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Infectious keratoconjunctivitis associated with *Pseudomonas aeruginosa* infection in a fat-tailed sheep reared under semi-open housing conditions†

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ABSTRACT: Pink eye, or infectious keratoconjunctivitis, is a contagious disease that can impair vision and welfare if untreated. This case report describes the diagnosis and management of *Pseudomonas aeruginosa*-associated infectious keratoconjunctivitis in a sheep in Kulonprogo, Yogyakarta, Indonesia. A 3-year-old female fat-tailed sheep weighing 30 kg presented with bilateral redness for two days. Clinical examination revealed photophobia, corneal opacity, lacrimation, and conjunctival inflammation. Hematological examination revealed leukocytosis and neutrophilia, indicating an inflammatory reaction. Bacterial culture of a conjunctival swab identified *P. aeruginosa*, although antibiotic susceptibility testing was not performed. Based on the history, clinical signs, physical examination, hematological findings, and bacteriological confirmation, the sheep was diagnosed with infectious keratoconjunctivitis associated with *P. aeruginosa* infection and a favorable prognosis. Empirical treatment consisted of intramuscular dihydrostreptomycin sulfate–procaine penicillin G at 0.1 mL/kg body weight, intramuscular vitamin B12 at 0.01 mg/kg body weight, and topical oxytetracycline to both eyes. Improvement occurred two days after treatment, with reduced lacrimation and clearer corneas.

Keywords:
infectious keratoconjunctivitis, photophobia, *Pseudomonas aeruginosa,* sheep

■ INTRODUCTION

Pink eye, or infectious keratoconjunctivitis (IKC), is an inflammation of the eye's membrane lining (conjunctiva), including the orbit and inner surface of the eyelids (Chapman *et al.* 2010). The clinical symptoms of IKC include conjunctival hyperemia, photophobia, blepharospasm, and excessive tear production, which may become mucopurulent. The infection can be transmitted through direct contact with eye secretions from infected animals, fomites (inanimate objects), and flies (Kuibagarov *et al.* 2023).

Although IKC in sheep is associated with several bacterial agents, including *Moraxella bovis*, other bacteria can also cause IKC, including *Bacillus* spp., *Mycoplasma* spp., *Staphylococcus* spp., *Mannheimia haemolytica*, *Streptococcus pyogenes*, and *Pseudomonas* spp.. Infection by *Pseudomonas aeruginosa* is rare, occurring in only 0.56% to 5,6% of cases (Chapman *et al.* 2010, Rhaymah *et al.* 2013). Therefore, this case report is important for understanding the clinical and hematological patterns, diagnostic confirmation, and management of IKC caused by *P. aeruginosa* in fat-tailed sheep reared in a semi-open housing system with possible exposure to dust and flies in Kulonprogo, Yogyakarta, Indonesia.

■ CASE

History and Signalment: A 3-year-old female fat-tailed sheep was brought in by a farmer with red eyes. The symptoms had been present for the previous 2 days. Two of the four sheep exhibited similar symptoms. **Physical examination**: A 30-kg sheep had a body condition score of 3/5, normal vital signs, and bilateral conjunctivitis, corneal edema, lacrimation, and photophobia (Figure 1a). **Laboratory examination**: CBC revealed leukocytosis (16 × 10^3 cells/mm^3) and neutrophilia (10.2 × 10^3 cells/mm^3) (Table S1), and conjunctival swab culture at Wates Veterinary Center Inspection was positive for *P. aeruginosa* (Figure S2); however, AST was not performed. **Diagnosis**: IKC due to *P. aeruginosa* infection. **Differential diagnosis**: Thelaziasis, infectious keratoconjunctivitis due to *Mycoplasma conjunctivae*, *Moraxella ovis*-associated keratoconjunctivitis, chlamydial keratoconjunctivitis, traumatic keratitis, foreign body irritation, and ulcerative keratitis. **Prognosis**: Favorable. **Treatment**: The sheep

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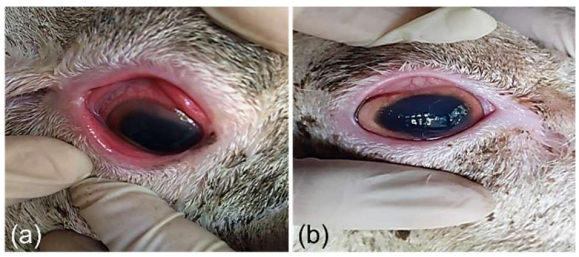

Figure 1. Affected sheep eyes before and after treatment. (A) Before treatment, conjunctival hyperemia, corneal edema, lacrimation, and photophobia. (B) After two days, reduced inflammation and opacity, indicating improvement.

received a single treatment consisting of intramuscular dihydrostreptomycin sulfate–procaine penicillin G at 0.1 mL/kg BW, topical oxytetracycline at 0.1 mL in both eyes, and intramuscular vitamin B12 at 0.01 mg/kg BW.

■ RESULTS AND DISCUSSION

The case was diagnosed as infectious keratoconjunctivitis associated with *Pseudomonas aeruginosa* based on bilateral ocular lesions, leukocytosis, neutrophilia, and positive conjunctival swab culture. *Pseudomonas aeruginosa* is a rare cause of ovine IKC (Chapman *et al.* 2010). However, isolation from an affected eye is relevant because P. aeruginosa is an opportunistic gram-negative bacterium that causes ocular inflammation and keratitis (O'Callaghan *et al.* 2019), explaining conjunctivitis, corneal edema, lacrimation, and photophobia.

The hematological findings supported an active inflammatory response (Akter *et al.* 2025). Leukocytosis was observed, with a total leukocyte count of 16×10^3 cells/mm³, which was above the physiological reference range for sheep. Neutrophilia was also recorded, with a neutrophil count of 10.2×10^3 cells/mm³. These changes are compatible with acute bacterial inflammation (Zaitoun *et al.* 2021). However, they are supportive rather than confirmatory, as leukocytosis and neutrophilia are not specific for *P. aeruginosa* infection.

The protocol included systemic procaine penicillin G, dihydrostreptomycin sulfate, topical oxytetracycline, and intramuscular vitamin B12. Treatment was empirical, and susceptibility testing was not performed; therefore, the response cannot be interpreted as susceptibility-guided evidence of antimicrobial efficacy. *P. aeruginosa* has intrinsic resistance through low outer-membrane permeability, efflux pumps, β-lactamase production, and biofilm formation (Pang *et al.* 2019). Improvement indicates response, not elimination.

Topical oxytetracycline increases ocular antimicrobial exposure because systemic antibiotics may not achieve adequate corneal and tear film concentrations (Angelos 2015). Tetracycline-class drugs have anti-collagenase and matrix metalloproteinase-inhibitory effects that may reduce stromal degradation during inflammation (García-López *et al.* 2023). However, bacterial clearance and healing cannot be determined without fluorescein staining, corneal cytology, or culture.

Clinical improvement occurred within 48 h after treatment, with reduced inflammation and discomfort (Figure 1B). Complete recovery was recorded seven days after therapy, with edema resolution and restored appearance. Limitations include no antibiotic susceptibility testing, repeat bacterial culture, and a seven-day follow-up. This case highlights bacteriological confirmation of IKC and suggests *P. aeruginosa* as an opportunistic pathogen in sheep under semi-open housing with dust and fly exposure.

■ CONCLUSION

A fat-tailed sheep with *Pseudomonas aeruginosa* infectious keratoconjunctivitis recovered clinically within seven days after empirical dihydrostreptomycin sulfate–procaine penicillin G and topical oxytetracycline treatment.

■ ASSOCIATED CONTENT

Supporting Information

†The hematology and Wates Veterinary Center Inspection assessment were submitted in PDF form as supporting information.

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