

Treatment of Genital Warts by Using CO₂ Laser

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Abstract

Background: Genital wart is the most common viral sexually transmitted disease. In fact, its incidence is rising rapidly. It is approximated that 30%–50% of sexually active adult have human papillomavirus (HPV) infection, but only 1%–2% of them have apparent genital wart. Mostly, cervical dysplasia and cancer are associated with oncogenic HPV types. HPV types are classified into high-, intermediate-, and low-risk group. HPV Types 16 and 18 are considered as a high-risk group cancer-associated HPVs, whereas Types 6 and 11 concerned as a low risk and HPV types 31, 33, and 35 have an intermediate association with cancer. **Objective:** The objective of the study was designed to evaluate the activity of CO₂ laser to treat genital warts of female Iraqi patients. **Materials and Methods:** Fifteen female patients with genital warts were involved in this study. Their age range from 22 to 49 years treated by CO₂ laser at the Laser Medicine Research Clinics of Institute of Laser for Postgraduate Studies from July 2017 to end of July 2018. Application of topical lidocaine cream 10% for 30 min or local infiltration of 2% xylocaine had been performed. CO₂ laser in chopped mode was used with a peak power: 151 watts and repeated time 35 s in D mode, pulse duration 1.3 ms. Treatments by vaporization of the warts were done in one session except one patient with a large number and multiple locations two sessions were done. **Results:** Three patients expressed mild pain during the procedure, but it could be tolerated by them. No edema or oozing observed during the 1st week. No postoperative infections or scars. Two cases of recurrence 2/15, (13.3%) after few months from treatment. **Conclusion:** CO₂ laser vaporization is an effective and safe method for treatment of genital warts and can be done in the outpatient clinic.

Keywords: CO₂ laser, condylomata acuminata, genital wart, sexually transmitted diseases

INTRODUCTION

Genital warts are one of the most common types of sexually transmitted diseases and also referred to as venereal warts or condylomata acuminata.^[1] Anogenital warts are caused by human papillomaviruses (HPVs) which are transmitted through oral, anal, and genital sexual contact with rare cases of autoinoculation and vertical transmission have been reported.^[2] HPV types are classified into high-, intermediate-, and low-risk group.^[3] Genital HPV infection is closely linked to cancer of the cervix, glans penis, anus, vulvovaginal area, and periungual skin. Cancer occurs when there is an integration of the HPV genome into the host DNA.^[4]

In most persons, genital HPV infection appears to be transient, lasting about 1–2 years and results in no sequelae. In a small proportion, about 2% of immunocompetent persons, the infection persists, and in a small proportion of those with persistent HPV infection, cancer may develop.^[4] Genital warts are sexually transmitted and therefore other sexually

transmitted diseases (STDs) may be found in patients with genital warts. A complete history should be taken and the patient screened for other STDs. The whole genital area should be carefully examined because external genital wart (EGW) infection is often multifocal. Women with EGWs should have a routine cervical cytological screening to detect cervical dysplasia, but the presence of EGWs alone does not require more frequent Pap smears or gynecologic evaluation.^[4] Risk factors included: early age of starting sexual relation, number of sexual partners, unprotected sex, infection by other STD at the same time,^[5] and immunosuppression, especially in a patient infected with HIV.^[6]

Genital warts are often asymptomatic but may cause discomfort, discharge, or bleeding. The typical lesion is soft, pink, elongated, and sometimes filiform or pedunculated. The lesions

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are usually multiple, especially on moist surface and their growth can be accelerated with pregnancy.^[7] Large malodorous masses may form on vulvar and perianal skin. This classical acuminate (sometimes called papillomatous or hyperplastic) form constitutes about two-thirds of anogenital warts. The most common sites of the posterior fourchette correspond to the likely site of greater coital friction.^[7] Most other lesions are flat and some of these generally on nonmucosal surfaces such as the pubic skin, perianal skin, and groin, may be sufficiently pigmented. The primary goal of treatment of genital warts is to eradicate or reduce the symptom. Warts may recur after treatment because of the activation of latent virus present in healthy skin adjacent to the lesion.^[8] Several treatment options are developed for eradication of genital warts. Pharmacological therapy includes topical application of podophyllin, podofilox, 5-fluorouracil, and trichloroacetic acid (TCA) have had unsatisfactory results.^[9,10] Local skin reaction and pain are common adverse effects. None of these drugs have been shown uniformly effective or directly antiviral.^[8]

Surgical techniques with the exception of cryosurgery, these modalities usually have the common advantage of complete treatment following one application. By electrosurgery removal of a very large mass of warts is a painful procedure, best performed with the patient under either general or spinal anesthesia. Pain after surgery is common. Carbon dioxide laser vaporization is typically used for treatment of refractory HPV disease or extensive warts of the anogenital mucosal category and is particularly useful in the treatment of periurethral and vaginal warts. It is the treatment of choice for pregnant women with extensive lesions or lesions that do not respond to TCA. Carbon dioxide laser therapy is an efficient therapeutic modality because of its precision and rapid healing without scarring.^[8]

This study is aimed to use CO₂ laser to treat genital warts of a group of female Iraqi patients in Baghdad province.

MATERIALS AND METHODS

The study was designed as a prospective study conducted from July 2017 to July 30, 2018. The work was done at the Laser Medicine Research Clinics in the Institute of Laser for Postgraduate Studies, University of Baghdad, Iraq. Fifteen female patients with genital warts with an age range from 22 to 49 years were involved in this study. The patients recruited from a local clinic. Patients provided informed signed consent before treatment.

Data collection

A full medical history was obtained for each participant. Pelvic examination with inspection under magnification and good lightening was performed for each participant. Speculum examination was also performed for each patient for any vaginal or cervical involvement. The age, duration of appearance of warts, number of lesions, shape of lesions, size of largest wart in mm, if the lesion is primary or recurrent, then we look for any complication, and recurrence during the period of follow-up, were recorded.

Diagnosis the patients underwent physical examination in order to diagnose the genital lesion by visual inspection of characteristic skin lesion under magnification and lightening.

Vaginal speculum examination performed to visualize the entire vagina and the cervix for the presence of warts.

An investigation done included: serum for anti-Hepatitis B virus and Hepatitis C virus, serum for HIV, Venereal Disease Research Laboratory test, high vaginal swab for other STD, and Pap smear. One patient was positive for *Trichomonas vaginalis* treated before surgery.

System specification

CO₂ laser system manufactured by Daeshin Enterprise, model; DS-40U (B). Figure 1 shows the CO₂ laser system with the surgical handpiece used in the study [Figure 1].

Safety measures taken during the procedure

The laser used in this study was Class IV, so the laser device was placed in an isolated room with a door closed during the procedure.

- The vacuum system was used to extract the smoke and vapor plume
- Special mask with a filter used for the provider [Figure 2]
- Transparent goggle designed with special optical density suitable for the wavelength of CO₂ laser [Figure 3].

Procedure

Patients were put in the lithotomy position. Sterilization of the lesion was done with povidone-iodine solution. Application of topical lidocaine cream 10% and in case of wide lesion and big size wart local infiltration of 2% xylocaine had been performed. CO₂ laser in chopped mode was used with peak power 151 watts and repeat time 35 s in D mode, pulse duration 1.3 ms [Figure 4].

Treatment was done by CO₂ laser vaporization of the warts and residual debris wiped away with a piece of gauze. Laser vaporization of the whole wart to the level of normal skin. Treatment was done in one session except for one patient



Figure 1: CO₂ laser system with the surgical handpiece

with a large number and multiple locations were treated in two sessions.

Follow-up assessment of the patients

Patients were seen after 1, 2, and 4 weeks and then they were followed at 4 weeks interval for 6 months. Associated complication that may occur during the time of follow-up such as bleeding, edema, infection, scarring, hypopigmentation, or hyperpigmentation, they were looked for and recorded. Longer term complication such as recurrence also evaluated.

RESULTS

Fifteen female patients were enrolled in this study. All were treated with CO₂ laser for genital wart. Their ages were ranging from 22 to 49 years. The participants had a total of 162 lesions. This includes five patients had 20 lesions and more. Lesions located in the perineum, labia major, labia minor, mons pubis, clitoris, posterior fourchette, and the vagina. The shape of the lesion was flat, papules and cauliflower, or mixed shape. Reported duration of lesions was from 2 months to 5 years with two cases presented as recurrence after medical treatment. They had normal Pap smear which they were performed previously. Table 1 shows the patients data.

Treatment outcomes

Mild pain during the procedure expressed by three patients, but they could tolerate it. No edema, no pain, and no oozing observed during the 1st week. Postoperative infection was

not recorded in all the patients and healing was rapid. Time for follow-up continued for 6 months during which no complication from the CO₂ vaporization was observed with no scars, but with two cases of recurrence after 3 months from treatment. Figure 5 shows examples from a case with genital lesions before treatment, immediately after laser treatment and 1-week postlaser treatment.

A total of 162 lesions were treated in this study with different sizes largest one up to 20 mm and the number of the lesion in each patient vary from single wart to 25 lesions with different shapes.

The locations of the warts were in the labia majora, labia minora, mons pubis, clitoris, perineum, posterior fourchette, vagina, and anus. Duration of lesion varies from 1 month up to 5 years. Two patients presented as a recurrent cases treated by medical treatment with failure. One patient not response to medical treatment, whereas the other patients were with primary lesions seeks for laser therapy. The follow-up period was 6 months, and it is done by seeing the patients at interval of 1, 2, and 4 weeks. After that follow-up monthly by seeing the patients or by phone for the rest of the period of study.

Regarding intraoperative complication, three patients experience mild pain, especially in warts located at the anus, but every patient treated in this study could tolerate the pain caused by CO₂ laser treatment. The operation was bloodless. No discomfort or edema was neither noticed immediately nor 1-week postlaser treatment. Infection not occurred in any patients in our study since the high temperature of the



Figure 2: High filtration mask



Figure 4: Laser parameters used in treatment



Figure 3: Transparent goggle

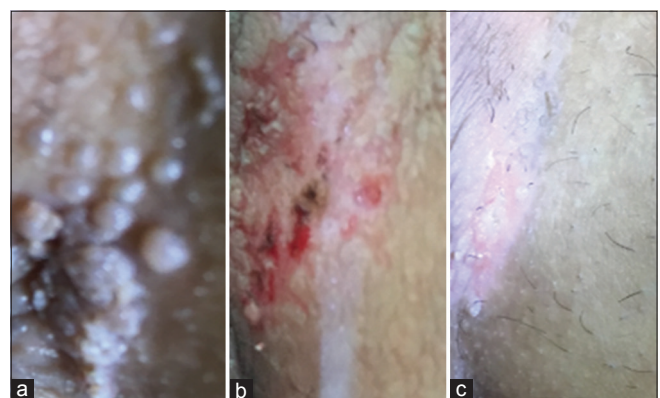


Figure 5: A 25-year-old female with 23 warts papule and cauliflower in the perineum. (a) Before treatment (b) Immediately after treatment (c) 1-week after treatment

Table 1: Data of patients enrolled in the study

<i>n</i>	Age	Duration of lesion	Number of lesion	Location of lesion	Shape of lesion	Size of largest lesion (mm)	Notes
1	22	1 year	25	Perineum	Papule	5	Recurrence
2	37	2 months	4	Posterior fourchette, perineum	Papule, flat	4	Primary lesion
3	38	2 months	3	Vagina	Flat	4	Primary lesion
4	49	1 year	5	Labia majora, vagina	Flat	4	Primary lesion
5	48	5 years	15	Labia majora, perineum	Flat	10	Recurrence
6	27	5 months	20	clitoris, labia major, labia minor perineum, anus	Cauliflower, flat	20	Primary lesion
7	35	5 months	6	Posterior fourchette	Cauliflower	8	Primary lesion
8	25	3 months	1	Perineum	Papule	6	Primary lesion
9	25	4 months	23	Perineum	Cauliflower, papule	10	Primary lesion
10	32	2 months	22	Perineum, posterior fourchette, labia major, labia minor	Papule	3	Primary lesion
11	22	4 months	20	Monspubis, clitoris, labia major, labia minor, posterior fourchette, anus	Flat, cauliflower	20	Primary lesion
12	25	3 months	5	Posterior fourchette, vagina	Cauliflower	12	Primary lesion
13	28	5 months	6	Posterior fourchette, labia majora	Cauliflower	20	Primary lesion
14	26	4 months	3	Posterior fourchette	Cauliflower	9	Primary lesion
15	30	5 months	4	Posterior fourchette	Cauliflower	10	Primary lesion

laser beam result in evaporation of the virus, bacteria, and fungi within the treatment field. There were no long-term complications in patients enrolled in this study except two cases of recurrence of warts in the area not involved by the previous laser treatment.

DISCUSSION

Our study shows that the posterior fourchette is the most common location for developing the genital wart 8/15 (53.3%). The cauliflower is the most common shape. Among our patients, 3/15 (20%) had documented contact with infected sexual partners.

In this study, lesions treated with CO₂ laser with single session except for one patient with 20 lesions and multiple locations treated by two sessions at an interval of 4 days.

In this study, we selected the lowest possible power output to vaporize the tissue to a shallow depth of penetration for effective and safe treatment with minimal complications. We identified the total boundaries of the lesions and then we started to vaporize and remove the lesions from the surface to the base.

CO₂ laser can vaporize warts, so it is necessary to use high filtration masks and vacuum system for protection from the smoke and vapor plume.

Compared with medical therapy

Topical application of podophyllin and 5-fluorouracil have had unsatisfying results.^[2] Local skin reactions and pain are

common side effect of medical therapy and they cannot be applied to the mucosal surfaces. None of them are uniformly effective or directly antiviral.^[1] Long-treatment courses with multiple sessions may be needed with medical therapy.

The principle advantage of CO₂ laser therapy is precision, probable elimination of infective agents, and relatively cosmetic result. Our study supports the report of Li^[11] who found that CO₂ laser is an effective and safe therapy for vulvar condylomata acuminata.^[11,12] Our study also supports by Ramirez and Barrena^[13] who concluded that laser vaporization is an excellent alternative in treatment of lesion in the vulva or vagina, also they concluded that laser vaporization versus excisional procedure there was advantages of cosmetic results of ablation treatment.^[13]

Furthermore, in comparison with other surgical treatment, Aziz *et al.*^[14] concluded in their research that CO₂ laser treatment of EGW was approximately two-fold greater than cryotherapy, and it was associated with lower recurrence rate.^[14]

CONCLUSION

It could be concluded from the present results that CO₂ laser vaporization has a low complication and side effect profile including postoperative oozing, pain, and scarring, also it is an effective and safe method for treatment of genital wart when used in chopped mode. It can be done in outpatient clinic with local anesthesia so can get ride from side effect of general

anesthesia and postoperative pain with the use of electrocautery which is widely used by gynecologists.

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Conflicts of interest

There are no conflicts of interest.

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