International Journal of Gynecology and Obstetrics 133 (2016) 351–354

Contents lists available at ScienceDirect

International Journal of Gynecology and Obstetrics

journal homepage: www.elsevier.com/locate/ijgo

CLINICAL ARTICLE

Efficacy, safety, and acceptability of thermocoagulation for treatment of cervical intraepithelial neoplasia in a hospital setting in Brazil

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ARTICLE INFO

Article history:
Received 19 June 2015
Received in revised form 24 September 2015
Accepted 15 February 2016

Keywords:
Cervical intraepithelial neoplasia
Thermocoagulation

ABSTRACT

Objective: To analyze the acceptability, safety, and effectiveness of thermocoagulation for the treatment of histologically proven cervical intraepithelial neoplasia grade 2–3 (CIN2–3) lesions. *Methods:* In a retrospective study, data were obtained for women treated for CIN2–3 lesions by thermocoagulation at the Hospital de Clínicas de Porto Alegre, Brazil, between March 6, 2012, and October 29, 2013, and followed up after 1 year. The proportions of women with no evidence of disease, adverse effects, or complications were determined. *Results:* Among 52 women included, 44 (85%) had no evidence of disease 1 year after thermocoagulation. The rate of no disease at follow-up was similar for women treated for CIN2 (17/20 [85%]) and CIN3 (27/32 [84%]). No serious adverse effects or complications requiring hospitalization were observed during the follow-up period. *Conclusion:* Thermocoagulation is useful in the management of ectocervical CIN and should be integrated into public health services for management of cervical cancer.

1. Introduction

Ablative methods are used to treat women diagnosed with cervical intraepithelial neoplasia (CIN) if their lesions are on the ectocervix only, are fully visible, and involve up to three quadrants of the transformation zone. Cryotherapy is the most widely used ablative treatment, particularly in low-resource settings, and its efficacy, safety, and acceptability in many of these settings have been documented [1–4]. Worldwide, it has been observed to have cure rates ranging between 90% and 100% for CIN grade 1 (CIN1), between 75% and 96% for CIN grade 2 (CIN2), and between 71% and 92% for CIN grade 3 (CIN3) [1–5]. Cryotherapy can be effectively performed by a wide range of providers, including non-physicians [5], and large-scale national or regional cervical cancer screening programs using cryotherapy are in progress in countries such as Thailand and Zambia [6,7]. Its feasibility as a "single-visit approach" has also been extensively documented [8–11]. However, certain challenges—e.g. the need for continuous refills of refrigerant gas and the bulky equipment that limits mobility in the field—impede the sustainable use of cryotherapy in low-resource settings.

Thermocoagulation—which has cure rates similar to those of cryotherapy [12]—provides a more feasible treatment option for ectocervical CIN lesions because it is powered by electricity and thus requires no consumables (gas). The equipment is light and easily portable, and has an incorporated automatic self-sterilization feature. Additionally, it has a significantly shorter treatment time with rapid patient turnover, and results in less vaginal discharge and fewer adverse effects and complications than does cryotherapy.

Nevertheless, thermocoagulation was not included in the recent updated WHO guidelines for screening and treatment of precancerous lesions for cervical cancer prevention [13] because of its infrequent use worldwide and limited studies documenting its use [14]. The aim of the present study was therefore to determine the acceptability, safety, and effectiveness of thermocoagulation for the treatment of histologically proven CIN2–3 lesions among women in Porto Alegre, Brazil.

2. Materials and methods

In a retrospective study, data were obtained from the hospital records of women with high-grade CIN who were treated by thermocoagulation between March 6, 2012, and October 29, 2013, and followed up after 1 year at the Hospital de Clínicas de Porto Alegre, Federal University of Rio Grande do Sul, Porto Alegre, Brazil. Ethical

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http://dx.doi.org/10.1016/j.ijgo.2015.09.035
0020-7292/

approval was obtained from the ethical review committee of the hospital to treat women with CIN using thermocoagulation and to use the data for future studies. All patients gave informed consent to undergo the procedure and for the data to be used in future studies.

Women with histologically proven CIN2–3 lesions diagnosed at the hospital were treated with thermocoagulation if four criteria were met: the lesion could be covered by the probe and involved three quadrants or fewer of the transformation zone, the lesion was fully visible with no extension into the endocervix or vaginal walls, the squamocolumnar junction was fully visible, and there was no evidence of invasive cancer or adenocarcinoma in situ. Women with CIN lesions not suitable for thermocoagulation were treated by the loop electrosurgical excision procedure (LEEP). Women with invasive cancer were referred to the oncology hospital for further investigations and treatment.

Prior to treatment, the histologic findings, treatment procedure, and potential adverse effects or complications were explained to each woman and informed consent was obtained. To clearly demarcate the lesion on the cervix, 5% acetic acid followed by Lugol iodine was applied. The thermocoagulator (WISAP Medical Technology, Sauerlach, Germany) was switched on and the flat metallic probe was heated to 100 °C. The heated probe was applied onto the cervix for 20 seconds and, if required, multiple overlapping applications (20 seconds each) were used to cover the whole transformation zone adequately. The cervix was examined for any bleeding and the vagina was examined for any evidence of inadvertent damage due to the application of the heated probe. No local anesthesia, sedation, or analgesics were used. The probe was decontaminated with alcohol and heated to 100 °C for sterilization before reuse.

After completion of the thermocoagulation treatment, women were given instructions on self-care, expected symptoms, and follow-up care. They were informed of the possibility of mild fever, pain, cramps, and excessive discharge for up to 2–3 weeks. They were advised to report back to the treatment center if they experienced severe pain or cramps, bleeding with passing of blood clots, foul smelling discharge, and/or fever for more than 2 days [15]. They were also advised not to use a vaginal douche or tampons for 1 month after treatment.

All women who were treated were given a 1-year appointment to assess the cervix and to rule out CIN or invasive cancer. During the follow-up visit, screening by visual inspection with acetic acid (VIA) and cytology was offered. Women with positive screening findings were offered colposcopy and punch biopsy samples were taken from any abnormal areas identified. Women with CIN were treated either with repeat thermocoagulation or with LEEP, depending on the extent and/or characteristics of the lesions.

The outcome of interest in the present study was no evident disease at the 1-year follow-up, which was defined as no histologically proven CIN if biopsy results were available, no colposcopic impression of CIN if biopsy results were not available, or negative screening results on both VIA and cytology if no biopsy or colposcopy results were available.

As a measure of safety for the procedure, the following complications were noted [16]: severe bleeding during or after treatment requiring further treatment or transfusion, pelvic inflammatory disease, local cervical infections, other complications indicated by severe pain following treatment, and unintended major surgery. Acceptability was assessed in terms of the following adverse effects [16]: heavy discharge, mild pain and/or cramping during or after treatment, dizziness, fainting or flushing during or immediately after treatment, and mild bleeding or spotting immediately after treatment.

Data were entered into Excel 2010 (Microsoft Corporation, Redmond, WA, USA) and analyzed by Stata version 13.1 (StataCorp, College Station, Texas, USA). The distribution of patient characteristics and measures of cure, safety, and acceptability were presented as proportions. The Fisher exact χ^2 test was used to compare baseline patient characteristics of patients with CIN2 and CIN3. $P < 0.05$ was considered to be statistically significant.

3. Results

During the study period, 52 women were treated for histologically proven high-grade CIN (20 CIN2, 32 CIN3) and completed the 1-year follow-up. The median age was 31 years (interquartile range 27–40). More than half the women diagnosed with CIN2 were younger than 30 years and had had no or one pregnancy (Table 1). The reverse was true for women diagnosed with CIN3: most were 30 years or older and had had at least two pregnancies (Table 1). More women with CIN3 than with CIN2 were subjected to more than one probe application during thermocoagulation treatment, although the difference was not significant ($P = 0.444$) (Table 1).

Table 1
Baseline characteristics.[a]

Characteristic	Overall (n = 52)	Baseline diagnosis		*P* value
		CIN2 (n = 20)	CIN3 (n = 32)	
Age, y				
<30	18 (35)	11 (55)	7 (22)	0.015
≥30	34 (65)	9 (45)	25 (78)	
Education, y				
≤10	31 (60)	12 (60)	19 (59)	0.964
>10	21 (40)	8 (40)	13 (41)	
Minimum wage income [b]				
<1	23 (44)	7 (35)	16 (50)	0.289
≥1	29 (56)	13 (65)	16 (50)	
Marital status				
Married	31 (60)	11 (55)	20 (63)	0.621
Divorced	4 (8)	1 (5)	3 (9)	
Single	17 (33)	8 (40)	9 (28)	
Number of pregnancies [c]				
0–1	22 (42)	13 (65)	9 (28)	0.011
≥2	29 (56)	7 (35)	22 (69)	
Squamocolumnar junction visible				
Fully	51 (98)	20 (100)	31 (97)	0.425
Partially	1 (2)	0 (0)	1 (3)	
Screening by visual inspection with acetic acid				
Positive	52 (100)	20 (100)	32 (100)	
Negative	0 (0)	(0)	(0)	
Quadrants acetowhitening				
1–2	33 (63)	14 (70)	19 (59)	0.439
3–4	19 (37)	6 (30)	13 (41)	
Visual inspection after Schiller				
Negative	1 (2)	0 (0)	1 (3)	0.425
Positive	51 (98)	20 (100)	31 (97)	
Quadrants turning mustard yellow [c]				
1–2	35 (67)	14 (70)	21 (66)	0.717
3–4	16 (31)	6 (30)	10 (31)	
Cytology results				
Negative	2 (4)	0 (0)	2 (6)	0.144
Atypical squamous cells of undetermined significance	11 (21)	5 (25)	6 (19)	
LSIL	9 (17)	6 (30)	3 (9)	
HSIL	30 (58)	9 (45)	21 (66)	
Colposcopy findings				
LSIL	18 (35)	17 (85)	1 (3)	<0.001
HSIL	34 (65)	3 (15)	31 (97)	
Area of the cervix affected				
<50%	33 (63)	13 (65)	20 (63)	0.855
>50%	19 (37)	7 (35)	12 (38)	
Extension into the canal				
<1 cm	13 (25)	4 (20)	9 (28)	0.510
No	39 (75)	16 (80)	23 (72)	
Probe applications during procedure				
1	20 (38)	9 (45)	11 (34)	0.444
≥2	32 (62)	11 (55)	21 (66)	

Abbreviations: CIN2, cervical intraepithelial neoplasia grade 2; CIN3, cervical intraepithelial neoplasia grade 3; LSIL, low-grade squamous intraepithelial lesion; HSIL, high-grade squamous intraepithelial lesion.

[a] Values are given as number (percentage) unless stated otherwise.

[b] A minimum wage is 788 Reais per month; US$1 is approximately equal to 3 Reais.

[c] Patient numbers do not match overall group totals owing to missing data.