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Case Report

Culture-guided management of proliferative necrotizing otitis externa in a cat

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ABSTRACT

This case report describes the diagnosis and long-term management of bilateral necrotizing otitis externa in an 11-month-old cat. Clinical, cytological, and microbiological findings supported a presumptive diagnosis of proliferative and necrotizing otitis externa (PNOE). Microbiological culture identified multidrug-resistant *Pasteurella multocida* and *Staphylococcus intermedius*. A seven-month, culture-guided treatment using topical and systemic antimicrobials helped resolve secondary bacterial infections. Complete clinical and microbiological resolution was achieved, with no recurrence observed. This case shows that targeted antimicrobial therapy can support recovery in complicated PNOE cases.

Keywords: Antibiogram, Bacteriology, Cat, Feline Otitis externa

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Otitis externa (OE) is a common inflammatory disease of the external ear canal in cats, caused by a combination of predisposing, primary, and secondary factors. Predisposing factors such as anatomical variations and moisture facilitate microbial growth, while primary causes include allergies, parasites, and foreign bodies (2, 12, 16). Secondary bacterial (e.g., *Staphylococcus* spp.) and fungal (e.g., *Malassezia* spp.) infections exacerbate the condition (14). Diagnosis is based on clinical examination, cytology, culture, and sometimes advanced imaging (7). Although treatment typically involves antimicrobials, increasing resistance underscores the importance of culture-based protocols (5). Proliferative and necrotizing otitis externa (PNOE), a severe form mostly seen in kittens, is likely immune-mediated and complicated by secondary infections (6, 11). Management includes infection control, inflammation reduction, and immune modulation, often using antimicrobials, corticosteroids, and cyclosporine A (8, 13). This case report aims to describe the diagnosis and therapeutic management of proliferative and necrotizing otitis externa (PNOE) in an 11-month-old cat, emphasizing the challenges posed by antimicrobial resistance and mixed infections.

An 11-month-old neutered male domestic shorthair cat presented with a one-month history of severe bilateral otitis externa. Clinical signs included intense pruritus, pain, foul-smelling discharge, and proliferative ulcerative lesions in the vertical ear canals (Figure 1a). Due to severe inflammation, edema, and inflammatory stenosis, initial otoscopic examination was limited, as advancement of the otoscope led to bleeding from erosive and ulcerative lesions (Figure 1b, 1c). Partial visualization became possible in the second week, and by week four, the horizontal ear canal and tympanic membrane were accessible. The tympanic membrane initially appeared opaque and hyperemic but gradually normalized as inflammation subsided (Figure 1d).

Routine hematological and biochemical tests were within normal limits. ELISA screening (SNAP FIV/FeLV Combo Test, IDEXX) was negative for FeLV (Feline Leukemia Virus) and FIV (Feline Immunodeficiency Virus). Cytological evaluation of Diff-Quik-stained smears revealed numerous cocci and rods. *Malassezia* spp. were absent initially but were detected after a month. No parasites, including *Otodectes cynotis*, were identified.

Figure 1. First-day appearance of the patient's pinna, showing brownish-black discharge, erosions with bleeding, and vegetative proliferative tissue (a). Hyperplasia and edema of the glands in the ear canal (b). Proliferative tissue exhibiting erosion and ulceration with bleeding (c). Inflamed and opaque tympanic membrane observed in the first month (d). Near-to-normal appearance of the ear canal in the seventh month (e). Post-treatment appearance of the external ear canal entrance (f).

The patient was evaluated weekly through clinical, otoscopic, and cytological assessments. Debris was gently aspirated to reduce trauma and support medication delivery. Cultures were obtained every three weeks.

Ear swab samples were collected using sterile swabs from both ears and inoculated onto 5% Sheep Blood Agar and Eosin Methylene Blue (EMB) Agar for bacterial culture, incubated at 37°C for 24 hours under aerobic conditions. Colony morphology and Gram staining were used for preliminary bacterial differentiation. For fungal analysis, samples were inoculated onto Sabouraud Dextrose Agar (SDA) and incubated at 25°C for up to 14 days; *Malassezia* spp. growth was confirmed by microscopic examination of yeast cells and hyphae stained with lactophenol cotton blue, which revealed cells with diameters ranging from 3 to 8 µm that were budding, round, or oval in shape. Bacterial identification and antimicrobial susceptibility testing (AST) were performed using the BD Phoenix™100 automated instrument (BD Diagnostics, Oxford, UK) with Gram-positive (PMIC/ID-600) and Gram-negative (NMIC/ID-433) panels, providing species identification within 12 hours and susceptibility results within 16 hours. β-lactamase production was detected using the included nitrocefin test. AST covered 23 antimicrobials across 9 classes. For antibiotics not included in the Phoenix panel, nine additional discs were tested using the Kirby-Bauer disk diffusion test method: Polymyxin B, Nystatin, Tobramycin, Enrofloxacin, Metronidazole, Bacitracin, Chloramphenicol, Cefpodoxime, and Cefotaxime. Inhibition zones were interpreted according to EUCAST criteria (EUCAST, 2025). Isolates were classified as susceptible (S) or resistant (R), and those resistant to three or more antibiotics were considered multidrug-resistant (MDR).

Bacterial isolates included *Pasteurella multocida*, *Escherichia coli*, *Staphylococcus aureus*, *Enterococcus* spp., and *Staphylococcus intermedius*; where *Malassezia* spp. was the fungal agent.

Initial treatment included daily usage of an antiseptic ear cleanser (EpiOtic®, Virbac) and topical ciprofloxacin/dexamethasone (Siprogut Plus®, Bilim Pharma) three drops twice daily for three weeks. As response was insufficient, systemic ciprofloxacin (Cipro®, Biofarma) was added at 20 mg/kg once daily. Following detection of *Malassezia* spp. and antimicrobial resistance, therapy was adjusted to a topical preparation containing miconazole, prednisolone, and polymyxin B (Saniotic®, İnterhas), administered once a day for two weeks.

Despite partial improvement, *S. intermedius* persisted. Fusidic acid (Fucithalmic® 1%) was administered twice daily, followed by dexamethasone (Onadron® 0.1%) three times daily with short intervals. After three weeks, pruritus and inflammation decreased significantly, and lesions regressed. This allowed a complete otoscopic exam with a 5 mm speculum. *P. multocida* was no longer detected, but *S. intermedius* remained.

At the 20-week reassessment, no new lesions or discharge were observed (Figure 1e). Residual lesions were mild, with resolution of erythema and erosion. Susceptibility testing revealed *S. intermedius* had developed resistance to fusidic acid and was only sensitive to chloramphenicol. Topical chloramphenicol (Gemysetin® 1%) was applied twice daily for three weeks. By seven months, all clinical signs had resolved (Figure 1f), and no microbial growth was detected, confirming full recovery.

PNOE is a rare and severe form of otitis in cats, characterized by chronic inflammation, tissue proliferation, and secondary infections, often requiring long-term, individualized treatment (3, 12). While histopathology remains the gold standard for diagnosis, it was not performed in this case. Instead, diagnosis relied on clinical and microbiological findings—a practical alternative in chronic feline OE (4, 9). Ulcerative-proliferative lesions, chronic inflammation, and persistent bacterial colonization supported a diagnosis of PNOE, consistent with previous reports (6). Differential diagnosis is essential, as conditions like idiopathic ceruminous otitis, hyperplastic OE, or paraneoplastic lesions can present similarly (11, 16). In this case, persistent colonization with *Staphylococcus intermedius*, *Pasteurella multocida*, and *Malassezia* spp., along with progressive lesions, favored PNOE over uncomplicated infectious OE.

Chronic OE is often complicated by multidrug-resistant (MDR) bacterial and fungal overgrowth, which prolongs disease and complicates treatment (2, 5). MDR pathogens isolated in this case included *P. multocida*, *E. coli*, *S. aureus*, *Enterococcus* spp., and *S. intermedius*. β-lactamase-mediated resistance in *S. intermedius* and *P. multocida* explained the failure of penicillins and cephalosporins, while susceptibility to amikacin, vancomycin, and chloramphenicol guided effective therapy (1, 15). Initial treatments administered before culture and susceptibility results were available were insufficient due to multidrug resistance, highlighting the importance of culture-guided antimicrobial therapy (AST). Although *P. multocida* is rarely associated with otitis externa, its presence may exacerbate inflammation, further underscoring the need for targeted treatment.

PNOE is an immune-mediated disease, with immunomodulatory therapy as the cornerstone of treatment, although secondary bacterial infections may complicate the course (9, 10). Momota et al. (2016) reported that tacrolimus was effective in managing PNOE, while corticosteroids provided partial benefit. They achieved full resolution using intralesional and potent topical corticosteroids, emphasizing the role of potency and administration route (10). In our case, corticosteroids addressed the immune-mediated pathology, but persistent multidrug-resistant bacterial and fungal infections required a prolonged, culture-guided antimicrobial regimen alongside corticosteroid therapy for complete remission. This highlights that while immunomodulation is central to PNOE management, targeted antimicrobials are a critical adjunct in complicated cases, and the combination can synergistically achieve full recovery.

Initial fluoroquinolone-based treatment with ciprofloxacin/dexamethasone was only partially effective, and resistance emerged, requiring adjustments (16). The combination of miconazole nitrate, prednisolone acetate, and polymyxin B effectively reduced *Malassezia* spp. and inflammation (2, 11). Chloramphenicol proved effective against MDR *Staphylococcus* spp. (5), and culture-guided therapy led to resolution over seven months. Given the progressive nature of PNOE, continuous microbiological monitoring, strict adherence, and tailored treatment are essential.

This case illustrates the importance of long-term, evidence-based, culture-guided management in feline PNOE with MDR complications. Even without histopathological confirmation, clinical and microbiological findings were sufficient to guide a successful therapeutic strategy.

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Ethical Statement

This clinical case report does not present any ethical concerns.

Conflict of Interest

The authors declared that there is no conflict of interest.

Author Contributions

EU and SB conceived the idea and planned the manuscript. EU, and SB contributed to sample preparation. EU and SB have made significant scientific support and also contributed to the interpretation

of the results. All authors provided significant contributions by giving feedback and help shape the manuscript.

Data Availability Statement

The data supporting this study's findings are available from the corresponding author upon reasonable request.

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