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CO_2 Laser Treatment of Cervical Ectropion

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Abstract Background: Cervical ectropion is considered to be a physiologic condition caused by columnar epithelium migration from the cervical canal into the vaginal portion of the cervix and usually there is no treatement for clinically asymptomatic cervical ectropion . Treatment can be achieved by thermal cauterization (Electrocautery), Cryosurgery or laser vaporization. **Aim of the study:** To study the effectiveness of CO2 laser (10600nm) in treatment of symptomatic cervical ectropion . **Setting:** The study was carried out at Laser Medicine Research Clinic at the Institute of Laser for Postgraduate Studies, University of Baghdad between the first of August 2013 to the end of October 2013. **Patients and Methods:** Ten female Patients with age range between 25-48 years old were collected from Department of Health (Pap smear unit) at Al-Ilwiya Maternity Hospital. Patients who were diagnosed clinically as having cervical ectropion were subjected to Pap smear in order to exclude an underlying dysplasia. The patients were subjected to CO2 laser vaporization in a continuous mode. **Results:** 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 bleeding nor pain intraoperatively. No bleeding post operatively and all with rapid return to the normal activity . Only patients with Pap smear findings of trichomoniasis or monilia received the appropriate antibiotic treatment before laser ablation. Most patients didn`t require analgesics nor anesthesia and no need for antibiotics postoperatively. **Conclusion:** CO2 laser vaporization with a power range of 5-10 W (mean power 7.9 W) and exposure time ranged from 1-2 minutes appears to be quite effective for treatment of cervical ectropion .By laser we can go more precise in the tissue and we can reach squamocolumnar junction and destroy the deepest glands and so the whole region can be treated. There is good and rapid healing, insignificant bleeding and pain postoperatively.

Introduction

Cervical ectropion is considered to be a physiologic condition caused by columnar epithelium from the cervical canal extending into the vaginal portion of the cervix (Xiaolin Hua, et al., 2012). Cervical ectropion is common in young women (P.L. Bright et al., 2011). The prevalence reported for cervical ectropion ranges from 17% to 50%. Because of its thin, vascularized epithelium, the area of ectopy is fragile. This creates easy access to blood and lymphatic systems, possibly diminishing mucosal barriers to sexually transmitted infections (Anna-Barbara Moscicki, et al., 2001).

A cervical ectropion appears red and may have an inflamed appearance due to the columnar epithelium being thinner than squamous epithelium. Along with the red appearance, the columnar epithelium may also secrete mucus which, if abundant, causes a vaginal discharge. (Liu Y, Yang K, Wu T, et al., 2010) Common symptoms include mucopurulent vaginal discharge, postcoital bleeding, recurrent cervicitis, and pelvic pain. Cervical ectopy can also be a risk factor for infertility (Xiaolin Hua, et al., 2012). In cervical erosion the results of pap smear is squamous metaplasia (D.Keith Edmonds, 2007). 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, coploscopy and cervical biopsy should be undertaken (Geoffery chamberlain, 1995). If the patient has a troublesome discharge then the ectopy is treated by one of the following methods: thermal cauterization (electrocautery), cryosurgery or laser vaporization (D.Keith Edmonds, 2007 and Geoffery chamberlain, 1995). During the last decade, the use of laser technology has become more common in operative gynecology. The first modality to be introduced was the carbon dioxide, CO_2-laser, used together with the colposcope for the treatment of cervical intraepithelial dysplasia and condylomata (Kirschner R, Tidsskr Nor Laegeforen, 1991). CO_2 laser may 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 JM. Bailliieres, 1995). The advantages of lasers include great conservatism due to tissue sparing, great precision because of microsurgical method, combination of excisions and vaporization possible, suitable for therapy of multifocal disease, uncluttered field, and good hemostasis. It is almost always an outpatient procedure done without anesthesia or with only local anesthesia (Dorsey JH. 1991). The aim of the current study is to evaluate the effectiveness of CO_2 laser (10600nm) in treatment of symptomatic cervical ectropion.

Patients and Methods: Patients were collected from Department of Health (pap smear unit) at Al-Ilwiya Maternity Hospital. Ten women received a consent and a questioner involving patient`s name, age, last menstrual period , menstrual history, previous pap smears ,marital status , parity , previous abortion , history of curettage, contraceptive pills, number of marriage and history of previous cervical cauterization. Patients who were diagnosed clinically as having cervical ectropion were subjected to Pap smear to exclude dysplasia. Main complaint was either one or more of the followings: vaginal discharge, infertility, dyspareunia, post coital bleeding or irregular vaginal bleeding or pelvic pain. Some of the patients had previous history of electrocautery for cervical ectropion. Their ages were between 25-48 years.

Pap smear was done to all patients at the Department of Health (pap smear unit) at Al-Ilwiya Maternity Hospital to exclude cervical intraepithelial neoplasia. Patients with preoperative histology findings indicative of cervical intraepithelial neoplasia were excluded from the study.

Materials required for CO_2 laser vaporization include : CO_2 Laser device **(ultra dream pulse V, :DS-40U,Daeshin enterprise)**) , Bivalve speculum, Light source , sterilizing solution, guaze, EMLA (a cream formulation of lidocaine 2.5% /prilocaine 2.5% which has proven effectiveness in providing superficial anesthesia of the skin and mucous membranes) and a suction apparatus. Laser vaporization 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 was introduced and adequate visualization of the cervix, then laser vaporization was done. The appropriate parameters for the laser device were chosen. The power range was from 5-10 watt and the power density range (63694.2675 W/cm^2 - 127388.535 W/cm^2) and exposure time about 1-2 minutes. The beam power starting with the lowest power and increasing it accordingly. Laser safety measures and precautions had been adopted in the current study which includes: The patient and the surgeon had the appropriate goggles which designed with special wavelength and optical density for the CO2 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.

Fig. (1): (A) The CO2 laser device (ultra dream pulse V, :DS-40U,Daeshin enterprise), (B) The smoke evacuator used in this study.

Table (1): Laser parameters

Patient`s No.	mode	Power(W)	Power density	Operative time (min)	Exposure time
1	CW	10	127388.535	15	1.5
2	CW	6	76433.121	15	1.5
3	CW	10	127388.535	10	1
4	CW	5	63694.2675	25	2
5	CW	8	101910.828	20	1.8
6	CW	9	114649.6815	15	1.5
7	CW	5	63694.2675	10	1
8	CW	5	63694.2675	15	1.5
9	CW	10	127388.535	20	1.8
10	CW	6	76433.121	15	1.5

Evaluation criteria: Post operative assessments depends on the following criteria:

- Pain.
- Vaginal discharge or bleeding .
- Quick return to their normal daily activities.
- Need for antibiotics and analgesics.

Results: This study was carried out at the Institute of Laser for postgraduate studies, University of Baghdad between the first of August, 2013 to the end of october 2013. In this study (10) ten women with cervical ectropion were treated by CO_2 (10600nm) laser vaporization. The mean age of the patients was 34.2 years (range 25-48 years). The most common presenting symptom was vaginal discharge. Only one patient had postcoital bleeding and one patient with infertility seeks treatment for cervical ectropion.

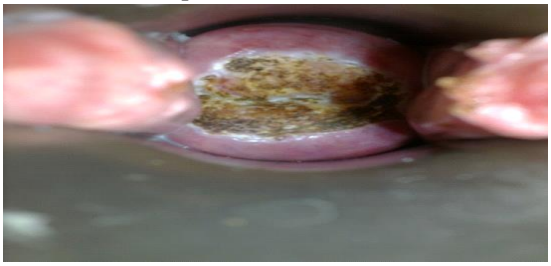
Post-operative assessments of these women:

Regarding pain only three of them complained of slight pain during the procedure. All of them had heavy vaginal discharge after the procedure. No bleeding post operatively and all with early return to normal activity and all patients were asked to have sex abstinence for 2 weeks.

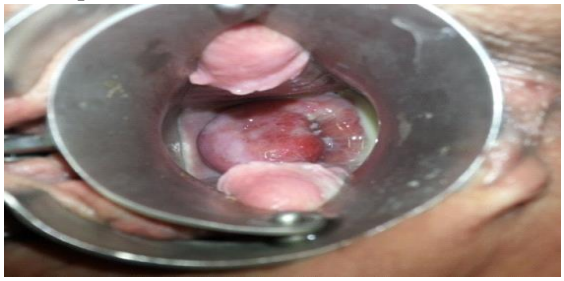
Regarding the need for drugs and analgesics, patients with pap smear findings of trichomoniasis or monilia received the appropriate antibiotic treatment. Only one patient who was already complaining of backache before the procedure continue to have the same pain and was given analgesics and a rheumatologist consultation had been done for further care.

Before CO2 vaporization

Laser parameters



Immediately after CO2 vaporization



2 weeks after the procedure

Fig. (2): Patient No.3

Discussion: Cervical ectropion is a physiological presence of columnar epithelium on the ectocervix. It increases in pregnancy and with use of contraceptive pills (Kirschner R, Tidsskr Nor Laegeforen , 1991). Laser vaporisation is a widely used method of localised ablative treatment based on both histologically confirmed cervical intraepithelial neoplasia and clear colposcopic visualisation of the upper limit of the lesion (Kuppers V, et al., 1994). A conization, to be diagnostic and therapeutic, must remove the entire transformation zone to the proper depth. This procedure is almost always attended by a higher morbidity rate than is simple ablation (Dorsey JH. 1991). In this study the selected patients with cervical ectropion were treated with CO2 (10600 nm) laser vaporization. The main presenting complaint for the 10 women was vaginal discharge which was present in 7women enrolled in this study and this goes with the diagnosis of cervical ectropion as the columnar epithelium secrete mucus which causes vaginal discharge (Liu Y, Yang K, Wu T, et al.,2010). A study was done at our institute in 2005 by Murooj Dawood in which she compared between laser vaporization and electrocauterization and she founded that laser vaporization is faster and less painful and with less bleeding than electrocauterization (Murooj Dawood Al-Ani. 2005).

Altawjery I. in 2004 evaluated the effectiveness of CO_2 laser vaporization of ectocervical lesions and compared the results to the electrocauterization results and concluded that both CO_2 laser vaporization and electrocauterization are effective and reliable treatments for cerical lesions (Altawjery I. 2009). Lisowski P. et al determined the efficacy of the non-radical treatment of the cervical lesions using LLETZ procedure (Large Loop Excision of Transition Zone) and laser CO2 vaporization. The choice between LLETZ or laser CO2 was made based on a pre-treatment examination (cytology, colposcopy, microbiology test and punch biopsy). The final results were evaluated from 6 months to 4 years after the treatment. The effectiveness of CO2 laser was 94.6% and was similar to LLETZ--96.4% (Lisowski P , et al., 1999).

In this study we used the CO_2 laser in the continuous mode for treating cervical ectropion with a power range of 5-10 W with the mean power 7.9 W. In Murooj`s study she used the CO_2 laser in continuous mode to treat cervical erosion in 3 patients with a power range 10-20 W and the mean power was 15 W (Murooj Dawood Al-Ani. 2005).

In this study the mean operative time was about 16 minutes with a range 10-25 minutes . This was comparable to the conventional treatments.

Patients enrolled in this study were not prescribed any prophylactic antibiotics postoperatively as the laser by itself act as a sterilizer and none of our patients had postoperative infection.

6 out of 10 patients in this study required no anesthesia nor analgesia at all. This is an advantage for laser vaporization that it would be suitable as an outpatient procedure.

CO2 laser works by vaporizing cervical cells. It is a very precise method; only need 5-7 mm of vaporization for treatment with good healing and sparing cervical excisions. Cost is a major problem and no pathology specimen (Chris DeSimone, 1998).

Wozniak J. et al observed that the wound's healing after laser therapy is quick and without any complications. Laser therapy causes no trauma of the cervix structure and does not disturb excretion of mucus by cervical glands. (Wozniak J, et al., 1994) Patients in this study had rapid healing and without any complications.

Conclusion

CO_2 laser vaporization with a power range of 5-10 W (mean power 7.9 W) and exposure time ranged from 1-2 minutes appears to be quite effective for treatment of cervical ectropion .By laser we can go more precise in the tissue and we can reach squamocolumnar junction and destroy the deepest glands and so the whole region can be treated. There is good and rapid healing, insignificant bleeding and pain postoperatively.

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معالجة الشتر الخارجي لعنق الرحم باستخدام ليزر CO_2

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الخلاصة : الشتر الخارجي لعنق الرحم يعتبر حالة طبيعية يحدث بسبب امتداد الظهارة العمودية من قناة عنق الرحم الى الجزء المهبلي لعنق الرحم وهذه الحالة لاتحتاج الى علاج إذا كانت المريضة لاتشكو من اي اعراض٠ العلاج يكون عادة اما بالكوي الحراري(مكواة كهربائية) اوجراحة الابتراد أو التبخير بواسطة الليزر٠ أجريت هذه الدراسة في العيادة الطبية في معهد الليزر للدراسات العليا في جامعة بغداد للفترة من الاول من آب لسنة ٢٠١٣ ولغاية الثلاثون من تشرين الأول لسنة ٢٠١٣ ٠ تم أختيار عشر مريضات من قسم صحة المرأة (وحدة الفحص الخلوي) في مستشفى العلوية للنسائية والتوليد بعد أخذ مسحة لعنق الرحم وتشخيصهم (الشتر الخارجي لعنق الرحم) و من ثم علاجهم بتبخير خلايا عنق الرحم الخارجية بواسطة ليزر ثنائي اوكسيد الكربون (النمط المستمر) وبقدرة تتراوح بين(5-10) واط ووقت العملية كان يتراوح بين (١٠-٢٥) دقيقةاعتمادا على حجم الشترالخارجي وتعاون المريضة٠ يمكن الاستنتاج من هذه الدراسة فاعلية ليزر ثنائي اوكسيد الكربون(١٠٦٠٠ نانومتر) في علاج الشتر الخارجي لعنق الرحم وبدقةمتناهية ويمكن الوصول الى منطقة الاتصال الحرشفي-العمودي و بدون أي الم أثناء وبعد العلاج وبدون نزف كذلك تستطيع المريضة ممارسة نشاطها اليومي بشكل طبيبعي بعد العلاج .