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CASE REPORT: BILATERAL OTITIS EXTERNA DUE TO *PROTEUS* SPP. INFECTION IN A PERSIAN CAT

Laporan Kasus: Otitis Eksterna Bilateral akibat Infeksi *Proteus* spp. pada Kucing Persia

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Abstract

External otitis is a commonly encountered ear disease in cats, characterized by inflammation of the external auditory canal and influenced by predisposing, primary, secondary, and perpetuating factors. This case report describes a six-year-old male Persian cat with a history of recurrent external otitis. The cat was presented to the Internal Medicine Laboratory, Faculty of Veterinary Medicine, Udayana University, Denpasar, Bali, with primary complaints of frequent ear scratching, head shaking, and the presence of yellow, foul-smelling discharge from both ears. Physical examination revealed yellowish, watery cerumen with a strong odor. Cytological examination demonstrated abundant rod-shaped bacteria, and bacterial culture confirmed the growth of *Proteus* spp. A diagnosis of bilateral external otitis caused by *Proteus* spp. infection was established, with a favorable prognosis. The treatment consisted of topical administration of Topigen® ear drops containing gentamicin sulphate (1.6 mg/mL), nystatin (100,000 IU/mL), and fluocinolone acetonide (0.25 mg/mL), administered at a dosage of three drops twice daily for 12 days, accompanied by routine ear cleaning using an otic cleansing solution. Clinical evaluation after 12 days of treatment showed significant improvement, characterized by reduced cerumen production, resolution of malodor, and the absence of inflammatory signs on otoscopic examination. This report underscores the importance of cytological examination and bacterial culture in establishing an accurate diagnosis and demonstrates the effectiveness of combination topical antibiotic and anti-inflammatory therapy in the management of bacterial external otitis.

Keywords: Otitis externa, *Proteus* spp., Persian cat, Topigen®

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Abstrak

Otitis eksterna merupakan penyakit telinga yang sering dijumpai pada kucing, ditandai dengan peradangan liang telinga luar yang dipicu oleh berbagai faktor, yaitu faktor predisposisi, primer, sekunder, dan perpetuatif. Laporan kasus ini membahas seekor kucing Persia jantan berusia enam tahun dengan riwayat otitis eksterna berulang. Kucing tersebut dibawa oleh pemiliknya ke Laboratorium Penyakit Dalam Fakultas Kedokteran Hewan Univeritas Udayana, Denpasar, Bali dalam dengan keluhan utama sering menggaruk telinga, menggeleng-gelengkan kepala, serta adanya sekret berwarna kuning dan berbau busuk dari kedua telinga. Pemeriksaan fisik menunjukkan adanya serumen cair berwarna kekuningan dengan bau menyengat. Pemeriksaan sitologi menemukan banyak bakteri basil, dan hasil kultur bakteri mengonfirmasi pertumbuhan *Proteus* spp. Diagnosis ditegakkan sebagai otitis eksterna bilateral akibat infeksi *Proteus* spp. dengan prognosis baik. Terapi yang diberikan adalah obat tetes telinga *Topigen*® (yang mengandung *Gentamicin sulphate* 1,6 mg/mL; *Nystatin* 100.000 IU/mL; *Fluocinolone acetonide* 0,25 mg/mL) dengan dosis tiga tetes, dua kali sehari selama 12 hari, disertai pembersihan telinga rutin menggunakan larutan pembersih telinga. Evaluasi setelah 12 hari pengobatan menunjukkan perbaikan klinis yang signifikan, ditandai dengan berkurangnya produksi serumen, hilangnya bau busuk, serta tidak adanya lagi tanda-tanda peradangan pada pemeriksaan otoskopi. Laporan ini menggarisbawahi pentingnya pemeriksaan sitologi dan kultur bakteri untuk menegakkan diagnosis yang akurat, serta membuktikan efektivitas terapi topikal kombinasi antibiotik dan antiinflamasi dalam menangani kasus otitis eksterna bakteri.

Kata kunci: Otitis eksterna, *Proteus* spp., Kucing Persia, Topigen®

INTRODUCTION

Otitis externa is one of the most commonly encountered dermatological diseases in cats and dogs (Tešin & Kovačević, 2025). The feline ear canal has three main anatomical boundaries. The external boundary begins at the pinna and extends into the external acoustic meatus, which is divided into vertical and horizontal canals. The medial boundary is marked by the tympanic membrane, which separates the external ear from the middle ear. The internal boundary begins at the middle ear cavity (tympanic bulla), which contains the auditory ossicles and connects to the inner ear, responsible for hearing and balance (Njaa *et al.*, 2012).

The etiology of otitis externa is multifactorial, involving various predisposing, primary, secondary, and perpetuating factors (Nuttall, 2016). Based on its duration, otitis may present as either acute or chronic, and it may affect one ear (unilateral) or both ears (bilateral) (Jacobson, 2002). Otitis externa can result from bacterial or fungal infections, foreign bodies, parasitic infestations, immune-mediated diseases, and atopic dermatitis (Dye *et al.*, 2002). In cats, a commonly identified primary cause is infestation with *Otodectes cynotis*; however, bacterial infections also play a significant role in exacerbating the condition (Gharban, 2021).

Under normal conditions, the ear canal is not sterile and harbors a variety of microorganisms that constitute the normal ear flora in cats (Tešin & Kovačević, 2025). When structural abnormalities of the ear or impairments in host defense mechanisms occur, this balance may be disrupted, allowing normal flora to become pathogenic and lead to disease (Puigdemont *et al.*, 2021). One of the organisms frequently involved is *Malassezia pachydermatis* (King *et al.*, 2018). In addition, bacteria such as *Staphylococcus pseudintermedius* are among the most common pathogens, with reported prevalence rates of up to 70% (Scherer *et al.*, 2018). According to Greene and Budsberg (2018), Gram-negative bacteria including *Pseudomonas aeruginosa*, *Proteus* spp., and *Escherichia coli* have also been reported as causative agents of otitis externa, particularly in chronic or recurrent cases.

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Clinical signs of otitis externa include erythema of the pinna, otalgia, pruritus, and the presence of purulent discharge or excessive cerumen within the ear canal (Ebani *et al.*, 2023). In chronic cases, persistent inflammation may lead to ear canal stenosis, and if not properly managed, the infection may extend to deeper tissues, resulting in otitis media or otitis interna (Tešin & Kovačević, 2025).

The purpose of this case report is to describe a case of bilateral otitis externa caused by *Proteus* spp. infection in a Persian cat, including signalment, anamnesis, physical examination findings, supporting diagnostic tests, diagnosis, therapeutic management, and evaluation of treatment outcomes. This report is expected to serve as a reference for veterinary practitioners regarding bilateral bacterial otitis externa in cats and its clinical management.

RESEARCH METHODS

Signalment and History

The subject of this study was a six-year-old male Persian cat named Tommy, weighing 4 kg, with an orange coat. The cat was presented to the Internal Medicine Laboratory, Faculty of Veterinary Medicine, Udayana University, Denpasar, Bali. The owner reported that for approximately two weeks the cat had been frequently scratching its ears and shaking its head, accompanied by the presence of yellow, foul-smelling cerumen discharge from both ears. The cat had a previous history of otitis externa and aural hematoma. The cat was maintained under a semi-free-roaming management system, with access to the home yard. Vaccination and deworming status were reported to be up to date.

Physical Examination

The physical examination included assessment of body temperature, heart rate, pulse rate, respiratory rate, body condition score (BCS), and capillary refill time (CRT). Inspection of the five mucous membranes, i.e., conjunctiva, nasal, oral, anal, and vulvar mucosa was performed. Palpation of peripheral lymph nodes was conducted, and the level of pruritus was assessed by observing the frequency of scratching during the examination. A thorough general inspection was carried out to identify any visible lesions. Clinical examination using inspection, palpation, and auscultation was performed for the digestive, respiratory, urogenital, circulatory, and neuromuscular systems.

Otoscopic Examination

Otoscopic examination was performed to evaluate the condition of the external ear canal up to the tympanic membrane. The procedure was conducted systematically by placing the cat in a safe restraint position, followed by gentle dorsolateral traction of the pinna to straighten the ear canal. The otoscope speculum was slowly inserted into the vertical canal, and the examiner observed the condition of the canal epithelium, the presence of exudate, parasites, masses, and the integrity of the tympanic membrane.

Cytological Examination

Cytological examination of cerumen was performed by collecting samples using a sterile swab, which was gently inserted into the vertical ear canal to avoid irritation. The sample was then rolled onto a glass slide using a rotational motion and allowed to air-dry at room temperature. The smear was fixed with methanol and stained using a Romanowsky stain (Diff-Quik). After staining, the slides were examined under a light microscope at magnifications ranging from 10× to 1000×.

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Bacterial Culture

Bacterial culture of cerumen was performed by collecting samples using a sterile swab gently inserted into the vertical ear canal to minimize contamination. The swab was then inoculated onto nutrient agar and appropriate selective media based on the suspected bacterial pathogens, using the streak plate technique to evenly distribute the sample across the agar surface. The inoculated media were incubated at 35–37°C for 24–48 hours. Bacterial colonies were subsequently evaluated based on their morphology, color, and hemolytic characteristics.

Routine Hematological Examination

Routine hematological examination was performed by collecting 1 mL of fresh blood from the cephalic vein and placing it into a tube containing ethylenediaminetetraacetic acid (EDTA). Hematological analysis was conducted using an automated analyzer (Abaxis VetScan® HM5, Abaxis Inc., Union City, CA, USA) to evaluate the

RESULTS AND DISCUSSIONS

Results

The general condition of the cat appeared normal, with a body condition score of 3 out of 5 (Shoveller *et al.*, 2014). Body temperature was 38.5 degrees Celsius, respiratory rate was 30 breaths per minute, heart rate was 144 beats per minute, and capillary refill time or CRT was less than two seconds (Table 1). Physical examination revealed abnormalities in both ears, characterized by the presence of yellow cerumen with a liquid consistency and a foul-smelling odor within the ear canals. Otoscopic examination of both ears showed yellow cerumen with a liquid texture, as well as swelling and erythema of the pinna and external ear canal (Figure 1).

Cytological examination of cerumen from both ears revealed the presence of bacilli shaped bacterial colonies that were evenly distributed on the smears from both the left and right ears. These findings indicated the involvement of rod-shaped bacteria in the inflammatory process associated with bilateral otitis externa (Figure 2). Bacterial culture of ear cerumen demonstrated the growth of *Proteus* spp. colonies on nutrient agar and selective media from both ears, confirming the presence of this bacterium as the causative agent in this case of bilateral otitis externa.

Hematological examination prior to therapy showed that most parameters were within normal limits, except for a mild increase in the RDW CV value, which was 18.4% compared with the reference range of approximately 14-18%. Based on the history, physical examination findings, and supporting laboratory results, the cat was diagnosed with bilateral otitis externa caused by *Proteus* spp. infection, with a favorable prognosis.

Treatment of the cat with bilateral otitis externa due to *Proteus* sp. infection consisted of topical therapy using Topigen® containing gentamicin sulphate at 1.6 mg per mL, nystatin at 100,000 IU per mL, and fluocinolone acetonide at 0.25 mg per mL. The medication was administered as three drops twice daily for twelve days. Ear cleaning was performed using an ear cleaner at a dose of three drops twice daily for five days, followed by three drops once daily from day six to day twelve.

Clinical outcomes were analyzed descriptively by comparing the condition before and after treatment. On day twelve, the cat showed marked clinical improvement, characterized by the absence of cerumen discharge from both ears and the disappearance of the foul odor (Figure 3). Otoscopic examination revealed a marked reduction in cerumen compared with the initial condition, as well as resolution of inflammatory signs such as erythema and swelling of the pinna and external ear canal.

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Discussion

The results of the clinical examinations indicated that the cat in this case suffered from bilateral otitis externa caused by *Proteus* spp. infection. The diagnosis of otitis externa was established through several stages, including history taking, physical examination, and supporting diagnostic procedures such as otoscopy, cytology, and bacterial culture (Jacobson, 2002). In this case, clinical signs including head shaking and ear scratching were observed, which is consistent with findings reported by Maslim and Batan (2021).

Otitis externa is an inflammatory condition of the external ear canal that may present in either acute or chronic forms. This disease can be triggered by various factors, including bacteria, fungi, foreign bodies, parasitic infestations, immune mediated diseases, and atopic dermatitis (Dye *et al.*, 2002). In the present case, swab examination of both ears did not reveal the presence of parasitic agents. Therefore, cerumen cytology was performed to further support the diagnosis. Cytological examination was conducted using the Diff-Quik staining method, which employs ethanol as a fixative and eosin and methylene blue as staining agents. After staining, the slides were examined under a microscope at a magnification of 100 times (Aritonang *et al.*, 2020). Cytological findings from both ears revealed the presence of rod shaped or bacillary bacteria. According to a study by Perego *et al.* (2014), the prevalence of otitis externa caused by coccoid bacteria was reported to be 75%, while 29% of cases were caused by bacillary bacteria, with some cases involving mixed bacterial populations. To identify the specific bacterial species involved, bacterial culture serves as an important diagnostic tool in cases of otitis externa. In the present case, bacterial culture yielded positive results for *Proteus* spp. This finding is consistent with Greene and Budsberg (2018), who reported that gram negative bacteria such as *Pseudomonas aeruginosa*, *Proteus* spp., and *E. coli* are common causative agents of otitis externa, particularly in chronic or recurrent cases.

Treatment of otitis externa in this case was performed using topical therapy. Topical treatment is generally preferred over systemic therapy because it allows higher drug concentrations to be delivered directly to the site of infection while minimizing the risk of antimicrobial resistance (Tešin and Kovačević, 2025). The topical medication used was Topigen® ear drops containing gentamicin sulphate at 1.6 mg per mL, nystatin at 100,000 IU per mL, and fluocinolone acetonide at 0.25 mg per mL. The medication was administered as three drops twice daily for twelve days. Ear cleaning was also performed using an ear cleaner at a dose of three drops twice daily for five days, followed by three drops once daily from day six to day twelve. Topigen® is a veterinary formulation commonly used in dogs and cats that provides antibacterial, antifungal, antiinflammatory, and antipruritic effects. Gentamicin is an aminoglycoside antibiotic with bactericidal activity that acts on susceptible bacteria by binding to the 30S ribosomal subunit, thereby inhibiting protein synthesis (Paterson, 2016). Gentamicin is a broad-spectrum antibiotic with activity against both gram positive and gram-negative bacteria. Several clinical studies have demonstrated the efficacy of gentamicin against *Staphylococcus* sp., as well as *Proteus* spp., *E. coli*, and *Pseudomonas* sp. (Zamankhan *et al.*, 2010). Fluocinolone acetonide is a synthetic fluorinated corticosteroid that is particularly effective for topical treatment of various inflammatory conditions of the skin and ear. This agent exhibits antiinflammatory, antipruritic, and vasoconstrictive properties, making it effective in reducing inflammation, pruritus, and allergic reactions in the skin and ear canal (Montoro *et al.*, 2018).

In addition, cleaning and drying of the ear canal represent essential components of therapy, as these procedures help reduce debris and cerumen, decrease microbial populations, remove microbial toxins, enhance penetration of topical medications, and improve overall treatment efficacy (Jacobson, 2002). After twelve days of therapy, the cat showed significant clinical

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improvement, characterized by reduced cerumen accumulation, elimination of foul odor, and absence of inflammatory signs.

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the clinical examination, the cat in this case was diagnosed with bilateral otitis externa caused by *Proteus* spp., with a favorable prognosis. It can be concluded that topical therapy using Topigen® containing gentamicin sulphate at 1.6 mg per mL, nystatin at 100,000 IU per mL, and fluocinolone acetonide at 0.25 mg per mL, combined with ear cleaning using an ear cleaner twice daily for five days, was effective in managing bilateral otitis externa and resulted in significant clinical improvement twelve days after therapy.

Suggestions

Topical therapy combining antibiotic, antifungal, and antiinflammatory agents has been shown to be effective. However, animal owners should be educated about the importance of strict compliance with the prescribed treatment regimen until completion. Prevention of recurrence may be achieved by maintaining environmental hygiene, controlling predisposing factors, and performing routine ear examinations in animals with a history of otitis externa.

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Table

Table 1. The cat present status

Clinical examinations	Results	Reference range	Interpretation
Heart rate	144 beats/min	140-220	Normal
Pulse rate	140 beats/min	140-220	Normal
Respiration rate	30 times/min	20-30	Normal
Temperature	38.5˚C	37.5-39.2˚C	Normal
Capillary refill time (CRT)	<2 s	<2 s	Normal

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Figures

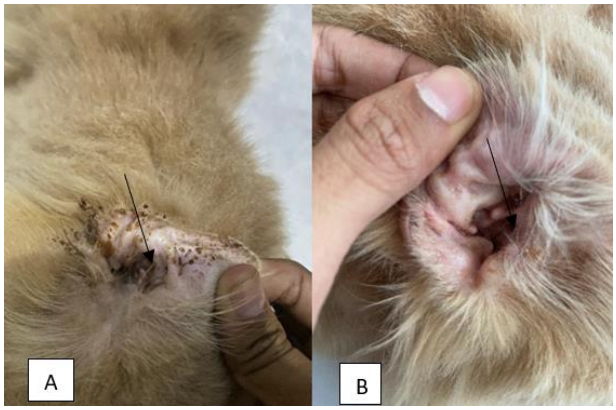

Figure 1. Condition of the cat in this case, showing yellow cerumen discharge from the ears, as indicated by the arrows. Panel A shows the right ear, and panel B shows the left ear.

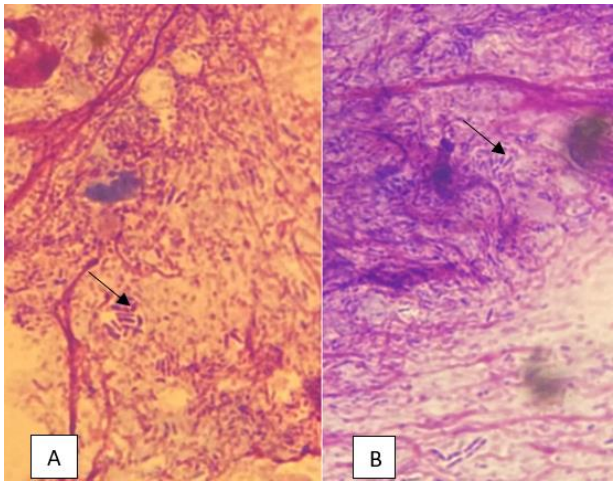

Figure 2. Cytological examination of feline ear cerumen showing the presence of bacillary shaped bacterial colonies, as indicated by the arrows. Panel A shows the right ear, and panel B shows the left ear, at 100 times magnification.

Figure 3. Condition of the cat ears after twelve days of treatment, showing no visible cerumen discharge from either ear, as indicated by the arrows. Panel A shows the right ear, and panel B shows the left ear.