A comparative study of two techniques in the treatment of condyloma acuminata

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A comparative study of two techniques in the treatment of condyloma acuminata

OBJECTIVES: *Condyloma acuminata (CA) is mainly caused by human papillomavirus (HPV) types 6 and 11. Clinicians use many different methods to treat analcondyloma acuminate (CA). In this study, we aimed to compare electrocautery ablation (ECA) and argon plasma coagulation (APC) techniques in terms of postoperative bleeding, pain, scar development, loss of sexual sensation, and recurrence rates.*
METHODS: *A retrospective analysis of collected data was performed for 49consecutive patients with CA, who underwent surgery between July 2011 and July 2014. Patients were grouped and evaluated according to surgical technique, including an ECA group and an APC group. Postoperative bleeding was determined by the number of dressings used in the first postoperative week. Scar severity in the perianal region following ablation therapy was evaluated by scar diameter. A visual analog scale (VAS) was used to measure pain and loss of sexual sensation. All patients were followed for 9 months.*
RESULTS: *There were statistically significant differences between the ECA and APC groups in terms of postoperative bleeding, pain, scar development, and loss of sexual sensation. No difference in recurrence rate was observed.*
CONCLUSIONS: *APC is a safe and effective alternative for the surgical treatment of patients with CA. Although it appears to be more comfortable than ECA techniques, more randomized controlled trials are necessary to reinforce this claim.*

KEY WORDS: Argon plasma coagulation, Condyloma acuminata, Electrocautery ablation, Human Papilloma Virus, Surgical treatment

Introduction

Human Papilloma Virus (HPV) infections one of the most common sexually transmitted diseases (STDs) [1]. HPV is thought to be the most common anogenital infection in the US, and the lifetime risk of developing at least one HPV infection in women is 75% [2]. The prevalence of anal HPV infection in HIV-negative men who have sex with men (MSM) is approximately 57%, and among HIV-positive men, the infection rate is approximately 60 times higher than in the general male population [3,4].
Condyloma acuminata (CA), commonly known as anogenital warts, is mainly caused by HPV types 6 and 11 [5]. Clinicians use many different methods to treat anal condyloma including surgical excision, ablation with electrocautery, laser or cryotherapy, trichloroacetic acid (TCA) application, and topical medications such as podophyllin, sinecatechins, or imiquimod [6-8].
Ablation with electrocautery (ECA)and multilayer argon plasma coagulation (APC) are some of the most effective procedures for the treatment of anogenital CA. Many studies have discussed the effectiveness of these two ablation methods when combined with topical treatments [8-11]. However, according to a search of the medical literature, this study is the first to compare the results of these surgical ablation techniques in patients with CA who did not receive topical treatment postoperatively.

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ABBREVIATIONS

CA: Condyloma Acuminate
HPV: Human Papillomavirus
ECA: Electrocautery Ablation
APC: Argon Plasma Coagulation
VAS: Visual Analogue Scale
STDs: Sexually Transmitted Diseases
MSM: Men who have sex with men

Methods

Medical records from 67 consecutive patients who underwent surgery between July 2011 and July 2014 at our institution were retrospectively evaluated. Data were collected and stored in a dedicated database with approval from the Institutional Review Board of Sisli Etfal Training and Research Hospital.
Proctoscopy was performed for all patients. Seven patients with anal warts extending to the rectum were excluded from the study. Eleven patients with a concomitant perianal disease such as perianal fissures, fistulas, or hemorrhoids were also excluded from the study. Forty-nine patients with isolated perianal CA were included in the study.
Patients were divided into two groups according to the surgical technique that was performed (ECA orAPC). All surgical procedures were performed in the operating room, under regional anesthesia, in the "Jack-Knife" position, by a single surgeon (FC) who follows a standardized protocol. All of the warts were coagulated with either ECA (Force 300, HF-Surgical Device, Valleylab, Boulder, CO, USA) or APC (Force Argon II System, Valleylab, Boulder, CO, USA) after coagulation the residual tissues are cleaned with a scalpel.
The amount of postoperative bleeding was determined by the number of dressings used in the first postoperative week. The pads used for the wound dressing in the first postoperative week were provided by the hospital free of charge and recorded by the nurses as a routine clinical practice. Scar severity in the perianal region following ablation therapy was evaluated by scar diameter (range, 1 to 3 cm). Patients received a specific questionnaire to record postoperative pain and loss of sexual sensation. A visual analog scale (VAS) was used to measure pain and sexual sensation, ranging from no pain and no loss of sexual sensation (VAS: 0) to the worst pain and maximum loss of sexual sensation (VAS: 10). Outpatient follow-up was performed on the 7th postoperative day and subsequently at 3 months, 6 months, and 9 months during the postoperative period.
Statistical calculations were performed using the Number Cruncher Statistical System 2007 Statistical Software (Kaysville, Utah, USA) programme for Windows. In addition to standard descriptive statistical calculations (mean and standard deviation), a two-sample t-test used for the comparison of groups and a Chi-square test was performed for the evaluation of qualitative data. Statistical significance was established at $p<0.05$.

Results

The mean age of the 49 patients (35 men and 14 women) with CA in the APC and ECA groups was 29,65±9,89 years and 31,31±9,44 years, respectively. The male/ female ratio of the APC and ECA groups was 17/6 and 18/8, respectively. 3 of 35 male patients with CA were HIV-positive. 1 of 3 HIV positive patients were in the ECA group while the 2 of 3 HIV positive patients were in the APC group. 34 of 35 male patients with CA were having sex with men (MSM). 17 of 34MSM were in ECA group while 17 of 34MSM were in APC group. There were no statistically significant differences in terms of age, average age and gender between the groups APC and ECA (p> 0,005) (Table I) .
The number of bloody dressings, in the first postoperative week, was statistically different between the APC

TABLE I - *Demographic data for patient groups. APC, argon plasma coagulation; ECA, electrocautery ablation; n, number of patients.*

	APC n. 23	ECA n. 26	P
Age	29.65±9.89	31.31±9.44	0.552
Gender			
Male	17 (73.91%)	18 (69.23%)	0.717
Female	6 (26.09%)	8 (30.77%)	

TABLE II - *Postoperative pain score for APC and ECA groups. APC: argonplasma coagulation; ECA: electrocautery ablation; VAS: Visual analogue scale.*

	APC	ECA	-p
VAS 24h postoperative	4.13±0.63	7.35±0.63	<0.001
VAS 3months postoperative	2.00 ±0.67	4.23±0.65	<0.001
VAS 6months postoperative	0.26±0.45	0.96±0.72	<0.001

TABLE III - *Loss of sexual sensation in the postoperative period. APC: argon plasma coagulation; ECA: electrocautery ablation; n: number of patients; VAS: Visual analogue scale.*

	APC	ECA	-p
VAS 3 months postoperative	4.13±0.63	7.16 ±0.63	<0.001
VAS 6months postoperative	2.13 ±0.67	4.23±0.65	<0.001
VAS 9months postoperative	0.38±0.45	0.46±0.72	>0.05

and ECA groups (p<0.02). While there were 10 patients (38.46%) in the ECA group who changed dressings three times in the first week, there were only two patients (8.70%) in the APC group who changed dressings three times in the first week. The bloody dressings were changed by the patients themselves and any amount of the blood on the dressing called bloody for standardization. Mean postoperative 24-hour pain on the VAS scale was 2.13±0.63 and 3.35±0.63 in the APC and ECA groups respectively (p< 0.001). Pain scores between the groups were also significantly different at 3 months and 6 months postoperatively (Table II). The VAS score was 0 at 9months postoperatively in both groups.

Scar development in the postoperative period was also significantly different between the groups. In the 3rd postoperative month, there were 3 patients with a scar greater than 3 cm in the ECA group, while there were no patients with a scar greater than 3 cm in the APC group (p< 0.001). In the 6th postoperative month, there were still 13 patients with a scar of less than 1 cm in the ECA group, while there were no patients with a scar in APC group (p< 0.01). There were no patients with a scar in the 9th postoperative month in either group.

In the 3rd postoperative month, there were 11 patients with severe loss of sexual sensation in the ECA group while there were no patients with severe loss of sexual sensation in the APC group (p< 0.001). In the 6th and 9th postoperative months, there were less patients who reported mild or no loss of sexual sensation in the ECA group and this difference between the two groups was found to be statistically significant (Table III).

Recurrent disease was observed in one patient in the APC group in the 9th postoperative month. In the ECA group, there were 2 patients with recurrence. One patient was diagnosed with a recurrence in the 6th postoperative month and the other patient was diagnosed with a recurrence in the 9th postoperative month. There was no statistically significant difference in the recurrence rates between the two groups (p> 0.929).

Discussion

CA is one of a group of sexually transmitted diseases which are caused by HPV subtypes 6 and 11 [11]. Clinicians use many different methods to treat CA including ablation with electrocautery or laser, cryotherapy, and topical medications such as imiquimod, podophiline, bi/trichloroacetic acid [12]. ECA and APC are some of the most effective surgical procedures for the treatment of anogenital CA. In this study, we aimed to compare these two surgical techniques.

The ECA utilizes alternating high-frequency electric current passing through the probe to effectuate heat, which is used for cutting or to coagulate, and/or vaporize the targeted tissue [13]. Traditionally there are two types of ECA used worldwide: monopolar or bipolar devices. In this study, we used monopolar electrocautery in which, the electric current flows from the generator through the active electrode, into the surgical site, through the patient, grounding pad, and returns to the generator.[14] APC, incorporates argon gas, an inert and noncombustible gas, to improve the surgical effectiveness of the electric current [14]. The major comparative properties between APC and ECA are in terms of tissue contact and the depth of penetration. During coagulation mode, APC functions without tissue contact with a penetration depth of 2- 3mm while ECA needs to contact with the targetted tissue and the penetration depth is variable[15].

When we retrospectively analyzed the patient's data, we found that patients treated with APC had lower rates of postoperative bleeding when compared to patients treated with ECA. Sachdeva et al.[15] reviewed the properties of different types of devices in terms of coagulation and cryotherapy and stated APC as an ideal technique for hemostasis. According to their study, the use of APC "results in more rapid devitalization of tissues" when compared to ECA. This may be the explanation for the fewer number of pads used in the postoperative first week in our study. Scar development was significantly

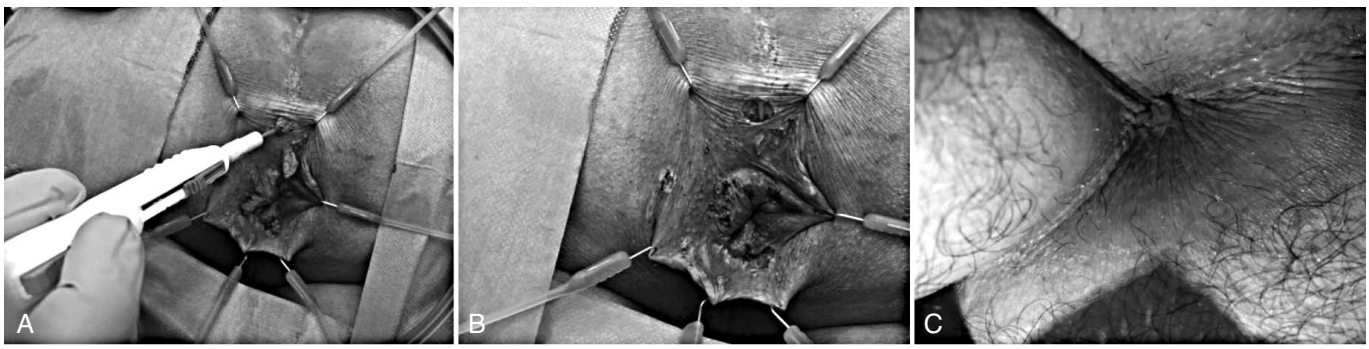

Fig. 1: Condylomaacuminata: (A) Preoperative status, (B) Postoperative status after ablation with argon plasma, and (C) Healing wound nine months after the operation.

Fig. 2: Condylomaacuminata: (A) Preoperative status, (B) Postoperative status after excision with electrocautery, and (C) Healing wound nine months after the operation.

greater in the ECA group. This may be due to the technological differences between electrocautery and argon plasma. APC is a non-contact method of delivering high-frequency monopolar current in a controlled manner. The ionized argon gas contacts the tissue closest to the probe, which makes a superficial effect, generally resulting in a1-3mm deep coagulation zone [14,16]. In this way, APC may lead to a less scar development (Fig. 1).

Loss of sexual sensation and postoperative pain levels were lower in patients in the APC group. Although there have been studies comparing the effects of APC and ECA in the digestive tract, we could not find a study evaluating the use of APC in the anogenital region. According to our review of the medical literature, this is the first study that compares APC and ECA techniques in terms of loss of sexual sensation and postoperative pain in the anogenital region (Fig. 2).

We recommended our patients not to having anal intercourse 6 weeks after the surgery. But some patients were sex workers and they did not obey this recommendation. In addition to this, these patients' partners were casual and multiple and this caused a bad hygiene and a bad wound healing. According to our clinical observations, these can be one of the explanations for postoperative pain and loss of sexual sensation even after 6 months from the surgery.

In the postoperative period, patients were followed for 9 months. Recurrent disease was observed in one patient in the APC group and two in the ECA group. There was no statistically significant difference in the recurrence rates between the groups. Stone et al. [17] studied 450 patients with CA and found that surgical techniques are more effective at reducing the recurrence rates than topical treatments.

Pontone et al. [18] presented a case of a young female with anorectal condyloma who was successfully treated by APC technique. According to their results, although limited to a case report, the use of non- contact method of thermal coagulation should be considered as a safe and effective treatment technique. Their statements correlate with our findings related with the use of APC in the treatment of CA.

There are studies that have documented the presence of intact HPV DNA in smoke plumes after treatment of CA with electrosurgical modalities [19- 22]. It is shown that collection of smoke plumes after carbon dioxide laser treatment and reinoculation into the skin of calves caused papillomas [23]. According to our search in the medical databases, there are no statistically significant differences between APC and ECA in terms of risk for the occupational exposure to HPV [24]. The National Institute of Occupational Safety and Health (NIOSH) and the American Society for Laser Medicine and Surgery (ASLMS) recommend the use of local exhaust ventilation during laser or electrosurgical procedures on patients with CA [25, 26].

This study has a number of limitations. First, it is a retrospective study in a highly select group most of them are MSM, treated by a surgeon experienced in treating HPV-related anorectal disease; as such, the data might not be generalizable to other populations. Another important limitations of this study are the subjective evaluation of the loss of sexual sensation and the number of bloody dressings. Because of homosexuality-related stigma and discrimination, MSM remains a relatively hidden, hard-to-reach population in Turkey. As a result of this privacy, we could not make a more illustrative or objective evaluation in terms of loss of sexual sensation because of the patients' high confidentiality. The number of bloody dressings is calculated by the patients so that caused a subjective evaluation of the real amount of postoperative bleeding could not be assessed. We believe that a prospective randomized trial with objective evaluation should afford more contribution to this topic.

In conclusion, APC is a safe and effective alternative for the surgical treatment of patients with CA. Although it appears to be more comfortable compared to ECA techniques, more randomized controlled trials are necessary to reinforce this claim.

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Commento e Commentary

Nicola Picardi
Già Ordinario di Chirurgia Generale

Molti anni fa abbiamo testato le proprietà fisiche dell'Argon Beam Coagulator in uno studio sperimentale. Lo scopo del nostro studio era di valutare il livello di calore che si sviluppa nei tessuti esposti al raggio in relazione alla durata dell'esposizione.
Lo studio sperimentale è stato eseguito con il Birtcher 6000 Argon Beam Coagulator, utilizzando come rivelatore di temperatura un teletermometro laser guidato su un pezzo di carne proveniente dalla macelleria, perché lo stesso non era facile da fare sul campo operatorio a causa dei movimenti involontari della mano dell'operatore del tele-termometro e quelli del paziente stesso.
Alla più lunga applicazione della coagulazione del fascio sullo stesso punto, la temperatura sviluppata non è mai stata superiore a 100 °C, con un effetto di coagulazione completo.
Il vantaggio della coagulazione Argon Beam è quindi quello di sigillare il sanguinamento diffuso senza pregiudizio per i tessuti adiacenti, mai esposti ad una temperatura superiore a quella dell'acqua bollente. I vantaggi sono evidenti anche rispetto alla più consueta operazione di elettro chirurgia a spay che è invece caratterizzata da un'ampia carbonizzazione che si estende ai tessuti limitrofi.
Siamo completamente d'accordo con l'uso dell'argon Beam Laser ovunque sia necessaria una coagulazione con effetti estremamente limitati sui tessuti adiacenti.

* * *

Many years ago we tested the physical properties of the Argon Beam Coagulator in an experimental study. The aim of our study was to evaluate the level of heat that develops in the tissues exposed to the beam in relation to the duration of exposure.
The experimental study was performed with the Birtcher 6000 Argon Beam Coagulator , using as a temperature detector a laser guided telethermometer on a piece of meat coming from the butcher's shop, because the same was not easy to do on the operatory field because of the unwilling movements of the tele-thermometer operator hand and those of the patient himself.
At the longest application of the beam coagulation on the same point the developed temperature was never higher than100°C whilst a complete coagulation effects.
The advantage of the Argon Beam coagulation are therefore to seal the diffuse bleeding without injury to this adjacent tissues, never exposed to a temperature higher than that of boiling water. The advantages are also evident in comparison with the more usual spray electro surgery that is instead characterized by a wide carbonisation also with its spray option
We completely agree with the use of the Argon Beam Laser wherever a coagulation is needed with extremely limited effects on adjacent tissues.

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