

Efficacy and Acceptability of Thermal Ablation in Patients with Positive Documented Visual Inspection with Acetic Acid (Do-VIA) Results

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Objective: This study aimed to evaluate the efficacy and acceptability of thermal ablation (TA) as a treatment modality in patients with positive Documented Visual Inspection with Acetic Acid (Do-VIA) results, in a low-resource clinical setting.

Methods: A retrospective cohort study was conducted at the VIA clinic of Cipto Mangunkusumo National Referral Hospital (RSCM), Jakarta, Indonesia, from January to July 2024. Patients with positive VIA-DoVIA results were treated with thermal ablation therapy (also known as cold coagulation) and followed up for three months to assess clinical outcomes and acceptability.

Results: Out of 99 patients who underwent VIA screening, 47 tested positive. Of these, 35 received thermal ablation therapy. Three months post-treatment, 25 patients tested negative on VIA, while only 3 patients remained VIA-positive. Patient-reported side effects included clear vaginal discharge (52%), vaginal discharge with blood spots (3%), itchy discharge (38%), and short-term vaginal spotting (7%). No severe adverse events were reported.

Conclusion: Thermal ablation therapy appears to be an effective and well-tolerated alternative to cryotherapy for the treatment of cervical precancerous lesions. It demonstrates good efficacy, minimal side effects, and high acceptability among healthcare providers in low-resource settings.

Keywords: cervical cancer, cold coagulation, Do-VIA, precancerous lesion

Introduction

Cervical cancer remains the second leading cause of cancer-related mortality among Indonesian women.¹ Vast majority of cervical cancer cases are linked to Human Papilloma Virus (HPV) of oncogenic subtype. Its development typically begins with precancerous lesions, which can be detected using screening modalities such as VIA (Visual Inspection with Acetic Acid), Pap smear, and HPV DNA testing, with VIA being more suitable for low-resource settings. VIA results supported with photographic evidence (Do-VIA) reviewed and confirmed by two trained physicians to ensure consistency. VIA results interpreted as indicative of CIN 1–3 based on WHO criteria, clinical training, and appearance of acetowhite lesions. Treatment of detected lesions, such as cryotherapy, is part of Indonesia's national See and Treat program. Despite the efficacy of cryotherapy in managing these lesions, its implementation in low-resource settings is often limited due to technical and logistical challenges.^{1,2} This necessitates exploration of alternative treatment methods such as thermal ablation (previously known as Cold Coagulation (CC)), a thermal ablative technique that has shown promising outcomes.^{1–4}

Thermal ablation offers a promising alternative, using an electric battery to ablate cervical lesions at high temperatures without consumables. It is portable, self-sterilizing, quick, and associated with few adverse effects.² Previous studies suggest that thermal ablation offers several advantages over cryotherapy, including ease of use, portability, and faster treatment time. Liu et al⁵ reported that CC had a higher cure proportion than cryotherapy (85% vs 81%, $z = 2.245$, $p = 0.025$).^{2,3}

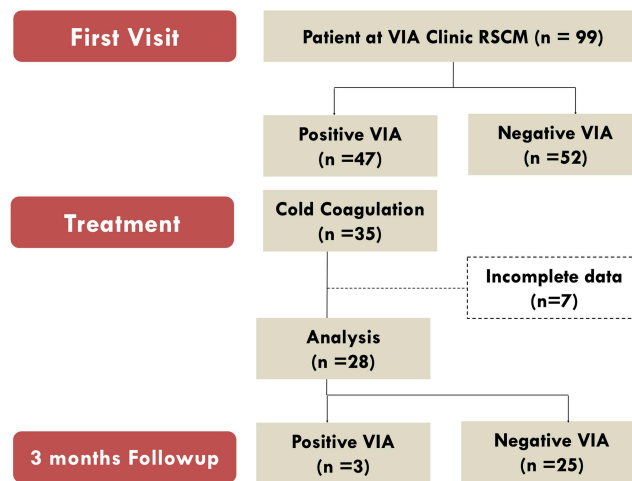


Figure 1 Flow of participants from VIA screening to treatment and follow-up.

Methods

A retrospective cohort study was conducted at the VIA clinic in Cipto Mangunkusumo Hospital from January to July 2024. Women aged 20 to 35 years old with a positive VIA-positive lesion documented by DoVIA photography and a visible transformation zone without endocervical involvement (CIN grades 1–3) were included. Patients who were in pregnancy, with cervical infection, having bleeding disorders and incompletely documented were excluded. A total of 99 patients underwent VIA screening. Of these, 47 were VIA-positive, and 35 completed thermal ablation therapy and follow-up.

Thermal ablation was performed using a portable, electrically powered device with a thermal probe set to 100°C, applied to the cervical lesion for approximately 30–45 seconds. Treatment were given to eligible patients who had lesions fully visible on the cervix, suitable for ablative therapy as per WHO thermal ablation guidelines. Follow-up VIA testing and patient symptom interviews were conducted three months post-treatment.

Results

Of the 35 patients treated, only 28 completed follow-up due to loss to follow-up or incomplete data. At three months post-treatment, 25 patients tested negative for cervical lesions, while 3 patients remained VIA-positive. The overall flow of participants from initial screening to analysis is shown in [Figure 1](#), which highlights that among 99 women screened, 47 were VIA-positive, 35 underwent thermal ablation, and 7 were lost to follow-up.

The baseline demographic and clinical characteristics of the 35 treated women are summarized in [Table 1](#), showing a mean age of 33.4 years (SD 8.5) and parity ranging from 0 to 5. Post-treatment outcomes are detailed in [Table 2](#), where the majority (89.3%) converted to VIA-negative at three months, while 10.7% remained VIA-positive.

Table 1 Patient Demographics and Baseline Characteristics

Characteristic	Value (N=35)
Age (mean ± SD)	33.36 ± 8.46
Parity (median)	33
Minimum	15
Maximum	52

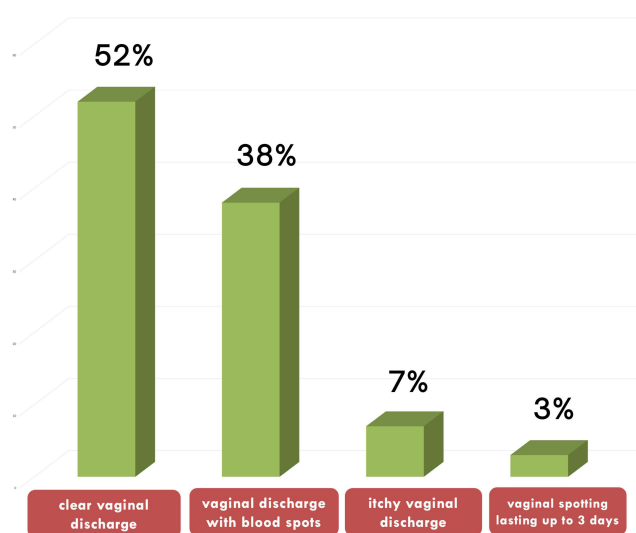
Table 2 Treatment Outcome at 3 Months

Outcome	n (%)
Total treated	35
Completed follow-up	28
Negative VIA at 3 months	25 (89.3%)

Reported side effects included clear vaginal discharge (52%), itchy discharge (38%), minor vaginal spotting lasting up to three days (7%), and discharge with blood spots (3%). No major complications or treatment-related adverse events were reported, and the distribution of these side effects is depicted in Figure 2, with watery discharge and itching as the most common findings.

Discussion

This study aimed to evaluate the effectiveness. The findings of this study align with existing literatures,^{2,3,5} suggesting that thermal ablation is an effective and safe alternative to cryotherapy in low-resource settings. In this study, a large majority (25 out of 28) of successfully followed-up patients has shown negative VIA results after three months. The high negative VIA conversion rate observed supports its use as a primary ablative therapy. Additionally, the absence of severe adverse effects and the minimal equipment required make thermal ablation particularly suitable for implementation in primary care or outreach programs. However, this study provides new evidence from Indonesia, where thermal ablation remains underutilized. Compared to cryotherapy, it avoids the need for refrigerant gas, shortens procedure time, and causes fewer side effects, which are usually limited to vaginal discharge or spotting. Complications are rare, and serious adverse events are uncommon. Evidence has shown that thermal ablation and cryotherapy have similar cure rate. Thermal ablation also need no consumables because it utilizes battery or electricity to produce heat of 100°C to 120°C for cervical lesions ablation, which is another reason why this instrument can be more suitable for low-middle income countries. This ablative method can be used for nonpregnant women of any age diagnosed with CIN2 or CIN3, as long as the full transformation zone is visible and there are no signs of endocervical extension or invasive cancer. The procedure itself is relatively brief and penetrates to a depth of about 4–7 mm. The device is lightweight and portable. Reported side effects are minimal.^{2,3}

**Figure 2** Distribution of reported side effects following thermal ablation.

This study contributes valuable local data on thermal ablation, which is rarely used and underreported in Indonesia. This helps address an important evidence gap in the national context. The study also aligns with Indonesia's See and Treat program and supports national cervical cancer prevention goals by exploring sustainable treatment options. Given the logistical challenges in procuring gas for cryotherapy, thermal ablation could serve as a feasible alternative in primary care settings, supporting wider implementation of the See and Treat program. This study did not compare the cure rates between thermal ablation and cryotherapy. However, our findings may provide a foundation for future research aimed at comparing these two treatment modalities in the Indonesian population. The study conducted by Liu et al⁵ even demonstrated that thermal ablation has a higher cure rate compared to cryotherapy. Other studies have also highlighted thermal ablation's operational benefits, including quicker procedure time and compatibility with basic clinical infrastructure.⁵ Another prospective randomized controlled study was conducted by Verma et al comparing both modalities also showed that thermal ablation has higher efficacies (93.54%) compared to cryotherapy (90.32%). The study also noted significant lesser side effects in thermal ablation group.⁶

Future research should aim to include larger, multicenter cohorts and consider integrating histopathological follow-up to validate VIA results. Additionally, a cost-effectiveness analysis comparing cryotherapy and thermal ablation would provide valuable insights for policymakers aiming to scale up cervical cancer prevention strategies in Indonesian rural and low-resource areas. While the ideal follow-up period is 6–12 months post-treatment, this study opted for 3 months due to logistical limitations and high loss-to-follow-up risks.

In conclusion, thermal ablation can be effective for the treatment of precancerous cervical lesions in low-resource settings. Given its operational advantages and comparable clinical outcomes, thermal ablation should be considered for broader implementation within national cervical cancer screening and treatment programs in Indonesia.

Ethical Clearance

The ethics of this study was reviewed and approved by *Komite Etik Penelitian Kesehatan Fakultas Kedokteran Universitas Indonesia – Rumah Sakit Umum Pusat Nasional Dr. Cipto Mangunkusumo* (Health Research Ethics Committee, Faculty of Medicine, Universitas Indonesia - Dr. Cipto Mangunkusumo National General Hospital) and written informed consent was obtained from all participants for the use of their medical records for research purposes. All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. Patient data were anonymized and handled with strict confidentiality.

Disclosure

The authors declare that there are no conflicts of interest related to this work.

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