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TREATMENT OF SYMPTOMATIC CERVICAL ECTOPY USING CO2 LASER (10600 nm) – Case Study

Baraa M. Muhaibi [(1)] **Manal I. Mzaiel** [(2)] and **Noor T. Ismaeel** [(3)]

(1,2) Ministry of Health, Baghdad, Iraq, baraamahdi@gmail.com
(3) Institute Of Laser for Postgraduate Studies, University of Baghdad, Baghdad, Iraq

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ABSTRACT: Background: Cervical ectopy advanced to erosion is one of the common conditions in gynecological and pathological study. It is considered as a physiologic condition resulting from columnar epithelium migration from the cervical canal into the vaginal portion of the cervix, in which no treatment for asymptomatic cervical ectropion can be given. Treatment can be accomplished via thermal cauterization (Electro cautery), Cryosurgery. CO_2 laser therapy is another modality of treatment. **Objective:** To study the effectiveness of CO_2 laser therapy and evaluate it as a biomedical tool for the treatment of cervical ectropion. The study was done at Laser Medicine Research Clinic at the Institute of Laser for Postgraduate Studies, University of Baghdad during a period of three months from (1st August to 30th October) 2018. **Methods:** Ten female Patients with age range between 22 to 40 years old who attended the private clinic or the outpatient clinic of Al-Imamain Al-Kadhmain Medical City and diagnosed with cervical ectropion. Patients were diagnosed clinically as having cervical ectropion. Pap smear was done to all patients at the Department of Health (Pap smear unit) at Al-Imamain Al-Kadhmain Medical City in order to exclude an underlying dysplasia. The patients were subjected to CO_2 laser therapy at a continuous mode. All patients were subjected to continuous wave laser and the range of power from 5 up to 10 Watt. The exposure time ranged from 1-2 minutes. **Results:** From all studied patients only three had mild bleeding during procedure and there was no pain reported during procedure except mild pain in two patients. So, simple analgesia (mefenamic acid 500 mg.) was given to them. No need for a prophylactic antibiotic in all patients. After two weeks follow up, the findings were slight vaginal discharge, no slough. Complete healing of erosion was noticed by the 4th week after procedure. **Conclusion:** Laser therapy with CO_2 10600nm at specific parameters was effective in treating women with cervical ectropion, which was non-invasive and acceptable by the women as a method of treatment, by laser we can treat precisely the affected area without affecting the surrounding healthy tissue.

Keywords: CO_2 laser,cervical ectopy, Electro cautery

Introduction

Cervical ectropion which is also called cervical ectopy or erosion occurs when eversion of the endocervix exposes columnar epithelium to the vaginal milieu, it's a condition in which the cells from the 'inside' of the cervical canal, known as glandular cells (or columnar epithelium), are present on the 'outside' of the vaginal portion of cervix.The cells on the 'outside' of the cervix are called squamous epithelial cells (Pandit et al;2005). The cervix is not eroded and there is no ulceration. It is simply that the columnar epithelium is much thinner than the squamous epithelium and so the underlying blood vessels show through more clearly, making the area look red and raw (Chamberlain et al;1995). Cervical ectropion is common in young women. The prevalence reported for cervical ectropion ranges from 17% to 50% (Bright et al;2011). The decision to treat or not remains controversial as the presence of cervical ectropion doed not interfere with life, but as it was well known that in many conditions of cervical cancer and precnceranous states were manifested as an erosion. Ectropion is considered to be a common physiological condition in adolescents and pregnant women (Critchlow et al; 1995). The condition should not be treated unless causing troublesome discharge. A cervical smear must be taken in all cases and if there is any doubt about the smear, colposcopy and cervical biopsy should be undertaken (Bright PL,et al;2011), methods of treatment modalities have been used for cases of ectropion including: Drug therapy: which was applied to mild erosive cervicitis (MMWR Recomm Rep 2015). Physical Therapy: It indicated those with cervical erosion, which do not respond to drug therapy. Commonly used methods of physical therapy are thermal cauterization, cryotherapy, infrared coagulation therapy, electric iron therapy, microwave therapy,and laser therapy (Jindal M,et al;2017). During the last decade, application of laser technology has become more obvious in operative gynecology. The first modality to be introduced was the carbon dioxide, CO_2 laser, in combination with the colposcope for the treatment of cervical intraepithelial dysplasia (Kirschner et al;1991). CO_2 laser can be used either in the ablative (vaporization) or the cutting mode. This flexibility allows patients with unsatisfactory as well as satisfactory colposcopy to be managed (Mongahan et al;1995).

The benefit of lasers involved great conservation due to tissue sparing, great precision because of microsurgical method, combination of excisions and vaporization, suitable for therapy of multifocal disease, uncluttered field and good hemostasis. It is almost always an outpatient procedure performed without anesthesia or with only local anesthesia (Dorsey JH.et al; 1991).

Aim of this study:

To study the effectiveness of CO_2 laser therapy and evaluate it as a biomedical tool for the treatment of cervical ectropion.

Patients and Study Design

This was an interventional study conducted at the laser institute for postgraduate studies university of Baghdad.Patients collected from the private clinic and the Department of Obstetrics and Gynecology of Al-Imamain Al-Kadhmain Medical City, Baghdad, Iraq during a period of three months from 1st August 2018 to 30th October 2018.

There was an interview with the study patients and history was taken from them which included information about age, parity, presence of IUCD, previous history of electro cautery, and current use of OCP. Verbal permission was obtained from each patient prior to collecting data, and all information was anonymous. Names were removed and replaced by identification codes. All information were kept confidential in a password secured laptop and data used exclusively for the research purposes.

The history, also, involved asking about symptoms such as vaginal discharge, backache, dyspareunia, and post coital bleeding. Weight and height were measured to calculate BMI. The study included 10 patients who attended the private clinic or the outpatient clinic of Al-Imamain Al-Kadhmain Medical City and diagnosed with cervical ectropion. Patients were diagnosed clinically as having cervical ectropion. Pap smear was done to all patients at the Department of Health (pap smear unit) at Al-Imamain Al-

Kadhmain Medical City to diagnose cervical intraepithelial neoplasia as CIN was excluded from the study. Then patients were subjected to CO_2 laser treatment in a continuous mode (figure 1). Assessments depend on the following evaluation criteria: (Follow up done after two and four weeks), Pain (During procedure), Bleeding (During procedure), Using drugs or analgesia, Sex abstinence, vaginal discharge, Slough, Cervix erosion, Infection after procdure. A Pap smear was done for all studied patients to exclude CIN, and then to start laser therapy. Patients were in lithotomy position, a speculum inserted into the vagina to view the cervix, cleaning of the area by cotton was done, and then a sample was collected from the ectocervix by Ayer's spatula. The spatula then whipped along the slide, after that an endocervical sample was taken by cytobrush and placed on slide, fixation was then done in a liquid based medium. High vaginal swab by a cotton swab was done for exclusion of infection. Laser therapy was done at the follicular phase of the cycle between seventh to tenth days of the cycle. The patient was put in lithotomy position with a bivalve speculum introduced to adequately visualize the cervix, then laser treatment was done radially (from inside to the outside of the cervical opening) .The appropriate parameters for the laser device were chosen. The power range was from 5 - 10 watt, the power density was 70.7714084 W/cm2 for three patients (power =5 watt), power density was 99.0799717 W/cm2 for 3 patients (power=7 watt), power density was 141.542817 W/cm2 for four patients (power =10 watt). The exposure time was about 1-2 minutes as shown in Figure 2.1 that clarifies parameters used during procedure. The beam power starting with the lowest power and was being increased accordingly. Laser safety measures and precautions were adopted in the current study including: The patient and the surgeon had the appropriate goggles designed with special wavelength and optical density for the CO_2 laser (10600 nm) to eliminate the risk of eye damage. The probe was directed to the cervix only and never directed to the eye, or reflection materials such as mirrors, glass, metals and polished plastic in the laser room. During procedure, plumes were avoided by using suction apparatus.

Fig, (1): The CO_2 laser device (ultra dream pulse V: DS-40U, Daeshin enterprise)

Results

The total number of study patients was 10. All of them were diagnosed with cervical ectropion. The distribution of study groups by general characteristics is shown in Table (1). Study patients age was ranging from 22 to 40 years with a mean of 30.25 years and standard deviation (SD) of ± 6.83 years.

Regarding parity, it was three or more in 60% of study patients. 60% of them were obese. Using OCP was reported in 30% and 40% of study patients were using IUCD. Half of them had a history of previous electrocautery.

Table 1: Distribution of study groups by general characteristics

Variable	No.	Percentage (%)
Parity		
< 3	4	40.0
≥ 3	6	60.0
BMI Level		
Normal	1	10.0
Overweight	3	30.0
Obese	6	60.0
Current OCP use		
Yes	3	30.0
No	7	70.0
IUCD		
Yes	4	40.0
No	6	60.0
Previous history of electrocautery		
Yes	5	50.0
No	5	50.0

The distribution of study groups by clinical presentation is shown in Table (2). It was noticed that all patients presented with vaginal discharge and backache. Dyspareunia was presented in 70% of study patients. Regarding post-coital bleeding, it was complained by 40% of study patients.

Table 2. Distribution of study groups by clinical presentation

Clinical Presentation	No.	Percentage (%)
Vaginal Discharge		
Yes	10	100.0
No	0	0
Backache		
Yes	10	100.0
No	0	0
Dyspareunia		
Yes	7	70.0
No	3	30.0
Post-coital Bleeding		
Yes	4	40.0
No	6	60.0
Squamous Cell Metaplasia		
Mild	3	30.0
Moderate	3	30.0
Severe	4	40.0

All patients were subjected to continuous wave laser and the range of power was from 5 up to 10 W. The exposure time ranged from 1-2 minutes according to size of the ectrpion and patient`s cooperation. There was no pain reported during procedure in all study patients. Only three patients had slight bleeding during procedure which needed to increase the power of laser output to a maximum power used here that was 10 watt.

All patient returned to their normal activity immediately and nobody of them need a prophylactic antibiotic.

Only two patients need simple analgesia after the procedure. For all patients, there was sex abstinence until the session of follow up after two weeks of procedure.

On follow up after two weeks, the findings were slight vaginal discharge, no slough. Complete healing of erosion with no superimposed infection was noticed by the 4th week after procedure, as shown in Table (3).

Table 3. Evaluation criteria during and after procedure

Pain during procedure	Slight pain in 2 patients
Bleeding during procedure	Present in 3 patients
Need for drugs (antibiotics and analgesia)	No need for antibiotics in all patients. Only 2 patients need for simple analgesia
Sex abstinence	2 weeks for all patients
Follow up of patients 2 weeks after procedure	
Vaginal discharge	Slight in all patients
Slough	Not present in all patients
Follow up of patients 4 weeks after procedure	
Vaginal discharge	Not present in all patients
Cervical erosion	Not present in all patients
Infection after procedure	Not present in all patients

Discussion

Cervical ectropion is common in young women. The decision to treat or not remains controversial as the presence of cervical ectropion does not interfere with life, but as well-known that in many conditions, cervical cancer and precnceranous states were manifested as an erosion. A total of 10 symptomatic patients diagnosed as having cervical ectropion with exclusion of any precancerous state by pap smear ,by sending them for cervical biopsy (if there was CIN). As

CO_2 laser can be used to vaporize, excise, or coagulate tissue by modifying the power density (Drake, Richard et al; 2005), treatment here offers an effective therapy to the studied patients as shown in Figure (2) (A,B) Treatment done at follicular phase of cycle (day seven to ten of cycle) and that was to avoid treatment of cervical erosion occurring during pregnancy, and to avoid bleeding during procedure as the cervix become highly vascularized in the luteal phase of cycle. Laser treatment done radially on the cervix from inside to outside of the cervical opening to avoid future scaring of cervix.

In this study continuous wave CO_2 10600nm laser in the range of power from 5 up to 10 W was applied to all patients. The exposure time ranged from 1-2 minutes, and with the operative time ranging from 10 to 15 minutes according to size of the ectropion and patient`s cooperation. In comparison to a study conducted in 2005 in the laser institute at Baghdad University , where higher power was used 10 to 20W (Murooj Dawood AlAni.2005), it has been shown that there is no need to increase the power more than 10 W.as it leads to a complete healing of erosion ,and this was supported by another study in laser institute conducted at 2013 in which the operative time ranged from 10-15 minutes, the CO_2 laser used in the continuous mode for treating cervical ectropion with a power range of 5-10W (Younus HM.2016). Only two patients need simple analgesia (mefenamic acid 500 mg.) after the procedure as they complained of mild pain during procedure, as anesthetic cream was applied topically for all patients. Three patients had mild bleeding during procedure needed to increase the power of laser output to10 watt (the maximum power used) and that was to produce coagulation. No prophylactic antibiotic was needed. There was sex abstinence until the session of follow up after two weeks of procedure, where findings were slight vaginal discharge, no slough. Complete healing of erosion with no superimposed infection was noticed by the 4th week after procedure. Laser therapy was effective in the treatment of cervical erosion however, some necessary safety measures are still required to avoid physical hazards for medical personnel. CO_2 laser is cost effective in case of comparison with electrocautery therapy.

Fig. (2): (A) Cervical ctropion before laser treatment. (B) Cervical ectropion after laser treatment

Conclusion

The results show that laser treatment with CO_2 10600nm with a power range of 5 to 10W.and an exposure time of 1 to 2 minutes is effective in treating women with cervical ectropion, which is noninvasive and acceptable by the women as a method of treatment. By laser we can treat precisely the affected area without effecting on the surrounding healthy tissue.

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علاج منظار عنق الرحم العرضي باستخدام ليزر ثاني أكسيد الكربون (10600 نانومتر)

براء مهدي محيبس [1] منال ابراهيم مزيعل [2] نور طه اسماعيل [3]

(1،2) وزارة الصحة ، بغداد ، العراق

(3) معهد الليزر للدراسات العليا، جامعة بغداد ، بغداد ، العراق

الخلاصة: انتباذ عنق الرحم المتطور للتاكل هو واحد من الحالات الشائعة الحدوث في دراسة أمراض النساء والباثولوجي. ويعتبر حالة فسلجية ناجمة من انتقال ظهارة عمودية قناة عنق الرحم الى الجزء المهبلي من عنق الرحم. يمكن أن يتم العلاج عن طريق الكي الحراري، الجراحة بالتجميد. العلاج بليزر ثاني اوكسيد الكاربون هو طريقه اخرى للعلاج. **هدف الدراسة:** لدراسة فعالية العلاج عن طريق ليزر ثاني اوكسيد الكاربون وتقييمه كأداة طبية حيوية وفعالة لعلاج تاكل عنق الرحم. **طرق البحث:** أجريت هذه الدراسة في عيادة أبحاث طب الليزر في معهد الليزر للدراسات العليا بجامعة بغداد خلال فترة ثلاثة أشهر من الاول من أغسطس 2018 حتى الثلاثين من أكتوبر 2018. عشر مريضات تتراوح أعمارهن بين 22 إلى 40 سنة حضرن العيادة الخاصة أو العيادة الخارجية في مدينة الامامين الكاظمين الطبية وشخّصن بالتهاب عنق الرحم. تم تشخيص المرضى سريريا على أنه تآكل عنق الرحم. تم إجراء فحص عنق الرحم لجميع المريضات في مراكز الصحة (وحدة مسحة عنق الرحم) في مدينة الامامين الكاظمين الطبية من أجل استبعاد خلل التنسج الضمني. تعرض المريضات لعلاج ليزر ثاني اوكسيد الكاربون في وضع مستمر. تم إخضاع جميع المريضات لليزر المتواصل ومدى الطاقة من 5 إلى 10 واط. وتراوحت مدة التعرض من 1-2 دقيقة. **النتائج:** من ضمن كل مريضات الدراسه، فقط ثلاثة مريضات عانين من نزف طفيف أثناء الإجراء ولم يكن هناك أي ألم يذكر أثناء العملية في جميع المرضى الذين أجريت عليهم الدراسة في ماعدا مريضتين اثنتين عانتا من الم طفيف وتم اعطائهم تسكين بسيط بعد العمليه(حامض الميفنامك 500ملغم) . لم تحتاج اي من المريضات الى مضاد حيوي وقائي .وبعد مرور أسبوعين من المتابعة ، كانت النتائج عبارة عن إفرازات مهبلية طفيفة ، بدون تقرحات في عنق الرحم. وقد لوحظ الشفاء التام للتآكل في الأسبوع الرابع من العلاج. **الاستنتاج:** أظهرت النتائج أن العلاج بليزر ثاني اوكسيد الكاربون 10600 nm مع نطاق قوة من 5 إلى 10واط ووقت تعرض من 1 إلى 2 دقيقة كان فعالا في علاج النساء الذين يعانن من تاكل عنق الرحم ، والتي كانت غير غزوية ومقبولة من قبل النساء كطرق العلاج بالليزر حيث يمكننا علاج المنطقة المصابة بدقة دون التأثير على الأنسجة السليمة المحيطة بها.