

Research Article

Study the Bacterial and Fungal Colonizing agents of the External Ear of Dogs

*Asaad khalaf Talal Al-Shuwaili , **Mohammed Asaad Saleh Alkabi , ***Ali Hussein Fadhil , ****Ihab Ghazi Mahdi Al-Shemmari.

*, **, ***, ****, *****PhD. Department of internal and Preventive Medicine University of Kerbala/ College of Veterinary Medicine. Karbala,Iraq.

Article Info

Article history:

Received 8-6-2023

Received in revised form
20-6-2023

Accepted 21-6-2023

Available online 23- 7-2023

Keywords: Otitis, Bacterial,
Fungal , antibiotic,
sensitivity

Abstract:

Otitis externa is one of the most prevalent disease in small animals. The aims of cross-sectional study survey incidence otitis in dogs and isolation most causes and treated with specific treatment and determine the susceptibility breeds. From April 2022 to July 2022, 976 dogs were examined, and 117 dogs were infected (12%). Ear swab were inoculated on different media for microbiological examination. The most prevalent microorganism isolated from ear swab was *Staphylococcus aureus* (35.17%), followed by *Pseudomonas aeruginosa* (26.7%). Penicillin, erythromycin, and gentamycin were highly effective against the bacteria while the Mycostatin against yeast and fungus . The commonest breeds to be affected with otitis externa were shihtzue and the Old English sheep dog.

INTRODUCTION:

Otitis externa is one of the most prevalent disease in small animals. It is an inflammation of the mucous lining of external auditory canal that portion of the external ear located between the pinna and the tympanic membrane. This mucous lining which is histologically similar in man and dog contain numerous hairs, sebaceous glands and ceruminous glands (1). The external auditory canal in man and dog provides an ideal environment for growth of microorganisms.

In dog the primary factors associated with otitis externa are the shape of the ear canal, most author agree that there is great susceptibility to otitis externa in long hair pendulous-eared breeds than in dogs with erect smrs the latter being better in dogs with ventulated (2) . Other factors also predispose to infection such as debris foreign bodies,

Aims of study:

Survey incidence study the bacterial and fungal colonizing agents of the external ear of

MATERIALS AND METHODS:

Study design, sample collection and isolation method:

A total of 976 dogs admitted to different veterinary clinic in Iraq (specify which places and areas) , March 2022- July, 2022, were subjected to the present investigation.

During this period ear swab from 117 dog diagnosed as having been suffering from otitis externa were collected for microbiological examination these cases collected in different veterinary clinic . The swab specimens were inoculated onto blood agar plates, Mannitol salt agar, MacConky agar, Brain-heart infusion broth for the isolation of bacteria.

ectoparasites ,trauma, allergic response and excessive moisture (3) Infection by microorganisms is often responsible for causing severe and chronic inflammation.

The microorganisms most frequently mentioned are *Staphylococcus spp.*, *Pseudomonas* (4) *Proteus spp.* and *Pityrosporum spp.* (5)

Most workers agree that predisposition to otitis externa differ little with age and sex but have found a slightly higher in male dogs and animals between 5 and 8 years of age.

The incidence of otitis externa may vary with (6) recorded slightly more cases in the warmer months of the year in Australian present study, the incidence of otitis externa in dogs specially in relation to breed and age was investigated, microorganisms isolated from affected animals were identified.

dogs, Then treated with specific treatment and determine the susceptibility dogs breed.

Sabouroud's dextrose agar plates were inoculated for the isolation of fungi. The plates were incubated aerobically at 37°C for 24 to 48 hours for bacteria and at 25°C for 14 days for fungi(7) (need reference for this procedure). Bacteriological and fungal cultures were discarded after 7 and 14 days respectively if growth was not evident.

Microorganisms isolated were identified by slandered procedures (8). Antibacterial sensitivity testing was performed on isolates using the disk-diffusion method.(9)

Information were taken from owners concerning age breed, case historyetc. and were tabulated in special form.

RESULTS:

Of 976 dogs examined clinically , 117 were infected otitis . The incidence of otitis externa was 12%. We observed diseased animal from two months to ten years old.

The highest incidence in dogs was found in shihtzu 30.9% followed by old English sheep dog (30%), and the lowest incidence was found in cocker spaniels and mixed dog (5%), respectively (Table 1).

The incidence of the organisms isolated is presented in table (2).Of the 202 microorganisms isolated from the 179 ear

swab specimens (54.5%) were gram positive bacteria, (36.1%) were gram negative bacteria, 8.9% were Yeast and 0.5% Fungi. The most prevalent microorganism isolated was *Staphococcus aureus* (35.1%), *Pseudomonas aeruginosa* (26.7%) and β -hemolytica Streptococcus (11.4%).

The infected dogs were treated with different antibiotics like penicillin, erythromycin & gentamicin depending on sensitivity of the bacterial isolates to antibacterial agents, and the dogs infected with yeasts or fungi were treated by Mycostatatin.

Table (1) Breed incidence of otitis externa in doga.

No.	Breed	No.of animal examined	Percentage
1.	Shihtzu	55	30.9
2.	Old English sheep dog	10	30
3.	Doberman	8	25
4.	Poodle	79	18.9
5.	Boxer	7	14.2
6.	Youck shire terner	22	13.6
7.	Terrier	228	12.3
8.	German shepherd	304	10.8
9.	Pekingese	94	10.6
10.	Dachshund	5	6.6
11.	Mixed breed dog	20	5
12.	Cocker spaniel	33	3.03
13.	Local breed dog	42	0
14.	Samoyed	15	0
15.	Bull dog	15	0
16.	Chihawhaw	6	0
17.	Saluki	5	0
18.	Setter	5	0
19.	Pointer	4	0
20.	Other breed	4	0
21.	Spitz	3	0
22.	Eurpian breed	3	0
23.	Medium setter	2	0
24.	Collis	2	0
25.	Lhasaapsc	2	0
26.	Malteae	1	0
	Total	976	0

Table (2) Micoorganism patterns observed in Otitis Externa.

No.	Isolant	No.of isolant	Percentage
1.	Staphylococcus aureus	71	35.1
2.	Pseudomonas aeruginosa	54	26.7
3.	B-hemolytic Streptococcus	23	11.4
4.	Klebsiella spp.	16	8
5.	Pityrosporum canis	10	4.9
6.	α - hemolytic Streptococcus	10	4.9
7.	Candida spp.	8	4
8.	Corynebacterium spp.	4	2
9.	Proteus spp	2	1
10.	Micrococcus	1	0.5
11.	Staphylococcus epidermidis	1	0.5
12.	Enterobacter spp.	1	0.5
13.	Aspergillus fumigatus	1	0.5
	Total	202	

Discussion:

The incidence of canine external otitis reported by various investigator ranged from 3.1 percent to 9.4% (10, 2) . A higher incidence (12%) of otitis externa in dogs was found in this survey.

Shihtzu had the highest incidence in dogs followed by old English sheep dog .This disease with finding of other workers (11) who observed highest infection in miniature poodle by cooker spaniel and fox terriers. Reserachers (2) studied the distribution of otitis externa on the basis of ear types. They found that the highest percentage was found in dogs having pendulous pinnae (ear flaps) and /or long hair. A similar trend was observed in this survey. However low incidence of otitis in dogs with pendulous flops of some other breed, suggests that ear shape may not be the only influencing factor. Although the a etiology of ear disease of dog remains obscure the present findings are of interest in that they tend to emphasize the etiological important of one or two factors that are commonly held to predispose the canine ear to otitis (need citation) .

Many workers (References support this finding) reported that the *Staphylococci* , *Streptococci*, *Proteus species*, *Pseudomonas aeruginosa* and yeasts are often found in ears of animals with otitis externa and this agrees with our finding, while (12,13) reported that the causative agents were yeast (*Pityrosporum*

canis) followed by *Staphylococci* and *Pseudomonas* species. Indeed in one report the incidence of yeast was as high as 82.2 percent (12, 4) reported that the percentage incidence of *Staphylococci* ,*Yeast* and *Pseudomonas* species was similar. (14) noticed. *Staphylococci* in 85.4 percent of cases, while on other hand yeast were found in 2.7% only. In present survey, *Staphylococci* was isolated from 35.1% of the affected ear canals and Yeast from 8.9%. Geographical variations may account for these differentiation in the incidence of these organism, especially of the Yeasts especially if the dog swims or is bathed frequently, trapped water or debris in the ear canal can lead to yeast infections (17).

Since nothing is known about previous antibiotics treatment of our patients, the difference observed might have been influenced by these regions. Little attention has been paid to bacteria commonly isolated from ears, as a causative age of otitis externa. The importance of these organisms should be emphasized because their pathogenicity in other infectious diseases is well established (15).

All of the *Staphylococci* treated in this study were susceptible to penicillin and Erythromycin ,However. Other researchers (16,15) reported that ampicillin, as penicillin G. was one of the antibiotics with the lowest efficacy to staphylococci.

The present work and other works (17) have shown that Gentamicin is highly efficacious

Conclusion:

- 1- The most prevalent microorganism isolated from ear swab were *Staphylococcus aureus*. *Pseudomonas aeruginosa*
- 2-Penicillin, erythromycin, and gentamycin were highly effective against the bacteria.

References:

1. Peters-Kennedy, J., Scott, D. W., Loft, K. E., & Miller, W. H. (2014). Scaling dermatosis in three dogs associated with abnormal sebaceous gland differentiation. *Veterinary dermatology*, 25(1), 23–e8.
2. <https://doi.org/10.1111/vde.12098>.
3. Kaimio M, Saijonmaa K.L. & Laitinen O. Survey Otitis Externa in American Cocker Spanids In Finland .Acta. Vet. Scand. 2017 (1): 14 .
4. Gotthelf LN. Diagnosis and Treatment of Otitis Media in Dogs and Cats; *Vet Clin.North Am.Small animal Pract.* 2004;34(2):PP: 469-87.
5. Richarad G.Harvey (2014) Otitis Externa An Essential Guide to diagnosis and Treatment .Current Vet. Therapy Taylor and Francis Group CRC Press.
6. Mcphail C. Current Treatment Option for Auricular Hematomas . *Vet Clin. North .Am. Small Animal Pract.*2016; 46(4) 635-41.
7. Kasai,T, Fukui, Aokik K, Ishii Y. and Tatedak . Changes in the ear canal Microbiota of Dogs with Otitis Externa . *J. Appl. Microbiol*, 2021;130(4) PP: 1084-1091.
8. Duarte, E. R., & Hamdan, J. S. (2010). RAPD differentiation of *Malassezia* spp. from cattle, dogs and humans. *Mycoses*, 53(1), 48–56.

against Gram- negative bacteria. According to (16) Gentamicin proved the most effective antibiotic tested for the treatment of otitis externa.It is sugested that gentamicin should be used only to treat infected ears. With *Pseudomonas aeruginosa*: because this organism is frequently isolated from ears of incurable which show little susceptibility to other antibiotics.

3-Mycostatin against yeast and fungus .

Acknowledgement:

Thanks to the bacteriology staff in College of Veterinary Medicine –University of Kerbala . We would like to appreciate all veterinary clinic to help as to take swabs from dogs.

9. <https://doi.org/10.1111/j.1439-0507.2008.01658.x>
10. Cowan S.T. & Steel, K.JManual for the identification of medical Bacteria. 1993; 3 nd Ed. Cambridge Univ.Press.
11. Jorgensen, J. H., & Ferraro, M. J. (2009). Antimicrobial susceptibility testing: a review of general principles and contemporary practices. *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America*, 49(11), 1749–1755. <https://doi.org/10.1086/647952>
12. O'Neil D., Volk A., Soares T., Church D., Brodbelt D. and Pegram C. Frequency and predisposing factors for canine otitis externa ; *Canine Medicine and Genetics* . 2021 8; (1) : 1133-1136.
13. Qekwana D., Oguttum J., Sithole, F. & Odoi Burden and Predictors of *Staphylococcus aureus* and *S. Pseudintermedius* infection among dog presented at an academic Veterinary Hospital in South Africa .*Peer J.* 2017;5.
14. Anne G., Tal Marom ; Mohmood F. ; Margaretha L. Ellen M. Otitis Media : Treatment and Complication . *Otolaryngol Head Neck Surg.* 2017; 156 (4).
15. Cabanes FJ. Diagnosis of *Malassezia* Dermatitis and Otitis in Dogs and Cats. *Rev.Iberoam. Mecol.* 2021. 38 (1) : PP: 3-4 .

16. Schaefer P. & Baugh RF.(2012)Farm. Physician. 1:86.
17. John D., Bonagura David & Twedt C. Kirk's Current Veterinary Thearapy.2013; Elsevier Health Sciences.
18. Bajwa J. Canine Otitis Externa Treatment and Complication. Can Vet. J. 2019. ; 60 (1) : pp 97-99.
19. Awosile, B.; McClure J., Saab, M. & Heider L. Antimicrobial resistance in Bacteria Isolated from Cats and Dogs from Atlantic Provinces . Can . Vet. J. 2018 59,PP; 885-893.