CHAPTER 4

ADENOVİRAL CONJUNCTİVİTİS

Özkan KOCAMIŞ[1]

INTRODUCTION

Adenoviral conjunctivitis is the most common cause of viral conjunctivitis and represents one of the most significant infectious ocular diseases worldwide. It accounts for a large proportion of acute red eye cases and is highly contagious, spreading rapidly in community and healthcare settings. Although most cases are self-limiting, the disease can lead to persistent complications such as subepithelial infiltrates (SEIs), pseudomembrane formation, and conjunctival scarring, which can substantially impair visual function and quality of life (1,2). The disease also poses a major public health challenge, contributing to millions of outpatient visits annually and unnecessary antibiotic prescriptions due to diagnostic uncertainty (3). In clinical practice, misdiagnosis of adenoviral conjunctivitis as bacterial conjunctivitis often leads to excessive use of topical antibiotics, which not only increases healthcare costs but also fosters antimicrobial resistance. This review aims to provide a comprehensive academic discussion of adenoviral conjunctivitis, including its epidemiology, virology, pathogenesis, clinical spectrum, complications, diagnostic approaches, management, and preventive strategies. The expanded detail in each section is intended to provide a resource comparable to a graduate-level review or textbook chapter, supporting both clinical decision-making and academic research.

EPIDEMIOLOGY

Adenoviral conjunctivitis is responsible for an estimated 65–90% of all cases of viral conjunctivitis globally. The disease is recognized for its epidemic potential,

[1] Assoc. Prof., Kırşehir Education and Research Hospital Eye Clinic, okocamis@yahoo.com, ORCID iD: 0000-0003-0353-457X

DOI: 10.37609/akya.26.c690

REFERENCES

1. Garcia-Zalisnak D, Rapuano C, Sheppard JD, Davis AR. Adenovirus ocular infections: prevalence, pathology, pitfalls, and practical pointers. Eye Contact Lens. 2018;44 Suppl 1:S1-S7. doi:10.1097/ICL.0000000000000226.
2. Jhanji V, Chan TCY, Li EYM, Agarwal K, Vajpayee RB. Adenoviral keratoconjunctivitis. Surv Ophthalmol. 2015;60(5):435-443. doi:10.1016/j.survophthal.2015.04.001.
3. Shekhawat NS, Shtein RM, Blachley TS, Stein JD. Antibiotic prescription fills for acute conjunctivitis among enrollees in a large United States managed care network. Ophthalmology. 2017;124(8):1099-1107. doi:10.1016/j.ophtha.2017.03.021.
4. Kuo IC, Espinosa C, Forman M, Valsamakis A. A PCR-based algorithm to detect and prevent transmission of adenoviral conjunctivitis in hospital employees. Am J Ophthalmol. 2016;163:38-44. doi:10.1016/j.ajo.2015.12.007.
5. Jernigan JA, Lowry BS, Hayden FG, et al. Adenovirus type 8 epidemic keratoconjunctivitis in an eye clinic: risk factors and control. J Infect Dis. 1993;167(6):1307-1313. doi:10.1093/infdis/167.6.1307.
6. Aoki K, Tagawa Y. A twenty-one year surveillance of adenoviral conjunctivitis in Sapporo, Japan. Jpn J Ophthalmol. 2002;46(5):491-497. doi:10.1016/S0021-5155(02)00523-5.
7. Jin XH, Aoki K, Kitaichi N, et al. Genome variability of human adenovirus type 8 causing epidemic keratoconjunctivitis during 1986–2003 in Japan. Mol Vis. 2011;17:3121-3127. PMID: 22171162.
8. Fujimoto T, Matsushima Y, Shimizu H, et al. Molecular epidemiology of human adenovirus type 8 causing EKC in Kawasaki, Japan, 2011. Jpn J Infect Dis. 2012;65(3):260-263. doi:10.7883/yoken.65.260.
9. Kowalski RP, Romanowski EG, Waikhom B, et al. The survival of adenovirus in multidose bottles of topical fluorescein. Am J Ophthalmol. 1998;126(5):835-836. doi:10.1016/S0002-9394(98)00248-6.
10. Dawson CR, Hanna L, Wood TR, Despain R. Adenovirus type 8 keratoconjunctivitis in the United States. Am J Ophthalmol. 1970;69(3):473-480. doi:10.1016/0002-9394(70)90156-5.
11. Adams CP Jr, Cohen EJ, Albrecht J, et al. Interferon treatment of adenoviral conjunctivitis. Am J Ophthalmol. 1984;98(4):429-432. doi:10.1016/0002-9394(84)90100-3.
12. Karaca EE, Aynaci ZN, Kemer OE. Complication management in adenoviral keratoconjunctivitis: review. J Glau-Cat. 2023;18(3):99-105. doi:10.37844/glau.cat.2023.18.14.
13. Laibson PR, Dhiri S, Oconer J, et al. Corneal infiltrates in EKC: response to corticosteroid therapy. Arch Ophthalmol. 1970;84(1):36-40. doi:10.1001/archopht.1970.00990010038008.
14. Laibson PR, Green WR. Conjunctival membranes in EKC. Arch Ophthalmol. 1970;83(1):100-102. doi:10.1001/archopht.1970.00990020102014.
15. Levinger E, Slomovic A, Sansanayudh W, et al. Topical cyclosporine for SEIs in adenoviral keratoconjunctivitis. Cornea. 2010;29(6):638-640. doi:10.1097/ICO.0b013e3181c2956c.
16. Saitoh-Inagawa W, Oshima A, Aoki K. Rapid diagnosis of adenoviral conjunctivitis by PCR. J Clin Microbiol. 1996;34(9):2113-2116. doi:10.1128/jcm.34.9.2113-2116.1996.
17. Artieda J, Pineiro L, Gonzalez M, et al. Swimming pool–related outbreak of PCF due to adenovirus type 4, Spain. Euro Surveill. 2009;14(8):19125. PMID:19280117.
18. Kuo SC, Shen SC, Chang SW, et al. Corneal superinfection in acute viral conjunctivitis in children. J Pediatr Ophthalmol Strabismus. 2008;45(6):374-376. doi:10.3928/01913913-20081101-09.
19. Kim SI, Lee KW. Orbital inflammation from EKC in adults. Case Rep Ophthalmol. 2013;4(2):93-98. doi:10.1159/000351648.
20. Kay KM, Woo KI, Kim JH, et al. Acquired nasolacrimal duct obstruction in children. Jpn J Ophthalmol. 2007;51(6):437-441. doi:10.1007/s10384-007-0473-7.
21. Ozturk H, Sonmez B, Beden U, et al. Corneal sensitivity decrease in adenoviral EKC. Eye Contact Lens. 2013;39(4):264-268. doi:10.1097/ICL.0b013e3182871065.

22. Liu SH, Hawkins BS, Ng SM, et al. Pharmacologic interventions for EKC: Cochrane review. Cochrane Database Syst Rev. 2022;3:CD015126. doi:10.1002/14651858.CD015126.
23. Yang S, Rothman RE. PCR diagnostics for infectious diseases. Lancet Infect Dis. 2004;4(6):337-348. doi:10.1016/S1473-3099(04)01044-8.
24. Sambursky R, Trattler W, Tauber S, et al. Sensitivity/specificity of AdenoPlus. JAMA Ophthalmol. 2013;131(1):17-22. doi:10.1001/jamaophthalmol.2013.566.
25. Shunmugam M, Giovannetti F, Yeung SN, Iovieno A. Update on viral conjunctivitis treatment. Microorganisms. 2025;13(8):1712. doi:10.3390/microorganisms13081712.
26. Chintakuntlawar AV, Chodosh J. Architecture of conjunctival membranes in EKC. Ocul Immunol Inflamm. 2010;18(5):341-345. doi:10.3109/09273948.2010.486053.
27. Butt AL, Chodosh J. Adenoviral keratoconjunctivitis in tertiary clinics. Cornea. 2006;25(2):199-202. doi:10.1097/01.ico.0000191570.14360.53.
28. Laibson PR, Dhiri S, Oconer J, et al. Corticosteroid therapy in EKC. Arch Ophthalmol. 1970;84(1):36-40. doi:10.1001/archopht.1970.00990010038008.
29. Hillenkamp J, Reinhard T, Ross RS, et al. Topical cidofovir and cyclosporine for acute EKC. Arch Ophthalmol. 2001;119(10):1487-1491. doi:10.1001/archopht.119.10.1487.
30. Tabbara KF, Jarade E. Ganciclovir effects in adenoviral keratoconjunctivitis. Invest Ophthalmol Vis Sci. 2001;42(4):S579.
31. Adams CP Jr, Cohen EJ, Albrecht J, et al. Interferon treatment of adenoviral conjunctivitis. Am J Ophthalmol. 1984;98(4):429-432.
32. Yates KA, Shanks RMQ, Kowalski RP, Romanowski EG. Povidone–iodine evaluation vs adenovirus. J Ocul Pharmacol Ther. 2019;35(2):132-136. doi:10.1089/jop.2018.0127.
33. Than T, Morettin CE, Harthan JS, et al. Efficacy of 5% PVP-I single dose. Am J Ophthalmol. 2021;231:28-38. doi:10.1016/j.ajo.2021.05.005.
34. Soleimani M, Haydar AA, Cheraqpour K, et al. PVP-I application in ophthalmology. Surv Ophthalmol. 2024;69(2):211-223. doi:10.1016/j.survophthal.2023.05.006.
35. Hadad R, Hedengran A, Barnils A, et al. Antiseptic effects on conjunctival goblet cells. Acta Ophthalmol. 2024;102(8):773-778. doi:10.1111/aos.15745.
36. Gottsch JD. Surveillance and control of EKC. Trans Am Ophthalmol Soc. 1996;94:539-587. PMID:8981704.
37. Dart JK, El-Amir AN, Maddison T, et al. Control of nosocomial adenoviral EKC in UK. Br J Ophthalmol. 2009;93(1):18-20. doi:10.1136/bjo.2008.142182.
38. Paparello SF, Rickman LS, Mesbahi HN, et al. EKC outbreak in US military base. Mil Med. 1991;156(5):256-259. doi:10.1093/milmed/156.5.256.
39. Piednoir E, Bureau-Chalot F, Merle C, et al. Costs of nosocomial adenoviral conjunctivitis. Am J Infect Control. 2002;30(7):407-410. doi:10.1067/mic.2002.124201.