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TABLE 203-1 Recommended Treatments for Genital Warts Caused by Human Papillomavirusa TREATMENT IMIQUIMOD CRYOTHERAPY INTERFERON SURGICAL REMOVAL LASER Effectiveness Good Good Good Excellent Excellent Recurrence Frequent Frequent Frequent Frequent Frequent Adverse effects Frequent, mild to moderate Mild, well tolerated Frequent, moderately severe Mild, well tolerated Mild to moderate, well tolerated Availability Fair Good Fair Good Fair Cost Expensive Inexpensive Very expensive Moderately expensive Very expensive aImiquimod can be self-administered. All other treatments must be administered by a clinician. immune responses are blunted by specific viral mechanisms. Numerous therapeutic vaccines that are being developed are designed to enhance the cell-mediated response to the HPV E6 and E7 oncoproteins, which are expressed in HPV-associated cancers. Such vaccines would enhance the ability to treat HPV-associated cancers, conditions that are very difficult to treat with current modalities. However, while progress has been made, no HPV vac cine is currently available for treatment of HPV infection or HPVassociated disease. Other Therapies Both trichloroacetic acid and bichloroacetic acid are caustic agents that destroy warts by coagulation of proteins. Nei ther of these agents is recommended for treatment. Sinecatechins (15% ointment) and podophyllotoxin (0.05% solution or gel and 0.15% cream) are occasionally used for external genital warts, but other modalities listed above are as or more effective and are better tolerated. RECOMMENDATIONS FOR TREATMENT Table 203-1 lists available treatments for genital warts. An optimal therapy for HPV-related genital tract disease that combines high efficacy, low toxicity, low cost, and low recurrence is not available. For genital warts of the penis or vulva, cryotherapy is the safest, least expensive, and most effective modality. However, all available modalities for treatment of genital warts carry high rates of recur rence. Guidelines for the treatment of anogenital warts can be found on the CDC website (https://www.cdc.gov/std/treatment-guidelines/ anogenital-warts.htm). Women with vaginal lesions should be referred to a gynecologist experienced in colposcopy and treatment of these lesions. Treat ment of cervical disease involves careful inspection, biopsy, and

histopathologic grading to determine the severity and extent of disease. Women with evidence of HPV-associated cervical disease should be referred to a gynecologist familiar with HPV and experi enced in colposcopy. Optimal follow-up of these patients includes colposcopic examination of the cervix and vagina on a yearly basis. Guidelines from the American College of Obstetricians and Gyne cologists are available for the treatment of cervical dysplasia and cancer. For anal or perianal lesions, cryotherapy or surgical removal is safest and most effective. Anoscopy and/or sigmoidoscopy should be performed in patients with perianal lesions, and suspicious lesions should be biopsied to rule out malignancy. ■ ■COUNSELING PATIENTS REGARDING

HPV DISEASE Most sexually active adults will be infected with HPV during their lives. The only way to avoid acquiring an HPV infection is to abstain from sexual activity, including intimate touching and oral sex. Practicing safe sex (partner reduction, use of condoms) may help reduce HPV transmission. Most HPV infections will be controlled by the immune system and cause no symptoms or disease. Some infections lead to genital warts and cervical precancers. Genital warts can be treated for cosmetic reasons and to prevent spread of infection to others. Even after resolution of genital warts, latent HPV may persist in normalappearing skin or mucosa and thus theoretically may be transmitted to uninfected partners. Precancerous cervical lesions should be treated to prevent progression to cancer.

■ ■FURTHER READING Akhatova A et al: Prophylactic human papillomavirus vaccination: From the origin to the current state. Vaccines (Basel) 10:1912, 2022. Clifford GM et al: Carcinogenicity of human papillomavirus (HPV) types in HIV-positive women: A meta-analysis from HPV infection to cervical cancer. Clin Infect Dis 64:1228, 2017. Garland SM et al: Impact and effectiveness of the quadrivalent human papillomavirus vaccine: A systematic review of 10 years of real-world experience. Clin Infect Dis 63:519, 2016. Gavinski K, DiNardo D: Cervical cancer screening. Med Clin North Am 107:259, 2023. Gelbard MK, Munger K: Human papillomaviruses: Knowns, mysteries, and unchartered territories. J Med Virol 95:e29191, 2023. Giuliano AR et al: Efficacy of quadrivalent HPV vaccine against HPV infection and disease in males. N Engl J Med 364:401, 2011. Gravitt PE, Winer RL: Natural history of HPV infection across the CHAPTER 204 lifespan: Role of viral latency. Viruses 9:265, 2017. Palefsky J et al: Treatment of anal high-grade squamous intraepithe lial lesions to prevent anal cancer. N Engl J Med 386:2273, 2022. Rosenblum HG et al: Declines in prevalence of human papilloma virus vaccine-type infection among females after introduction of vaccine — United States, 2003–2018. MMWR Morb Mortal Wkly Rep 70:415, 2021. Schiffman M et al: Carcinogenic human papillomavirus infection. Common Viral Respiratory Infections, Other Than COVID-19
Nat Rev Dis Primers 2:16086, 2016. Section 13 Infections Due to DNA and RNA Respiratory Viruses James E. Crowe, Jr.

Common Viral

Respiratory Infections,

Other Than COVID-19 The most common and frequent infections in humans are respiratory virus infections. Influenza viruses and coronaviruses have been the agents responsible for the largest infectious disease pandemics. These viruses are easily transmitted by contact, droplets, and fomites. Fur thermore, transmission can occur before the appearance of symptoms. These viruses are also associated with a large reproductive number (the number of secondary infections

generated from one infected individual to others). Some classical respiratory viruses (e.g., rhinoviruses) enter the body through the respiratory tract, replicating and causing disease only in cells of the respiratory epithelium. Other, more systemic viruses (e.g., measles virus and severe acute respiratory syndrome coronavirus [SARS-CoV]) spread via the bloodstream and cause systemic disease;

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