Original Investigation
Orijinal Araştırma

DOI: 10.4274/turkderm.galenos.2025.58855
Turkderm-Turk Arch Dermatol Venereol 2025;59(4):132-8

Risk factors for giant condyloma acuminata in a tertiary referral hospital: A 10-year-analysis

Üçüncü basamak bir hastanede dev kondiloma aküminata için risk faktörleri: 10 yıllık analiz

Prasetyadi Mawardi, Lifesia Natali Lidjaja, Sesia Pradestine, Osdatilla Esa Putri, Pratiwi Prasetya Primisawitri

Sebelas Maret University Faculty of Medicine, Department of Dermatology and Venereology; Dr. Moewardi General Hospital, Surakarta, Indonesia

Abstract

Background and Design: Giant condyloma acuminata (GCA), or Buschke-Loewenstein tumor, is a rare anogenital and perianal verrucous tumor associated with human papillomavirus infection, characterized by circular, exophytic, cauliflower-like tumors commonly seen in the anogenital area. This study aimed to identify the risk factors associated with GCA among patients with condyloma acuminata (CA) at the dermatology and venereology outpatient clinic of a tertiary referral hospital in Indonesia.
Materials and Methods: This retrospective descriptive study used secondary data from the medical records of patients who visited the dermatology and venereology outpatient clinic of a tertiary referral hospital in Surakarta, Indonesia, from January 2013 to December 2022. The data were statistically analyzed using a bivariate chi-square test, and significance was set at p<0.05.
Results: Of the 2202 outpatient visits, 313 patients were diagnosed with CA, of whom 28 were diagnosed with GCA. These GCA patients were predominantly male (71.43%) and aged between 21 and 40 years (57.14%). Most subjects were high school graduates (42.9%), private employees (50%), men who have sex with men (42.86%), and human immunodeficiency virus (HIV)-reactive (67.86%). The most common predilection site was the anal region (35.71%). The duration of the disease was less than one year (53.6% of patients). The most common therapy was cryotherapy (82.14%), followed by oral cimetidine (78.57%), topical potassium hydroxide (75%), and topical trichloroacetic acid 80% (67.86%). Bivariate analysis revealed that male sex (p=0.023), sexually active age (p=0.025), high school graduation (p=0.000), employment (p=0.000), and reactive HIV (p=0.001) were the risk factors for GCA.
Conclusion: GCA is a rare disease. The risk factors for GCA include being a sexually active male, having a high school education, being employed, and being HIV-reactive.
Keywords: Giant condyloma acuminata, condyloma acuminata, HIV, men who have sex with men, HPV

Öz

Amaç: Dev kondiloma akuminata (DKA) veya Buschke-Loewenstein tümörü, insan papilloma virüsü enfeksiyonu ile ilişkili nadir bir anogenital ve perianal verrukoz tümördür ve sıklıkla anogenital bölgede bulunan dairesel, ekzofitik, karnabahar benzeri tümörlerle karakterizedir. Bu çalışmanın amacı, Endonezya'daki üçüncü basamak bir sevk hastanesinin dermatoloji ve venereoloji polikliniğindeki kondiloma akuminatalı (KA) hastalar arasında DKA ile ilişkili risk faktörlerini belirlemektir.
Gereç ve Yöntem: Bu çalışma, Endonezya'nın Surakarta kentindeki üçüncü basamak sevk hastanesinin dermatoloji ve venereoloji polikliniğine Ocak 2013 - Aralık 2022 tarihleri arasında başvurmuş KA'lı hastaların tıbbi kayıtlarından elde edilen ikincil verileri kullanan retrospektif tanımlayıcı bir çalışmadır. Veriler iki değişkenli ki-kare testi ile istatistiksel olarak analiz edildi ve istatistiksel anlamlılık p<0,05 olarak belirlendi.
Bulgular: Cinsel yolla bulaşan enfeksiyonlar kliniğine yapılan toplam 2202 ayaktan hasta başvurusunun 313'üne KA tanısı konuldu ve bunların 28'i DKA hastasıydı. DKA hastalarının çoğunluğu erkekti (%71,43) ve hastaların çoğunluğu 21-40 yaş aralığındaydı (%57,14). Katılımcıların büyük çoğunluğu lise mezunu (%42,9), özel sektör çalışanı (%50), erkeklerle seks yapan erkekler (%42,86) ve insan bağışıklık yetmezliği virüsü (HIV) reaktifti (%67,86). Lezyonlar çoğunlukla anal bölgede (%35,71) yerleşiyordu. Hastaların çoğunluğunda DKA'nin süresi bir yıldan azdı

Address for Correspondence/Yazışma Adresi: Prasetyadi Mawardi MD, Sebelas Maret University Faculty of Medicine, Department of Dermatology and Venereology; Dr. Moewardi General Hospital, Surakarta, Indonesia
E-mail: prasetyadi_m@staff.uns.ac.id **ORCID:** orcid.org/0000-0001-6062-5801
Received/Geliş Tarihi: 13.01.2025 **Accepted/Kabul Tarihi:** 10.12.2025 **Publication Date/Yayınlanma Tarihi:** 30.12.2025

Cite this article as/Atıf: Mawardi P, Lidjaja LN, Pradestine S, Putri OE, Primisawitri PP. Risk factors of giant condyloma acuminata in Dr Moewardi General Hospital as tertiary referral hospital (january 2013 - december 2022 period). Turkderm-Turk Arch Dermatol Venereol. 2025;59(4):132-8

(%53,6). Hastaların 4'üne sadece kriyoterapi ve 1'ine sadece trikloroasetik asit uygulandı. Hastaların toplam 5'ine (%17,9) tek bir tedavi yöntemi uygulanırken, 23 hastaya (%82,1) birden fazla tedavi yöntemi uygulandı. İki değişkenli analiz sonucunda erkek cinsiyetin (p=0,023), cinsel olarak aktif yaşın (p=0,025), lise mezunu olmanın (p=0,000), çalışan olmanın (p=0,000) ve reaktif HIV'in (p=0,001) DKA risk faktörleri olduğu belirlendi.

Sonuç: DKA nadir görülen bir hastalıktır. DKA risk faktörleri cinsel olarak aktif erkekler, lise mezunları, özel sektör çalışanları ve reaktif HIV'dir.

Anahtar Kelimeler: Dev kondiloma akuminata, genital siğiller, HIV, erkeklerle seks yapan erkekler, HPV

Introduction

Giant condyloma acuminata (GCA), or Buschke–Loewenstein tumor, is a rare anogenital and perianal verrucous tumor associated with human papillomavirus (HPV) infection, characterized by circular, exophytic, cauliflower-like tumors commonly found in the anogenital area[1]. These tumors are mostly caused by HPV 6 and 11, although in certain populations, they can be caused by HPV 16 and 18[1,2]. GCA is a variant of condyloma acuminata (CA)[1]. It is also described as multiple confluent classic CA (CCA)[3]. The exact relationship between these two factors remains unclear. GCA is characterized by cauliflower-like exophytic lesions with a diameter of 5-10 cm to more than 30 cm[4-6]. Both are distinguished not only by their size but also by their histopathological characteristics[7].

GCA develops slowly and is considered histopathologically benign. However, it is aggressive, as it can destroy and penetrate the inner layers of the surrounding tissue[8]. GCA is highly recurrent, and about 50% of GCAs become malignant[7,9-11].

CA is caused by sexually transmitted infections (STIs); thus, its occurrence is closely related to a person's sexual behavior. The reported prevalence of GCA is 0.1% annually among sexually active adults[7,12]. The GCA cases found and documented in Indonesia are primarily limited to case reports, so the information provided is individual[13,14]. This may be due to the rarity of the disease. CA has been the most common STI in our tertiary referral hospital for several consecutive years; therefore, the possibility of GCA is also increasing. To date, no collective dataset related to GCA in Indonesia has been published. Therefore, this study aimed to identify the risk factors associated with GCA among patients with CA in the dermatology and venereology outpatient clinic of a tertiary referral hospital in Indonesia.

Materials and Methods

We conducted a retrospective descriptive study using secondary data from medical records of patients visiting dermatology and venereology outpatient clinic in a tertiary referral hospital in Surakarta between January 2013 and December 2022. We included all patients diagnosed with GCA based on the international classification of diseases (10, A63.0). Patients with incomplete medical records and whose histopathological diagnosis did not show CA were excluded from this study.

Statistical Analysis

The data were compiled in tabular form and described narratively. Bivariate analysis was performed using the one-sample binomial test for variables with two categories and the one-sample chi-square test for variables with more than two categories to evaluate the relationship between variables. Statistical analyses were performed using Statistical Package for the Social Sciences for Windows (version 27.0; Armonk, NY: IBM Corp., USA)

Ethical Statement

This study has received ethical approval from the local health research ethics committee Dr. Moewardi General Hospital, Surakarta (decision no: 2.212.C/III/HREC/2024, date: 20.03.2024).

Results

In the last ten years, there were 2202 outpatient visits, of which 313 patients were diagnosed with CA. Of these patients with CA, 28 had GCA. GCA-affected patients were aged between 16 and 68 years (mean, 31.6 years, median, 26 years). The largest age group was 21-40 years, with 16 patients (57.14%). GCA predominantly affected males (71.43%). Most patients were high school graduates (46.43% of the total). Most patients were employees (50%). Human immunodeficiency virus (HIV) comorbidity was found in 19 patients (67.86%) who were simultaneously undergoing treatment and medical checkups at the voluntary counseling and testing (VCT) service. Among 285 patients presenting with CCA, 67 (23.51%) tested seropositive for HIV, 19 (6.67%) tested seronegative, and the remaining patients had not undergone HIV status testing. The lesion was most commonly found in the anal region (35.71%), followed by the genital, anogenital, and perianal regions (Figures 1, 2, and 3). Some patients had lesions in more than one region, spreading to the inguinal, perineal, and gluteal regions. Most patients had been suffering from GCA for less than one year (53.6% of patients). More than 75% of patients received cryotherapy administered once a week at each visit, potassium hydroxide (KOH) 10% applied once daily at night by the patient, and oral cimetidine at a dose of 400-800 mg three times daily as adjuvants. A total of 67.86% of subjects received 80% trichloroacetic acid (TCA) administered once a week at each visit. Seven patients received zinc supplementation in a 20 mg/24-hour tablet (Table 1). In addition, topical use of podophyllin, fluorouracil, and oral astaxanthin was also administered. Combination regimens were common: 85.71% received cryotherapy plus oral cimetidine, 64.28% received TCA plus oral cimetidine, and 50% received cryotherapy with TCA. When comparing data from the past three years, combination therapy with TCA and cryotherapy achieved the highest cure rate (78.95%), compared with TCA (63.86%) and cryotherapy (40%). Bivariate analysis revealed significant differences in sex (p=0.023), age of sexual activity (p=0.025), high school graduation (p=0.000), and reactive HIV (p=0.001). Regarding the predilection sites, there were no significant differences among the genital, anal, anogenital, and perianal areas (p=0.572).

Turkderm - Turk Arch Dermatol Venereol
2025;59(4):132-8

Figure 1. Giant condyloma acuminata spreading in the anal, genital, anogenital, and perianal regions

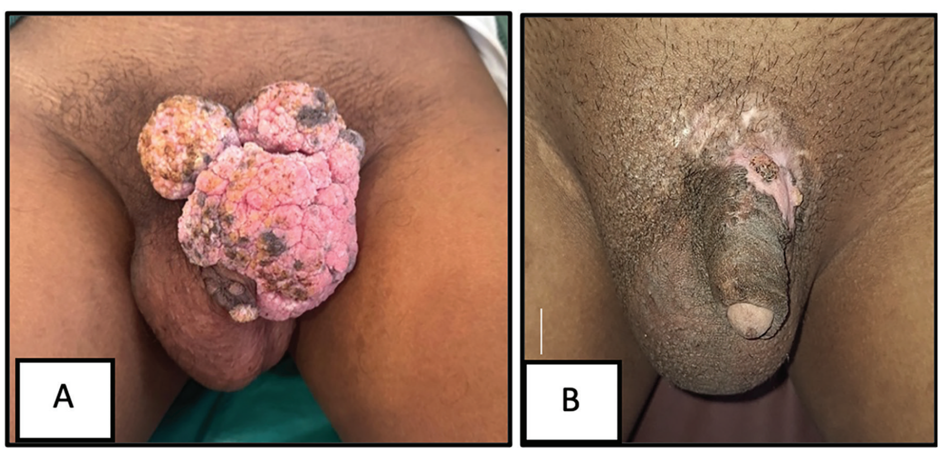

Figure 2. A) Giant condyloma acuminata on corpus penis (before therapy), B) After multi-modality therapy (cryosurgery, chemocautery, and electrocautery)

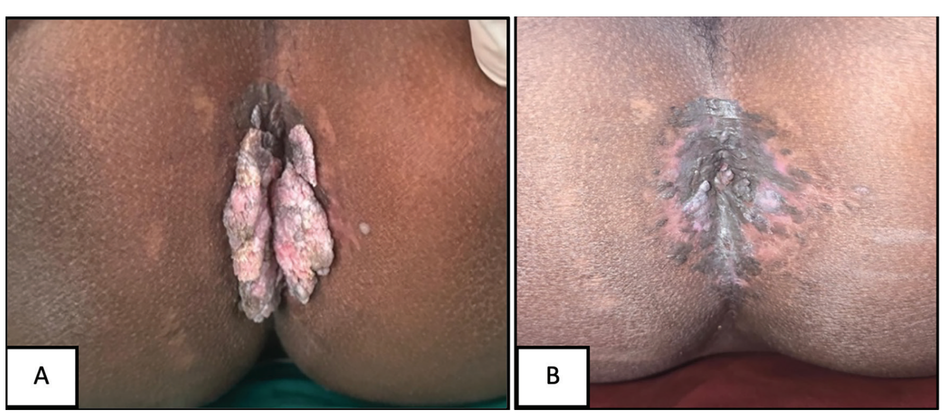

Figure 3. A) Giant condyloma acuminata on the anal region (before therapy), B)After multi-modality therapy (cryosurgery, chemocautery, and electrocautery)

Table 1. Characteristic of the study subjects

Characteristic	Number (n)	Percentage (%)	p
Sex			
Male	20	71.43	0.023
Female	8	28.57	
Age			
≤20 years	5	17.86	0.025
21-40 years	16	57.14	
>41 years	7	25	
Education			
Unschooled	1	3.57	0.000
Primary school	3	10.71	
Secondary school	0	0	
High school	13	46.43	
Associate’s degree	2	7.14	
Bachelor’s/master’s degree	7	25	
N/A	2	7.14	
Occupation			
Students	3	10.7	0.000
Housewives	2	7.14	
Private employees	14	50	
Self-employed	4	14.29	
Civil servants	1	3.57	
Farmers	1	3.57	
N/A	3	10.71	
Sexual orientation			
Heterosexual	7	25	0.112
MSM	12	42.86	
Bisexual	3	10.71	
N/A	6	21.43	
HIV status			
Positive	19	67.86	0.001
Negative	5	17.86	
N/A	4	14.29	
Predilection of lesions			
Genital	7	25	0.572
Anal	10	35.71	
Anogenital	6	21.43	
Perianal	5	17.86	
Duration of the disease			
<1 year	16	57.14	0.000
1-3 years	8	28.57	
>3 years	2	7.14	
N/A	2	7.14	
Type of therapy			
TCA 80%	19	67.86	0.000
Cryotherapy	23	82.14	
Electrocautery	6	21.43	
Cimetidine	22	78.57	
KOH	21	75	
Zinc	7	25	

N/A: No answer, TCA: Trichloroacetic acid, KOH: Potassium hydroxide, MSM: Men who have sex with men

Discussion

The prevalence of GCA in the past ten years in our tertiary referral hospital was 0.002%. This is smaller than the reference number in the literature, which is 0.1%. Such differences can occur due to several factors, such as differences in numbers and selection of the total population at risk[7,11]. GCA is a type of CA characterized by its large size. An agreement on the reference size of GCA for clinical diagnosis has not been established; thus, it remains controversial[14]. The clinical appearance of GCA can resemble that of CCA, and the two are sometimes distinguished only by subjective size. Lesions larger than 5 cm in diameter are classified as GCA. GCA and CA are indistinguishable at initial onset[1]. GCA differs from CCA in its invasive nature. It cannot spontaneously resolve and can transform into malignancy. It also has high recurrence[10,15]. In the medical record data reviewed, there were inconsistencies in writing the diagnosis, such as "genital warts," "CA," and "GCA" in several visits to the same patient. Such discrepancies may be a consequence of the lack of consensus on the clinical diagnosis of GCA. Histopathological examination is not routinely performed to establish a diagnosis. Hence, the diagnosis primarily relies on the clinical assessment of dermatologists and venereologists.

GCA tends to be more common in males than females (2.7:1)[16]. Our study also reported that males were more prone to GCA, with a male/female ratio of 2.5:1. Women are biologically more at risk for STIs than men because of their anatomical forms, whereas the vagina has a wider surface for contact and trauma[17]. HIV as the etiology of GCA is more common in men, although women are at higher risk. A weak immune response is assumed to be the cause of the high infection rate in men. Immunodeficiency or immune disorders predispose patients to GCA[1]. HPV clearance in men is comparable to that in women, that is, within 6-18 months, with a lower number of HPV antibodies[18]. Such differences may explain the high prevalence of GCA in men.

Education has long been considered a protective factor against risky sexual behavior and STIs. A study by Slurink et al.[19] in 2021 in Rotterdam, Netherlands, reported that a low education level is an independent risk factor for STI in women. In contrast to our findings, most of our subjects were high school graduates. Another study conducted in Medan, Indonesia, also found similar results, with 60% of patients with CA having graduated from high school[20]. The Indonesian government's 12-year mandatory formal education program could potentially explain the high distribution of high school graduates. However, we also observed that 32.14% of patients with GCA had a higher education. This shows that knowledge of reproduction or sexuality is not the main objective of formal education. No study has assessed the level of education as a potential risk factor for GCA.

Men who have sex with men (MSM) (42.86%) dominated the sexual orientation of our study participants, followed by heterosexual (25%) and bisexual (10.71%). MSM have a higher risk of HPV infection, which can lead to more severe conditions, such as cancer. One of the causes is receptive anal sexual intercourse[21]. A cohort study by Purwoko et al.[22] in Palembang, Indonesia, revealed sexual orientation as a risk factor for HIV-positive CA. In MSM with HIV, the rate of HPV infection is 88%[23]. By 2020, Indonesia recorded approximately 540.000 people living with HIV, with a prevalence of 0.4% in the 15-49 age group[24]. HIV was reactive in 67.86% of our subjects. Almost all of our male subjects were HIV reactive, except for one subject who was clinically suspected of having HIV. The immunosuppression in HIV promotes dysplasia, resulting in the transformation of CCA into anal intraepithelial lesions such as GCA[25].

In our study, the GCA lesion was mostly observed in the anal region, confirming the possibility of receptive anal sexual contact. Nevertheless, it can also occur in heterosexual couples without a history of anal contact[26]. Other affected regions include the genital, anogenital, and perianal areas. Lesions can occur in multiple areas due to expansion or simultaneous emergence in different patients. Buschke and Löwenstein first identified GCA on the penis and described it as CA-like carcinoma of the penis[27]. GCA can proliferate faster in immunocompromised patients than in immunocompetent or non-pregnant individuals[28]. In our study, patients with lesion distribution in more than one region were HIV-reactive, except for a few patients whose HIV status was unknown.

Most patients sought help at our hospital within less than one year after the occurrence of the lesion. CA is usually asymptomatic, especially when caused by low-risk HPV types 6 and 11; therefore, it may not affect organ function but is cosmetically disturbing[1]. The signs and symptoms are influenced by the size and anatomical location, such as GCA, which sometimes feels painful or itchy[26]. A study by Denison et al.[29] in 2017 in New Zealand identified three possible causes of delayed visits to STI facilities: personal (ignorance of risks, perceived harmlessness, concerns about genital examinations), structural (cost, judgmental clinician attitudes), and social (concerns about stigma). GCA's potential for malignancy underscores the importance of VCT department referrals for early detection and management.

Cryotherapy, cimetidine, and 10% KOH were the most common therapies administered to our participants. Some participants received chemical cautery (TCA 80%), electrosurgery, and zinc tablets. A total of 85.71% of the subjects received combination therapy consisting of cryotherapy and oral cimetidine, 64.28% received TCA plus oral cimetidine, and 50% received cryotherapy and TCA, with combination therapy of TCA and cryotherapy achieving the highest cure rate. Chemical surgery and cryosurgery are both effective in addressing GCA and have no significant difference in their effect on cluster of differentiation 4 (CD4+) status in reactive-HIV patients[30]. Cryotherapy in this study was generally administered once a week for several visits. Cryotherapy is the first-line treatment for CA, with a success rate of 94%[31]. To date, there have been no therapeutic guidelines for GCA. The optimal therapeutic strategy for GCA consists of extensive excision followed by reconstructive surgery with recommended imaging examinations to evaluate tumor extension[1]. Cimetidine is an immunomodulatory adjuvant that improves the healing process and lowers the risk of recurrence in CA therapy[32]. In our study, cimetidine was administered at a dose ranging from 3 × 400 mg to 3 × 800 mg per day. Similar to cimetidine, TCA is sometimes combined with cryotherapy to help speed up the healing process[33]. KOH 10% is administered as a keratolytic agent that can be individually applied by the patient to destroy cells infected by the virus[34].

Study Limitation

This study had several limitations. The main concern is the sample size; we could not analyze the data further using multivariate analysis due to its small sample size. Another limitation is the incomplete medical record data, especially for the sexual orientation variable; thus, the reported percentage may not represent the actual sexual orientation. Third, we relied on medical record diagnoses based on physicians' clinical assessments, which may have introduced misclassification bias. However, due to incomplete data from the past 10 years, we could only compare cure rates from the most recent three years. Nevertheless, the long study period was a strength of this study.

Therefore, further studies with larger sample sizes and multiple centers are required to generalize the findings.

Conclusion

GCA is a rare disease, found in only 8.94% of patients visiting our hospital over a ten-year period. The risk factors for GCA are being a sexually active male, a high school graduate, an employee, and reactive to HIV.

The combination of cryotherapy with other modalities, such as cimetidine and TCA, is the most common therapy administered to patients with GCA.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the local health research ethics committee Health Research Ethics Committee of Dr. Moewardi General Hospital (number: 2.212.C / III / HREC /2024, date: 20.03.2024).

Informed Consent: Retrospective study.

Acknowledgements

The authors would like to thank RSDM director for permitting and facilitating this research.

Footnotes

Author Contributions

Surgical and Medical Practices: P.M., L.N.L., Concept: P.M., L.N.L., P.P.P Design: P.M., P.P.P, Data Collection or Processing: P.M., L.N.L., S.P., O.E.P., Analysis or Interpretation: P.M., P.P.P Literature Search: P.M., S.P., O.E.P., Writing: P.M., P.P.P.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Purzycka-Bohdan D, Nowicki RJ, Herms F, Casanova JL, Fouéré S, Béziat V: The pathogenesis of giant condyloma acuminatum (Buschke-Lowenstein tumor): An overview. Int J Mol Sci. 2022;23:4547.
2. Mawardi P, Yuliarto D: Susceptibility of male who have sex with male to high-risk type human papillomavirus (HPV) 16 and 18 with condyloma acuminata. Berkala Ilmu Kesehatan Kulit Kelamin. 2022;34:197-202.
3. Pineda-Murillo J, Lugo-García JA, Martínez-Carrillo G, et al.: Buschke–Löwenstein tumor of the penis. Afr J Urol. 2019;25:1-4.
4. Elsayed AG, Sola-Rufai ST, Griswold D, Pacioles T: Verrucous carcinoma arising in a long standing Buschke-Löwenstein tumor. Clin Case Rep. 2019;7:836-8.
5. Venter F, Heidari A, Viehweg M, Rivera M, Natarajan P, Cobos E: Giant condylomata acuminata of buschke-lowenstein associated with paraneoplastic hypercalcemia. J Investig Med High Impact Case Rep. 2018;6:2324709618758348.
6. Niazy F, Rostami K, Motabar AR: Giant condyloma acuminatum of vulva frustrating treatment challenge. World J Plast Surg. 2015;4:159-62.
7. Nieves-Condoy JF, Acuña-Pinzón CL, Chavarría-Chavira JL, Hinojosa-Ugarte D, Zúñiga-Vázquez LA: Giant condyloma acuminata (Buschke-Lowenstein Tumor): Review of an unusual disease and difficult to manage. Infect Dis Obstet Gynecol. 2021;2021:9919446.
8. Sivakumar S, Subramanian VS, Kuncheria T, Subramanian SS: Buschke-lowenstein tumour: A case report. IP Indian J Clin Exp Dermatol. 2020;6:287-90.
9. Kang S, Amagai M, Bruckner AL, et al.: Fitzpatrick's dermatology. 9th ed. New York, McGraw-Hill Medical; 2019.
10. Papapanagiotou IK, Migklis K, Ioannidou G, et al: Giant condyloma acuminatum-malignant transformation. Clin Case Rep. 2017;5:537-8.
11. Zhan M, Tong Z, Chen S, Miao Y, Yang Y: Establishing a prediction model for recurrence of condyloma acuminatum. Eur J Med Res. 2022;27:183.
12. El Bessi M, Dougaz W, Jones M, Jerraya H, Dziri C: A giant anorectal condyloma is not synonym of malignancy. J Gastrointest Cancer. 2019;50:1026-8.
13. Rachman A, Hasan N: Giant condyloma acuminata in Indonesian females with SLE under immunosuppressant and steroid therapy. Case Reports Immunol. 2016;2016:4710979.
14. Hastuti R, Mustifah EF, Ellistasari EY: Kombinasi krioterapi dan KOH 5% untuk terapi kondiloma akuminata raksasa dengan infeksi HIV. CDK. 2018;45:524-7.
15. Kim HG, Kesey JE, Griswold JA: Giant anorectal condyloma acuminatum of Buschke-Löwenstein presents difficult management decisions. J Surg Case Rep. 2018;2018:rjy058.
16. Yang E, Palefsky JM: Diseases of the anus. Diagnostic gynecologic and obstetric pathology. Ed. Crum CP, Nucci MR, Howitt BE, et al. 3rd ed. Philadelphia, Elsevier; 2018:224-57.
17. Van Gerwen OT, Muzny CA, Marrazzo JM: Sexually transmitted infections and female reproductive health. Nat Microbiol. 2022;7:1116-26.
18. Lewis RM, Markowitz LE, Gargano JW, Steinau M, Unger ER: Prevalence of genital human papillomavirus among sexually experienced males and females aged 14-59 years, United States, 2013-2014. J Infect Dis. 2018;217:869-77.
19. Slurink IA, Götz HM, van Aar F, van Benthem BH: Educational level and risk of sexually transmitted infections among clients of Dutch sexual health centres. Int J STD AIDS. 2021;32:1004-13.
20. Rohanda BA, Hutapea R, Nadeak K: Relationship between clusters of differentiation 4 count and type of human papilloma virus with giant condyloma acuminata. Open Access Maced J Med Sci. 2023;11:335-9.
21. Zhang Z, Ling X, Liu L, Xi M, Zhang G, Dai J: Natural history of anal papillomavirus infection in HIV-negative men who have sex with men based on a markov model: a 5-year prospective cohort study. Front Public Health. 2022;10:891991.
22. Purwoko IH, Karim PL, Nugroho SA: Risk factors for HIV-positive status in condyloma acuminata. J Gen Proced Dermatol Venereol Indones. 2022;6:21-8.
23. Bruzzesi E, Galli L, Poli A, et al: Prevalence and risk factors of anal HPV infection in MSM living with HIV: identifying the target groups to prioritize for immunization. J Acquir Immune Defic Syndr. 2022;91:226-31.
24. Jocelyn, Nasution FM, Nasution NA, et al: HIV/AIDS in Indonesia: current treatment landscape, future therapeutic horizons, and herbal approaches. Front Public Health. 2024;12:1298297.
25. Kreuter A, Potthoff A, Brockmeyer NH, et al: Anal carcinoma in human immunodeficiency virus-positive men: results of a prospective study from Germany. Br J Dermatol. 2010;162:1269-77.
26. Mawardi P, Kamilah L, Fauziyyah Heryadi F, Arrosyid A: The effectiveness of chemical cautery and electrosurgery on anogenital wart: Systematic review. Clin Cosmet Investig Dermatol. 2023;16:2773-80.
27. Agarwal S, Nirwal GK, Singh H: Buschke-Lowenstein tumour of glans penis. Int J Surg Case Rep. 2014;5:215-8.
28. Atkinson AL, Pursell N, Sisay A: The giant condyloma (Buschke-Löwenstein tumor) in the immunocompromised patient. Case Rep Obstet Gynecol. 2014;2014:793534.

29. Denison HJ, Bromhead C, Grainger R, Dennison EM, Jutel A: Barriers to sexually transmitted infection testing in New Zealand: a qualitative study. Aust N Z J Public Health. 2017;41:432-7.

30. Mawardi P, Febrianto B, Yuliarto D, Sumandjar T: Comparing the efficacy of chemical cautery to cryosurgery on CD4+ status of HIV patients with condyloma acuminata. Clin Cosmet Investig Dermatol. 2021;14:1453-8.

31. Jahic M: Cryotherapy of genital warts. Mater Sociomed. 2019;31:212-4.

32. Mawardi P, Utami RD, Cahyono A, Murasmita A: Oral cimetidine as an adjuvant therapy for condyloma acuminata. Aktuelle Derm. 2023;49:123-6.

33. Dhamayanti ME, Rahayu T, Wirawan EP, et al.: Terapi kondiloma akuminata dengan kombinasi trichloroacetic acid (TCA) 80% + krioterapi. CDK. 2019;46:443-7.

34. Galal EA, Ali MM, Ali MS: Comparative study between potassium hydroxide 5% and liquid nitrogen in treatment of plane warts. Sci J Al-Azhar Med Fac, Girls. 2020;4:644-50.