

Immersion oil

Slides, cover slips

Cotton buds

Gloved finger

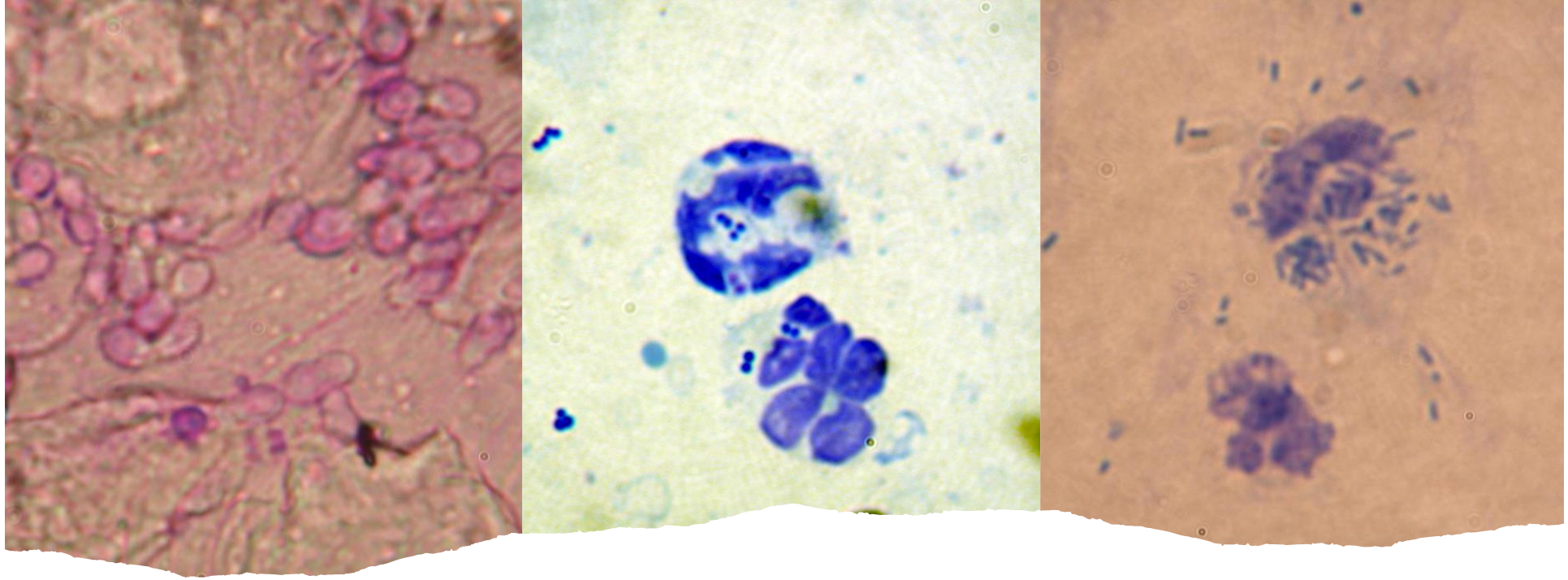
If patient head shy/fear aggressive

Massage ears

Distract

Slip finger in

Dab onto slide



Organisms

Which type?

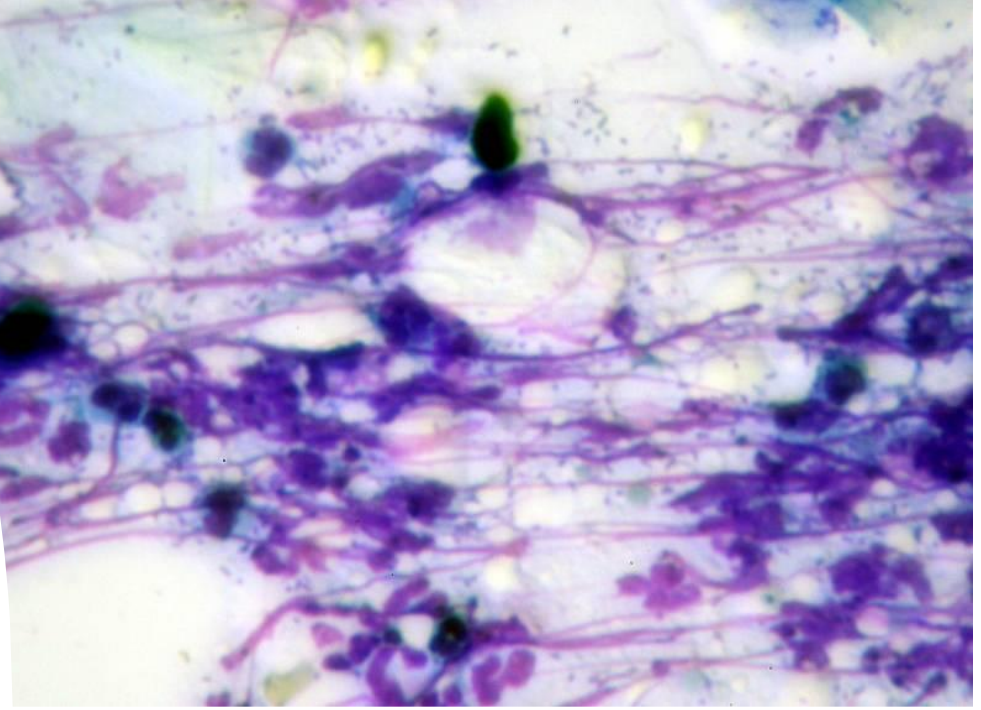
Bacteria/yeast?

Cocci/rods?

Normal numbers?

Infection/overgrowth?

Cytology vs culture/sensitivity

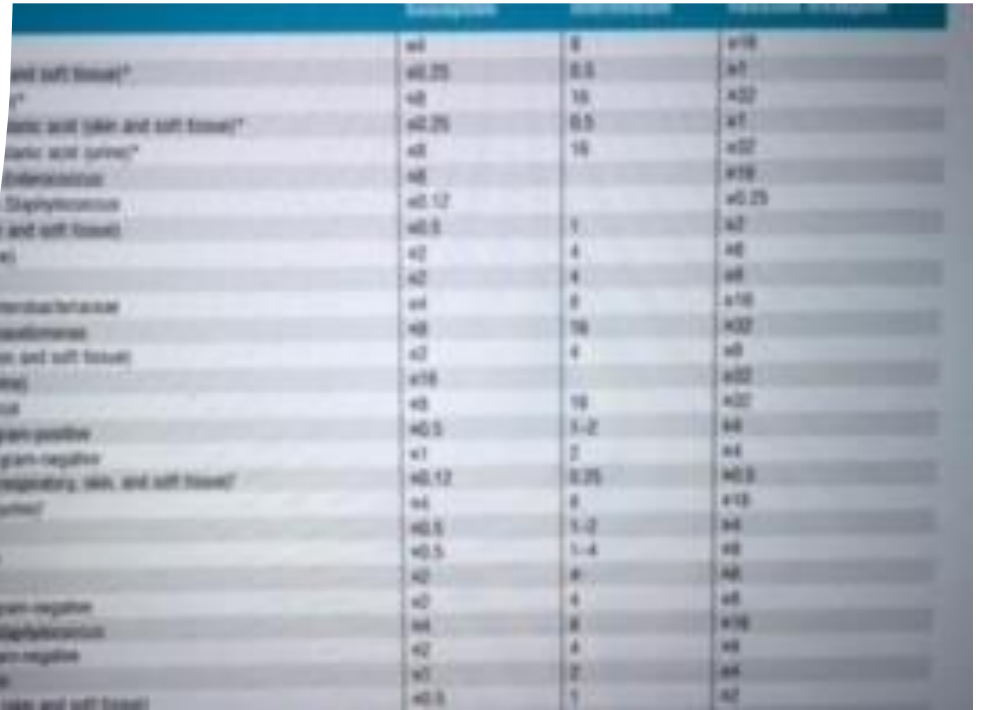


Cytology: for (almost) every case

C&S:

- when rods are seen
- when Tx not effective
- When middle ear disease present (systemic AB)
- With unusual organism morphology

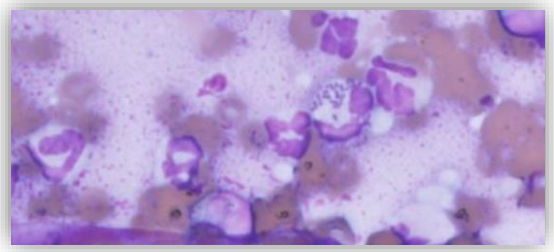
C&S cannot replace cytology



We can have discordant results …

Bacteria +/ WBC+ Culture negative

- Other causes of inflammation
- Bacteria nonviable
  - AM use
  - Extreme conditions (e.g. Temp; pH)
  - Lack of growth media
  - WBC inhibition
- "Pseudobacteria"
- Contaminated reagents
- Non-significant growth



Bacteria - / WBC- Culture positive

- Low bacterial numbers on cytology
- Lack of inflammation/reduced WBC migration
- Bacteria obscured by debris
- Growth of contaminants/ commensal flora
- Culture is more sensitive

Is Culture Beneficial?

IDEXX SERVICES: **CANA, EARSW**
SAMPLES RECEIVED: **Pink cap e-swab**

MICROBIOLOGY

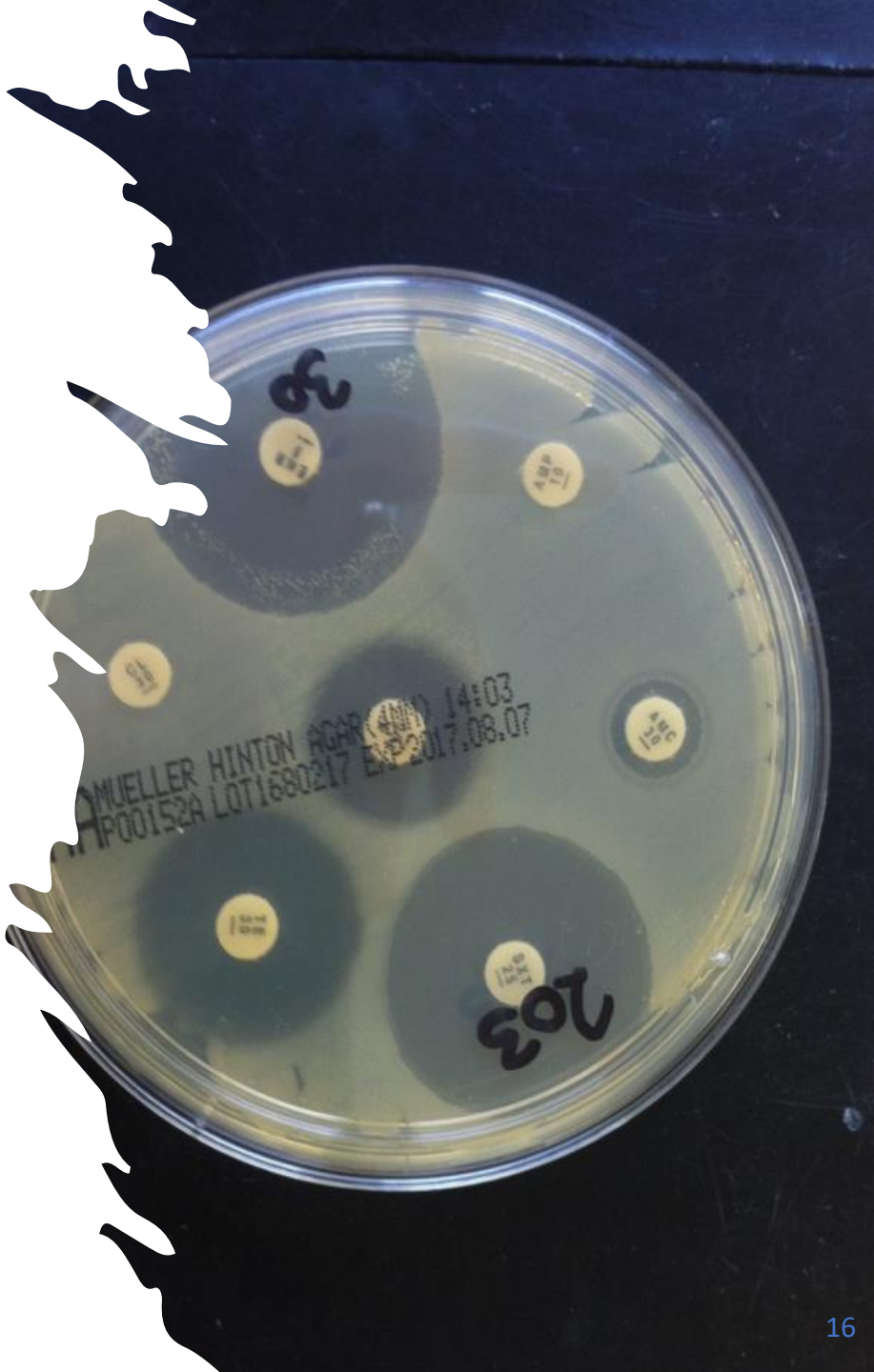
*Anaerobic Culture [a] — Moderate growth mixed anaerobes
*Site: — BOTH EARS :

Aerobic Culture - Ear

Isolate 1 — Profuse growth:Pseudomonas aeruginosa

Antibiotic	Result	MIC	Sensitivity Range		
*Amikacin	SENSITIVE	<=2	2	Ssssir	64
*Gentamicin	SENSITIVE	<=1	1	Sssir	16
*Ciprofloxacin	SENSITIVE	0.25	0.06	ssSssir	4
*Enrofloxacin	Intermediate	1	0.12	ssslir	4
*Marbofloxacin	SENSITIVE	<=0.5	0.5	Ssir	4
*Polymixin B	SENSITIVE	1	0.25	ssSsrrr	16
*Ofloxacin	SENSITIVE				

in mixed bacterial growth.



- ASTs are based on systemic breakpoints
- The results can be poorly predictive of the response to topical treatment.
  - If R on AST may respond in vivo due to high concentration that can be achieved on site
  - If S on AST may not respond in vivo due to local factors (e.g. inflammation, biofilm, ear stenosis, etc)
- May be useful with bacilli infection (e.g. Pseudomonas vs Enterobacterales vs Corynebacteria)

Antimicrobial Susceptibility Testing

- Why do we do it?
  - To predict outcome of therapy
  - But often we already started therapy – “why is it not working?”
    - Two types of resistance
      - Intrinsic/innate/inherent – PSEUDOMONAS have many….
      - Acquired
  - Because we know AMR is increasing

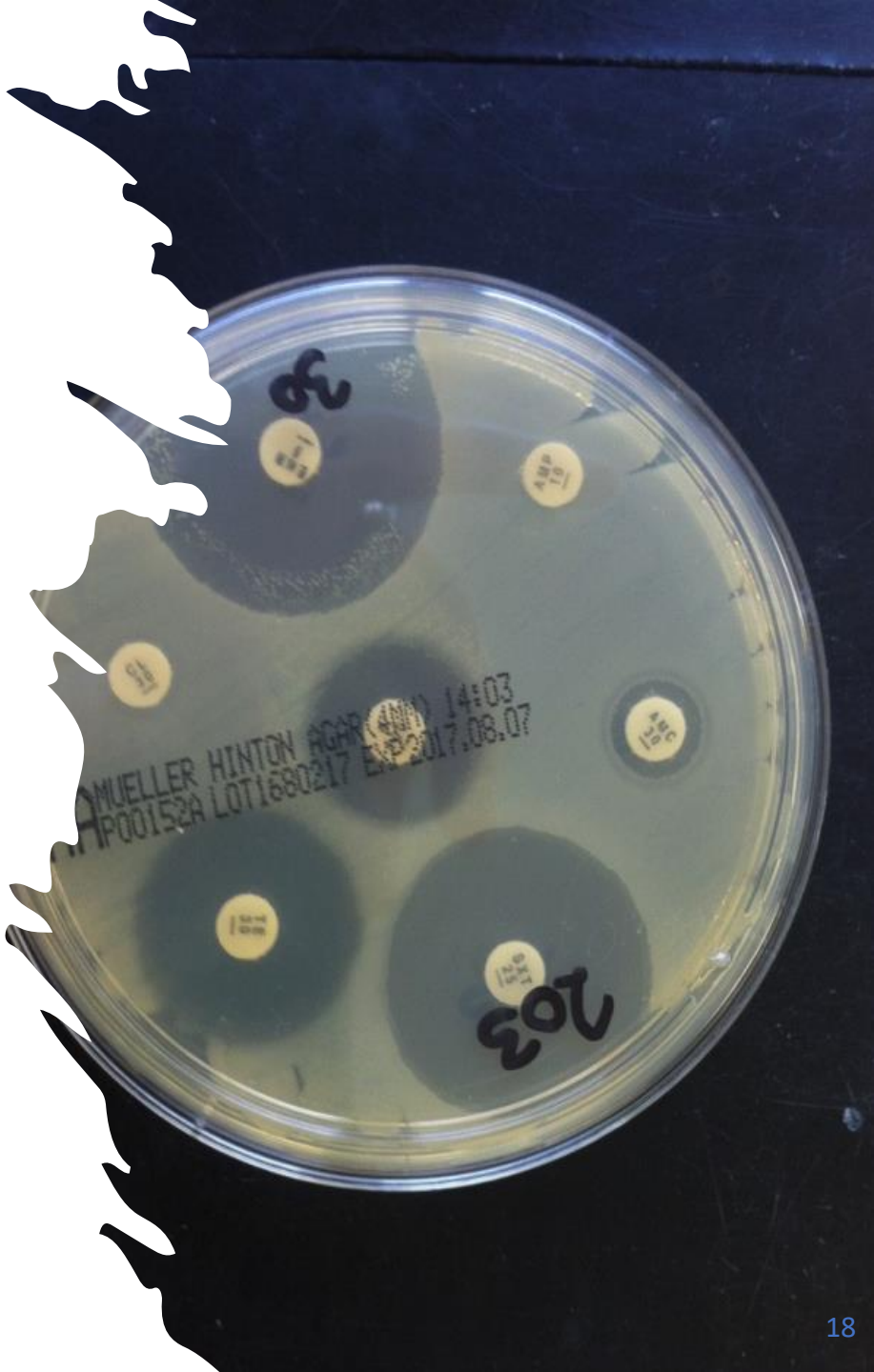
- Disclaimer
  - Testing is still only a guideline to treatment
  - Not all organs/systems behave the same
  - Not all patients have the same AM distribution/metabolism
  - Patient response ultimately confirms adequacy of treatment

Is Culture Beneficial?

Ear Aerobic Culture

Isolate 1
Profuse growth:Pseudomonas aeruginosa

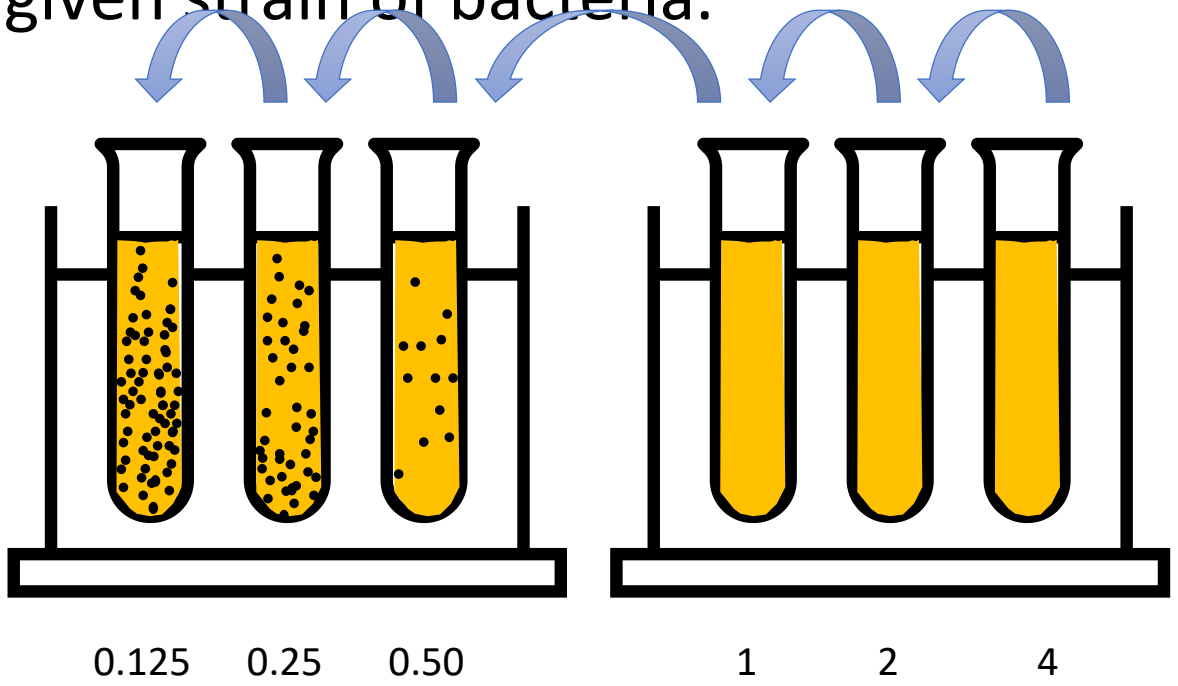
Antibiotic	Result	MIC
Ampicillin (1)	Resistant	N/A
Amoxicillin-Clavulanic acid (1)	Resistant	N/A
Enrofloxacin (2)	Intermediate	1
Gentamicin (2)	Resistant	>=16
Clindamycin (1)	Resistant	N/A
Amikacin (2)	Resistant	>=64
Tobramycin (2)	Resistant	
Polymyxin B (3)	Intermediate	1
Ofloxacin (2)	SENSITIVE	
Cephalexin (1)	Resistant	N/A
Marbofloxacin (2)	SENSITIVE	1
Cefovecin (2)	Resistant	N/A
Ciprofloxacin (2)	SENSITIVE	0.5



Standardised susceptibility tests do not reflect in vivo activity of topical antibiotics due to the high levels achieved in the target site with topical administration. Please note that topical treatment with the antimicrobials listed as intermediate (e.g. Polymyxin B) may be effective in this case given the high concentrations achieved at the site.

WHAT IS A MIC?

- Minimum Inhibitory Concentration
- is the lowest concentration (in µg/ml) of an antibiotic that inhibits the growth of a given strain of bacteria.



WHAT ARE BREAKPOINTS?

- Cut off between two different populations
  - Wild type and non-wild type
  - Susceptible and Resistant isolates
- Different types
  - ECOFFs
  - Clinical breakpoints

What about topical breakpoints?

- Still not available in Veterinary Medicine

In the absence of clinical data on outcome related to MIC of infecting organisms, EUCAST has not been able to determine relevant clinical breakpoints for topical use of antimicrobial agents. Laboratories are advised to either use the regular breakpoints or the cut-off values listed below to distinguish between organisms without and with acquired resistance mechanisms.

- EUCAST Guidelines

Organisms	Screening cut-off values for the detection and reporting of phenotypic resistance. Report resistant (R) for isolates with MIC above the cut-off value. Otherwise report susceptible (S).		Gentamicin	Tobramycin	Ciprofloxacin	Levofloxacin	Ofloxacin	Chloramphenicol	Colistin (for polymyxin B)	Neomycin (framycetin)
P. aeruginosa	Topical EUCAST	(mg/L)	8	2	0.5	2	2	ND	4	ND
P. aeruginosa	ECOFF EUCAST	(mg/L)	8	2	0.5	2	4	ND	4	ND
	CLSI VET01S-Ed7 S	(mg/L)	≤ 2	≤ 1	NA	≤ 1	NA	NA	NA	NA
	CLSI VET01S-Ed7 R	(mg/L)	≥ 8	≥ 4	NA	≥ 4	NA	NA	NA	NA

Pseudomonas spp in Canine otitis

- Not part of the normal flora and not an obligate pathogen
- Prior dysbiosis may predispose to ear infections

- Biofilm formation in >40% of cases
- MDR reported in 13-35% of isolates

- Rates of resistance vary across countries and change across time

Secker B, Shaw S, Atterbury RJ. *Pseudomonas* spp. in Canine Otitis Externa. *Microorganisms*. 2023; 11(11):2650. https://doi.org/10.3390/microorganisms11112650

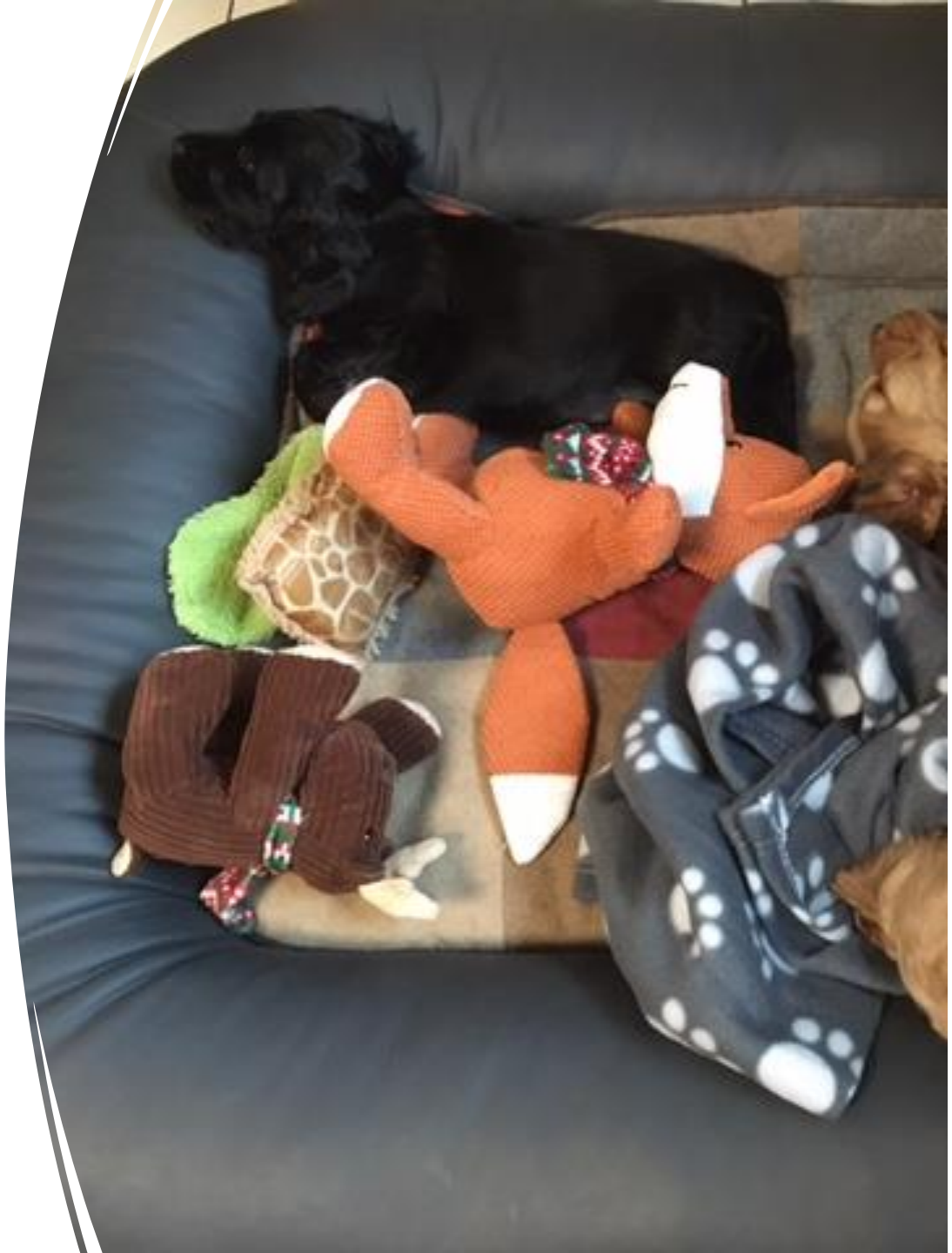
Goals of therapy

Treat infection
Remove discharge
Analgesia
Reduce chronic & perpetuating changes
Avoid relapse
Identify primary disease
Avoid side effects

Analgesia

- Is important!
- Avoids future issues
- Avoids behavioural problems
- Increases compliance, particularly future compliance
- E.g. Gabapentin off label

- Long-acting medications



Determine primary disease

Elimination diet?

- How?
- How long?

Environmental allergy testing

Blood tests

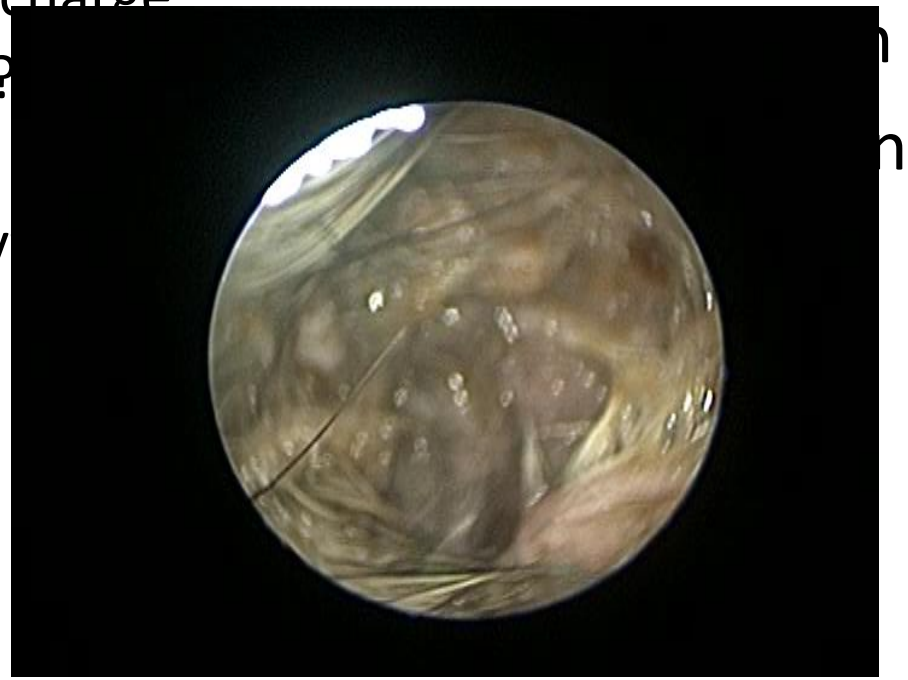
Parasiticidal diagnostic therapy

Ear flush/remove debris

Cleaning at home → most cases

GA flush →

- if severe disease
- copious discharge
- ?TM intact?
- Biofilm
- Ceruminoly



Aim:

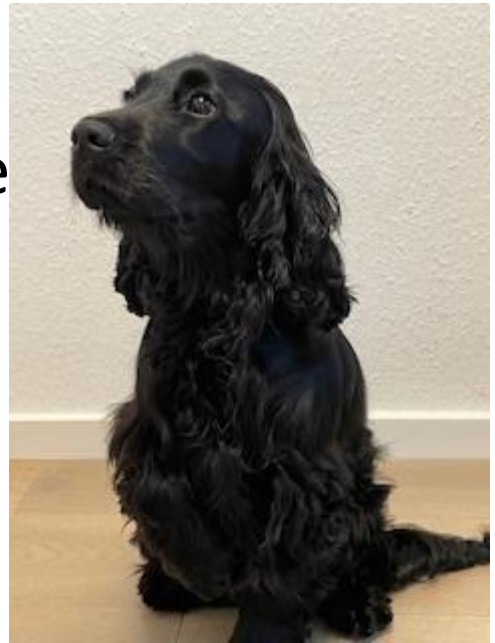
- Remove debris
- Examine TM
- n middle ear if necessary
- nostic & therapeutic

Client education/follow up

- Crucial!
- Show how to clean
- Written instructions

→Increases compliance

- Set expectations
- Allergy: life long dise
- Treatment duration



- Quality of life!
- Follow up visits depending on severity
- Maintenance therapy
- Long term topical steroids
- Warn about intermittant use of AB drops → resistance/AB stewardship