

Case Report

Ultrasonic scalpel associated with photodynamic therapy in the treatment of refractory vulvar condyloma acuminatum

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ABSTRACT

This is a case report of a patient with vulvar condyloma acuminatum associated with hyperkeratosis and folliculitis, which had been refractory to two previous therapies. The patient had been successfully treated using a combination of promising techniques: the ultrasonic scalpel and MAL photodynamic therapy.

1. Introduction

Genital infection caused by the Human Papillomavirus (HPV) is a globally prevalent condition, affecting a significant portion of the world's population. It is estimated that up to 80 % of women will come into contact with one or more types of HPV by the age of 50 [1].

The clinical manifestations of the infection caused especially by viral subtypes 6 and 11 include condylomata acuminata, appearing as benign white, exophytic, or papillomatous lesions, which can affect the vulva, penis, groin, perineum, anal, perianal, and suprapubic regions [2].

Therapeutic approaches for removing these lesions in Gynecology outpatient clinics involve topical applications of different compounds such as trichloroacetic acid (TAA), immunotherapy as Imiquimod, and surgical procedures, such as simple surgical excision, laser vaporization, cryosurgery, and electrosurgery [3]. However, these procedures require specialized resources and can result in post-treatment adverse effects such as severe perianal stricture [4,5]. Furthermore, even if the treatment occurs without side effects, the recurrence rate of these lesions is between 30 and 40 % and, therefore, there is a growing search for innovative interventions that are effective and minimize the adverse effects associated with treatment [6].

Previous studies have demonstrated that Photodynamic Therapy (PDT) represents a promising approach for treating clinical and

subclinical lesions caused by HPV, reducing the chances of recurrence [7,8]. PDT is characterized by the association of a photosensitizing agent, which presents selectivity for altered cells and, when subjected to a light source, can interact with oxygen molecules present in the medium and form reactive oxygen species that are cytotoxic to cells, leading to cell death [9]. In a randomized study by Buzza et al., PDT with 20 % methyl aminolevulinate (MAL) cream demonstrated efficacy in eliminating 63 % of lesions without recurrence. In comparison, in the group treated with topical application of TAA 80 % showed 60 % of complete response and 33 % of recurrence. However, it is important to highlight that PDT requires multiple treatment sessions to achieve effective results, as well as TAA. Furthermore, the number of patients with incomplete responses was more than 30 % in both protocols [10].

The Ultrasonic Scalpel appears as a new treatment alternative for these injuries, enabling the cutting and coagulation of soft tissues with broad bleeding control, without causing peripheral thermal injuries, as has already been demonstrated in laparoscopic surgeries [11].

To achieve greater resolution and effectiveness in the treatment of condyloma acuminata, the use of the Ultrasonic Scalpel associated with PDT was proposed in this case report, as an innovative and experimental dual technique that has sought to reduce the number of sessions, improve the effectiveness, the final aesthetic result and the rate of recurrence.

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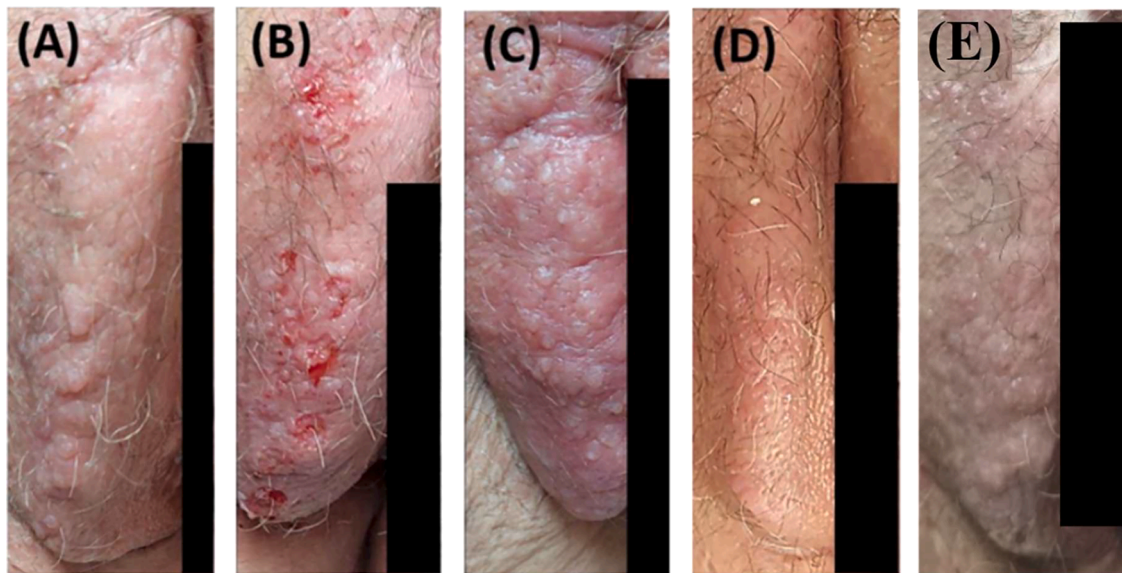


Fig. 1. Patient ZPGO, 61 years old, during treatment of condylomas on the vulva (A) initially, (B) immediately after removal with the ultrasonic scalpel, (C) after three weeks for application of PDT, in the return visits of (D) a month and (E) twelve months.

2. Case report

Female patient, 61 years old, white, married, non-smoker, and with no report of previous illnesses and continuous medication use. She reported having slightly itchy vulvar and perianal lesions in 2018 when she was seen at the University Hospital of the Federal University of São Carlos (HU-UFSCar). A biopsy was performed on the lesions of different regions for analysis. For biopsy of peri-clitoral lesions and perineum lesion, the mucosa showed acanthosis, papillomatosis, hyperkeratosis, and cells with koilocytic changes suggestive of the action of the human papillomavirus, and some sections of the peri-clitoral lesion had shown acanthosis, papillomatosis, and hyperkeratosis.

The topical Imiquimod, in cream, was prescribed for 8 weeks, without improvement. In 2020, the patient underwent over ten PDT sessions using 20 % MAL cream with 1-week intervals and 630 nm irradiation (80 mW/cm^2 , 100 J/cm^2) and there was a partial response to the treatment and the lesions remained. Two years later, the patient returned to HU-UFSCar where this study began with the association of the Ultrasonic Scalpel (with the operating frequency between 40 KHz and 60 KHz, and power delivered to the tip ranging from 0 to 0.1 W) with MAL-PDT. The protocol was approved by the Ethical Committee (protocol number CAAE: 26,134,319.9.0000.5414).

Initially, the region of the lesions was locally anesthetized with 2 ml of 2 % xylocaine injectable, without vasoconstrictor, and the lesions were removed using an Ultrasonic Scalpel Developed by the Technical Support Laboratory of the São Carlos Institute of Physics. Three weeks were waited for the region to heal and PDT was applied. For PDT, the patient self-applied MAL 20 % cream (PDTPharma, Cravinhos, Brazil) three hours before irradiation. Irradiation was carried out using the CerCa® system (MMOptics, São Carlos, Brazil) emitting at 630 nm with an irradiance of 80 mW/cm^2 for 21 min, totaling a fluence of 100 J/cm^2 .

The treatment was completed in September 2022 and the patient was followed up for one, three, six, and twelve months, where no new lesions or recurrences of previous lesions were observed. The healing status of the lesions is progressing well, with only the excision scars in a mature state and the patient has no reports of itching or pain in the treated area. [Fig. 1](#) shows the evolution of the lesions during treatment and follow-up.

3. Discussion

Although there is an important preventive trend in modern medicine,

with special vaccination of the young population before the first sexual contact [12,13], as long as immunization in countries does not achieve high vaccination coverage against HPV and its multiple subtypes, continuous efforts must be made to the improvement in therapeutic techniques for the treatment of infected patients [14].

In this case study, a patient with condyloma acuminata lesions was effectively treated with a combination of lesion removal with an ultrasonic scalpel and PDT, with a definitive resolution of a case refractory to other therapies. The patient had hyperkeratosis, a moderate or excessive thickening of the corneal layer that makes it difficult for both the cream and light to penetrate for the PDT effect, [11] and the combined therapies have proved to be effective.

This dual treatment makes it possible to remove these layers of the lesion, facilitating the photodynamic effect. The waiting time between the two techniques also allowed the effect not to be excessively inflammatory or cause damage to healthy tissue. Thus, the results so far have shown promise, with the ability to reduce the number of sessions required for usual topical treatments, improving the aesthetic result and the recurrence rate.

4. Conclusions

The Ultrasonic Scalpel associated with PDT has been demonstrated to be a promising option for treating vulvar and perianal condylomatous lesions with refractory characteristics. The results of this clinical case indicate the effectiveness of this approach, with definitive resolution of the lesions and absence of recurrence, in addition to a reduced number of sessions.

CRedit authorship contribution statement

Valter Fausto dos Santos: Writing – original draft, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Ian Carlos de Barros:** Writing – original draft, Validation, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Semira Silva de Arruda:** Visualization, Methodology, Data curation, Conceptualization. **Hilde Harb Buzza:** Writing – review & editing, Visualization, Methodology, Formal analysis, Conceptualization. **Natalia Mayumi Inada:** Writing – review & editing, Resources, Investigation, Data curation, Conceptualization. **Vanderlei Salvador Bagnato:** Writing – review & editing,

Visualization, Supervision, Resources, Methodology, Investigation, Funding acquisition, Conceptualization. **Mirian Denise Stringasci:** Writing – review & editing, Visualization, Supervision, Data curation, Methodology, Investigation, Conceptualization.

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