



Carbon dioxide (CO₂) laser ablation treatment of a peri-urethral genital wart: A case report

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ABSTRACT

Background: Visible genital warts are caused by the nearly 100 recognized strains of human papillomavirus (HPV). HPV infections caused by high-risk strains are associated with significant morbidity and mortality rates. Genital warts are diagnosed by visual inspection and treated by three major methods: topical agents, systemic agents, and surgical therapies. CO₂ laser ablation is the best treatment option for warts that present as refractory, thick, extensive lesions. CO₂ laser ablation offers benefits such as a painless procedure, increased clearance rate, lesser side-effects and decreased pain.

Case Presentation: An 18-year old patient was referred to the obstetric/gynecology clinic and presented with severe urinary complications. She complained of dysuria, frequency, vaginal irritation, and spraying while voiding. Physical exam was within normal limits; however, genital examination revealed a 3 cm fungating mass corresponding to a large genital wart at the urethral meatus and peri-urethral area. Due to her progressing symptomatology, CO₂ laser ablation therapy was advised.

Discussion: HPV directly impacts the public health system, affecting 1% of the US population with an estimated 10–20% prevalence rate. Treatment options such as CO₂ laser ablation offers complete removal for most patients with limited side-effects. Accurate follow-up is necessary to monitor proper recovery.

Conclusion: CO₂ laser ablation is considered an effective form of therapy in cases where immediate removal is desired and surgical excision is not recommended. CO₂ laser ablation provides high clearance rates and minimal instances of recurrence, as well as superior aesthetic outcome.

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1. Introduction

Genital warts are the visible manifestation of infection by one or more of the nearly 100 recognized strains of human papillomavirus (HPV). HPV is the most common sexually transmitted disease (STD) worldwide, and its infections are associated with significant morbidity and mortality. HPV is responsible for several mucosal and epithelial lesions and cancers. HPV infections most commonly affect women under the age of 25 years [1].

Visible genital warts are typically caused by HPV types 6 and 11, which are rarely associated with invasive squamous cell carcinoma of the external genitalia. HPV types 16, 18, 31, 33, and 35 have been found in genital warts and are associated with squamous intraepithelial neoplasia; types 16 and 18 are associated most strongly with malignant potential [2]. An HPV infection from a high-risk subtype does not alone

cause cancer but requires a trigger such as smoking, folate deficiency, exposure to UV light, immunosuppression and/or pregnancy [3].

The incubation period for HPV can be anywhere from 3 weeks to 8 months before entering the prodromal stage where clinical manifestation is observed [4]. Genital warts are diagnosed by visual inspection and can appear as papillomatous plaques or flat lesions with single or multiple forms and may increase in number and/or size. The color of genital warts varies from flesh-colored to white, pink, or brown. They can be found in the cervix, vagina, vulva, urethral meatus, and perianal region of females, and in the scrotum, penis shaft, corona and under the foreskin, as well as perianal region of males [5]. Multifocal genital warts have been found to carry a nearly three times higher risk of recurrence when compared to unifocal lesions. Prior to initiation of treatment, accurate diagnosis is important. Since diagnosis is based predominantly on physical examination, it is vital for healthcare providers to understand the different morphological forms of genital warts [6].

Genital wart treatment focuses on removal of warty tissue rather than virus eradication. The variety of treatment options for genital warts can be categorized into 3 groups: topical agents, systemic agents, and surgical therapies. A large number of cases recur within three

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months of infection after receiving appropriate treatment, meaning that no matter which option the patient chooses, a follow-up appointment will be required. Efficacy of treatment varies between 22% and 94% according to treatment method.

According to a recent systematic review and meta-analysis by Jung et al. regarding standard therapy, a podophyllotoxin 0.5% solution was significantly more effective than imiquimod 5% cream for lesion clearance but was associated with increased side-effects. Imiquimod 5% cream was significantly more effective than Sinecatechins 15% ointment [7]. Moreover, idoxuridine, polyhexamethylene biguanide, cidofovir and SB206 proved to be equally effective. These treatments were comparable regarding wart recurrence, severe side-effects, after taking into account patients who withdrew from the study. The authors concluded that all studied treatments were effective, well tolerated, and each had its own advantages and disadvantages [7].

Over the past decade, a trend towards surgical treatment has been observed. The benefits of surgical treatments are increased clearance rates, decreased pain, lower recurrence rate and lesser side-effects [6,8]. CO₂ laser ablation is a recommended treatment option for warts that present as refractory, thick, and extensive lesions. Unlike some other treatments, laser therapy requires local anesthesia and can sometimes be accompanied by side-effects such as pruritus surrounding the scar. The benefits of laser therapy are that it is often a painless procedure and patients are able to heal quickly with lower infection levels and low rates of recurrence and complications [8]. In addition, patients can usually have all lesions removed in one session. CO₂ laser ablation therapy offers good cosmetic results without scar formation in almost all cases. Efficacy studies report persistent complete clearance in 22–93% of patients who received CO₂ ablation therapy [9].

2. Case Presentation

An 18-year-old African American female with no pre-existing chronic conditions presented with severe urinary complications. She complained of dysuria, frequency, vaginal irritation, and spraying while voiding. She had had unprotected sexual intercourse once, four weeks prior to the onset of symptoms. The patient was initially consulted by a physician assistant at an urgent-care clinic, where rapid strip urine test results were found to be within normal limits. She was prescribed a 3-day course of Bactrim. When the symptoms were not diminished upon completion of antibiotics, the patient was advised to consult the obstetric/gynecology clinic.

The patient's past medical history was noncontributory. Family history was unremarkable. The patient had no previous history of urinary tract infection or STDs and her STD testing panel was within normal limits. Physical exam was also within normal limits; however, genital examination revealed a 3 cm fungating mass corresponding to a large genital wart at the urethral meatus and peri-urethral area [Fig. 1]. The patient's HPV test indicated low risk.

Due to her progressing symptomatology and location of the wart, we decided that the best course of treatment was CO₂ laser ablation therapy. The patient consented and the procedure was carried out without complication. An HPV vaccine was recommended. The patient consented and received the vaccination at the same clinic. At eight-day follow-up, genital wart and symptoms had resolved [Fig. 2]. At six-month follow-up, no sign of recurrence was observed.

3. Discussion

HPV has a direct impact on the public health system due to the costs associated with viral diagnostic tests, immunization, and treatment of cases, resulting in an annual expense of \$6.6 billion each year [9]. Genital warts affect 1% of the United States population, with an estimated prevalence rate of about 10%–20%. The highest prevalence occurs in women between 20 and 24 years of age and in men between 25 and 29 years of age [10]. Due to earlier age of initial sexual contact and an increased



Fig. 1. Genital wart found at the urethral meatus and peri-urethral area.

number of sexual partners, the incidence of HPV infections has increased dramatically. According to one study, at least 75% of sexually active adults have been infected with genital HPV-type at some time [11]. Warts caused by HPV are one of the most common manifestations of sexually transmitted disease. Most HPV infections are temporary and asymptomatic; however, in some cases the wart causes unbearable side-effects. More than 75% of those infected with HPV will clear the infections within two years, however, proper diagnosis and treatment are necessary in order for patients to return to normal life as quickly as possible, especially in cases where normal urogenital function has been compromised. Because there is no cure for HPV, wart removal is the main goal of therapy.

In the present case, the patient was initially treated with Bactrim; however, the antibiotic was unsuccessful. CO₂ laser ablation therapy was advised due to progressing symptoms and the disruption of normal urogenital function. CO₂ laser therapy is safe for use on skin as it is not absorbed by either blood or melanin [12]. It can be used in an outpatient setting with minimal risk to those providing treatment. In addition, CO₂ laser therapy is associated with faster healing and high patient satisfaction. A 2012 study by Azizjalali *et al* involving 160 patients compared CO₂ therapy to cryotherapy and found that 95% of patients who received CO₂ laser therapy achieved complete clearance with a single treatment, whereas only 46% of patients treated with cryotherapy achieved complete clearance within two to three treatments [13].



Fig. 2. Improvement of the patient's condition, 8 days after treatment with CO₂ laser ablation.

This case study reports the use of CO₂ laser ablation for the treatment of a peri-urethral genital wart. CO₂ laser allows precise tissue ablation and can be performed on vaginal or cervical lesions with good aesthetic result. CO₂ laser ablation therapy provides complete removal of genital warts with few patients experiencing recurrence and/or minimal side-effects. Accurate follow-up is necessary to monitor proper recovery and identify recurrence.

4. Conclusion

This case suggests that CO₂ laser ablation provides an efficient option for the treatment of peri-urethral genital warts. This treatment provides a good rate of elimination of HPV whilst having a low risk of complication and causing minimal side-effects. It can be considered a superior and advanced method for treating genital warts in the peri-urethral area, with satisfactory results in terms of pain and aesthetics.

Contributors

Paula Gutierrez designed the study and contributed to the writing and editing of this case report.

John Garza contributed to the writing and editing of this case report.

Kushal Gandhi designed the study and contributed to the writing and editing of this case report.

Alesia Voice contributed to the writing and editing of this case report.

Elea Stout contributed to the writing and editing of this case report.

Gary Ventolini consulted and treated the patient, designed the study, and contributed to the writing and editing of this case report.

PG, All authors approved the submitted version.

Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this case report.

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Patient Consent

Obtained.

Provenance and Peer Review

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