

Electrosurgical Loop Excision of the Cervical Transformation Zone: The Experience of Family Physicians

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Background. Electrosurgical loop excision of the cervical transformation zone (ELECTZ) is an excisional surgical procedure for treatment of premalignant cervical disease and the abnormal transformation zone by wire loop electrodes. The purpose of this study was to describe and assess the clinical experiences and complications of family-physician-performed ELECTZ and ELECTZ conization.

Methods. Women who were scheduled for the ELECTZ or ELECTZ conization procedures were enrolled in the study between March 1992 and March 1993, inclusive. Subjects were recruited from the practices of six family physician colposcopists located at five sites. The ELECTZ and ELECTZ conization procedures were performed on patients with abnormal Papanicolaou (Pap) smears or abnormal histologic results and abnormal colposcopic findings. Procedural complications were documented. Subjects were serially assessed during the first postoperative year by Pap smears, colposcopy, and, when necessary, by biopsy to determine therapeutic cure.

Results. Of 198 subjects enrolled in the study, 148 women were assessed at least once in follow-up by Pap smear and colposcopy. Only 7.6% of women were de-

finied as treatment failures by subsequent histologic assessment. Women treated by ELECTZ conization were older (32.2 vs 25.1 years, $P=.02$), were more likely to develop posttreatment cervical stenosis (25.9% vs 3.8%, $P=.001$), and were more likely to have the postoperative squamocolumnar junction positioned in the endocervical canal (32.4% vs 8.7%, $P=.002$) than were women treated by ELECTZ. Loop excision specimen margins demonstrated dysplasia for 27 (13.6%) subjects. Significant operative bleeding (>25 mL) was noted in 6.8% of subjects. Histologic thermal artifact was reported for 9.6% of specimens. One case of microinvasive cancer and one case of invasive cancer were identified unexpectedly by ELECTZ conization.

Conclusions. Electrosurgical loop excision of the cervical transformation zone and ELECTZ conization may be safely and effectively performed in office settings by family physicians. Complications and treatment failure rates for the ELECTZ and ELECTZ conization procedures were similar to those experienced by other clinicians.

Key words. Electrosurgery; cervical intraepithelial neoplasia; primary health care. (*J Fam Pract* 1995; 41:337-344)

Electrosurgical loop excision of the cervical transformation zone (ELECTZ) is an excisional surgical procedure of premalignant cervical disease and the abnormal trans-

formation zone by a relatively low-voltage, high-frequency alternating current wire loop electrode. The contemporary procedure is performed commonly in the outpatient setting. Medium-sized loop electrodes (20 mm \times 10 mm) powered by electrosurgical generators are used to simultaneously remove dysplastic epithelium and the abnormal transformation zone. As a result, histologic assessment of tissue excisional margins and verification of disease severity are made possible. Occult malignancy may be detected by use of the ELECTZ procedure in contrast with ablative treatment methods such as cryosurgery. The excisional technique also enables concomitant operative coagulation to minimize bleeding. When indicated, an

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additional, more narrow but deeper, endocervical excision ("cowboy hat" or ELECTZ conization) permits treatment of premalignant cervical disease that extends proximally into the endocervical canal.

The potential benefits of the ELECTZ procedure should be balanced by its potential disadvantages. Because of the inherent electrical characteristics of the technology, there is a risk of inadvertent thermal injury to the patient, staff, or surgeon. Excessive thermal injury to the excised specimen resulting from poor technique, faulty equipment, or improper generator settings may preclude an accurate histologic assessment by the pathologist. Operative and postoperative hemorrhage complications and accidental thermal injury or lacerations of the surrounding lower genital tract tissues present patient management challenges when compared with simple cryosurgery procedures. Clearly, colposcopic expertise exemplified by cognitive and psychomotor proficiency is a prerequisite to the performance of the ELECTZ procedure.

Family physicians are acquiring colposcopy-related skills, and competency based on a colposcopic accuracy index has been demonstrated.¹ The common learning errors and preclinical psychomotor skills acquisition of physicians learning the ELECTZ procedure have also been described.² Prospective studies of the procedure, therapeutic outcomes, and complications have been published in the gynecologic literature.³⁻⁵ The technical and general principles of electrosurgery have been reviewed,⁶ and the electrosurgical loop excision method described in the family medicine literature.^{7,8} To date, however, there has been no prospective study of the ELECTZ or ELECTZ conization procedures performed by family physicians. The purpose of this study was to describe, assess, and compare the clinical experiences of family physicians related to the performance of ELECTZ and ELECTZ conization procedures.

Methods

Patient Population

Women between the ages of 16 and 90 years who were scheduled for an electrosurgical loop excision procedure were enrolled in the study between March 1992 and March 1993, inclusive. Subjects were recruited from the practices of six family physician colposcopists at five clinical sites: The Medical College of Georgia, Augusta, Georgia; The Medical University of South Carolina, Charleston, South Carolina; National Procedures Institute, Midland, Michigan; East Carolina University, Greenville, North Carolina; and Morehouse School of Medicine, Atlanta, Georgia. Inclusion criteria were a min-

imum age of 16 years, cytologic, colposcopic, or histologic evidence of cervical dysplasia, and informed consent to undergo the ELECTZ procedure. Exclusion criteria were the presence of invasive cervical cancer, severe cervicitis, pregnancy, postpartum duration of less than 3 months, allergy to iodine or local anesthetics, hemorrhagic disorder or anticoagulation therapy, and extensive high-grade endocervical lesions.

Equipment and Materials

Each clinician was responsible for independently providing the necessary equipment and supplies required for the electrosurgical procedures. The equipment used included a colposcope, electrosurgical generator, hand pieces, active loop and ball electrodes of various sizes, return electrode (dispersive) pads, and a smoke evacuator with tubing. Supplies included nonconductive speculae, dilute Lugol's iodine, syringes and needles, 2% xylocaine with 1:100,000 epinephrine for local anesthesia, Monsel's paste, and cotton-tipped applicators.

Study Design

Data were collected on all patients scheduled for ELECTZ procedures during the 2-year enrollment and follow-up study period at each of the five sites. All subjects had undergone previous cytologic and colposcopic evaluation. The majority were previously found to have histologic evidence of cervical dysplasia by cervical biopsy, and most were treated by simple electrosurgical loop excision. Subjects with a prior endocervical curettage indicating dysplasia, with the proximal extent of the lesion or the entire transformation zone incompletely visualized, or with residual disease in the endocervical canal following simple ELECTZ received an ELECTZ ("cowboy-hat" conization).

Data forms were used to collect demographic information, colposcopic and laboratory findings, loop electrode size, depth of treatment, electrosurgical generator settings, complications, patient discomfort and medications. Follow-up data forms allowed collection of information about postoperative hemorrhage, vaginal discharge and infection, colposcopic findings, squamocolumnar junction location, presence of cervical button (a postsurgical protuberant wound deformity) or stenosis (inability to pass a small cotton-tipped swab into the endocervical canal), and laboratory findings.

After the patient was appropriately informed of the procedure and it was ensured that there were no contraindications to it, informed consent was obtained from

each subject. A dispersive or return electrode pad was applied to the patient near the operative site and plugged into the electrosurgical generator. A nonconductive vaginal speculum was placed and the smoke evacuation tubing secured. A nonconducting lateral sidewall retractor was used by several physicians, when necessary. Electrosurgery variables (power, and cut mode, blend mode, or coagulation mode) were selected and the safety systems tested. The cervix was colposcopically examined after the application of 3% or 5% acetic acid. Lugol's iodine was then applied to the cervix and the distal limits of the transformation zone were identified. Local anesthesia was obtained by a submucosal injection of 1 mL to 1.5 mL of 2% xylocaine with 1:100,000 epinephrine at the 3-, 6-, 9- and 12-o'clock positions 2 to 3 mm lateral to the iodine-negative transformation zone. The appropriate loop-electrode size was then selected for the procedure. After the smoke evacuator was activated, the excision was made under colposcopic observation. The excision was initiated slightly distal to the transformation zone and perpendicular to the epithelium. Tissue was excised to a depth of approximately 8 mm by moving the loop electrode beneath the transformation zone and then straight out distal to the opposite edge of the transformation zone. Any remaining elements of the transformation zone were then excised, if necessary.

If an ELECTZ conization was necessary, the power was reduced and a 10-mm × 10-mm loop electrode was used to excise the tissue surrounding the endocervical canal in a similar fashion. Some investigators performed an endocervical curettage following the procedure. The base of the excision was then superficially fulgurated using a ball electrode to obtain complete hemostasis. A 5-mm rim of the ectocervical wound margin was also lightly fulgurated and the base of the wound was packed with Monsel's paste. Residual blood was removed from the posterior fornix, the smoke evacuator was deactivated, the dispersive pad and speculum were removed, and the patient was assisted in getting up from the table. No routine postoperative intravaginal preparations were used. Specimens were submitted to the pathology laboratory for histologic review. Appropriate documentation was completed.

The patient was instructed to use nonsteroidal anti-inflammatory drugs for pain, comply with vaginal rest for 2 to 6 weeks, and return immediately if excessive postoperative hemorrhage were noted. Three follow-up examinations, which included a Papanicolaou (Pap) smear and colposcopic examination, were scheduled in the first postoperative year. When present, a biopsy was taken of residual or recurrent abnormal cervical lesions.

Statistical Analysis

Simple frequency measures were performed on demographic and descriptive data. The chi-square test was used to compare dichotomous variables and the *t* test was used to compare continuous variables. A *P* value of <.05 was considered statistically significant.

Results

One hundred ninety-eight patients were enrolled in the study. The mean age of patients was 25.5 years, with a range of 15 to 65. The average age of first intercourse was 16 years, and the mean lifetime number of sexual partners was 6.4. Thirty-seven percent of women were nulliparous. Forty percent of women reported current tobacco use and an average tobacco use history of 11 pack years. Approximately 15% of patients reported prior treatment of cervical dysplasia: 12% by cryotherapy, 2% by laser conization or ablation, and 1% by electrosurgical loop excision.

The cervical cytology, colposcopic impression, and histologic results from cervical biopsy and endocervical curettage for the 198 women treated by electrosurgical loop excision are recorded in Table 1. In general, the cytologic results appeared to underestimate the severity of disease when contrasted with the colposcopic impression and histologic assessment.

The histologic results from cervical biopsy were compared with histologic specimens taken during electrosurgical loop excision (Table 2). The correlation between cervical biopsy specimens and interpretation of histologic specimens from electrosurgical loop excision was within one grade of one another in 89.6% of the specimens. The biopsy and loop excision histologic specimens were equivalent for severity of disease in 53% of cases. Loop excision specimens were interpreted as more severe than biopsy specimens in 12% of cases and less severe in 35% of cases. One microinvasive cancer and one invasive cancer were detected in the ELECTZ specimens. The preliminary cervical biopsy histology for the invasive cancer was reported as cervical intraepithelial neoplasia (CIN) 3 with gland cleft involvement, and the colposcopic impression was reported as high-grade disease. The cervical biopsy for the microinvasive cancer was also reported as CIN 3 with a positive endocervical curettage demonstrating CIN 3.

The ELECTZ and ELECTZ conization techniques were compared for procedural complications (Table 3). Significant differences were noted in the ELECTZ conization group for the greater mean age of patients (*P*=.02), for the postoperative squamocolumnar junction being more proximally positioned (*P*=.002), and for a greater number of women who developed postoperative

Table 1. Preoperative Cytology, Colposcopic Impression, Histologic and Endocervical Curettage Results for Women Treated by ELECTZ and ELECTZ Conization (N=198)

	Normal	Inflammation	Atypia	LGSIL*	HGSIL†	Other	Missing Data
Cytology	7	2	14	121	47	1	6
Colposcopy	0	0	0	93	78	13	14
Histology	2	1	5	40	102	0	48‡
Endocervical Curettage	Negative 98			Positive§ 36			64

*LGSIL equates to mild dysplasia, CIN 1 or human papillomavirus associated cellular changes.

†HGSIL equates to moderate dysplasia (CIN 2) or severe dysplasia (CIN 3 or carcinoma in situ).

‡Reflects 48 patients who had a "see and treat" ELECTZ procedure and therefore did not have an initial biopsy.

§Positive endocervical curettage equates to histologic evidence of dysplastic epithelium.

ELECTZ denotes electrosurgical loop excision of the cervical transformation zone; LGSIL, low-grade squamous intraepithelial lesion; HGSIL, high-grade squamous intraepithelial lesion.

cervical stenosis ($P=.001$). Otherwise, there were no significant differences in complications between the two procedures.

In general, loop histologic specimen excisional margins for 26 patients were reported as demonstrating dysplasia. The corresponding postexcision endocervical curettage was positive for 2 of 16 of these women. Histologic thermal artifact was reported for 19 specimens, of which the thermal injury was reported to obscure the interpretation for 11. Loop stalling from too rapid an excision was reported for 13 procedures. Vaginal sidewalls were inadvertently struck by electrodes in 7 cases. Although a blend cutting/coagulation mode was used for 99% of excisional procedures, operative bleeding was reported for 21%. The median estimated blood loss was 5 mL with a range of 0 to 80 mL. Significant operative bleeding (>25 mL) was noted in 6.8% of subjects. Hemorrhage greater than 3 mL of blood was positively associated with excisions greater than 10 mm deep ($\chi^2=7.206$, $P=.007$). Twelve women reported minor postoperative bleeding and one experienced significant delayed hemorrhage of approximately 1500 mL of blood. She required cervical sutures to control the bleeding and was hospitalized for overnight observation. Most women (77%) expe-

rienced no postoperative vaginal discharge. When present, the discharge persisted for a mean of five (standard deviation [SD] ± 8.0) days. Postoperative cervicitis was reported for 7 women.

Overall, the postoperative squamocolumnar junction was located at an ectocervical position for 39% of women, at the cervical os for 42% of women, and within the endocervical canal for 19% of women. The resulting new squamocolumnar junction was more proximally located (at os or endocervical) for women with loop excisions greater than 10 mm deep ($P<.001$) and for women treated by an ELECTZ conization ($P=.002$), compared with women who had more superficial loop excisions. Cervical "buttons" were noted for 3% of women and cervical stenosis for 12.8%. Cervical stenosis occurred mainly when loop excisions exceeded a depth of 10 mm ($\chi^2=9.91$, $P=.002$). Therefore, few women treated by simple ELECTZ developed cervical stenosis. Only one subject with severe stenosis required cervical dilatation for symptomatic relief of severe postoperative dysmenorrhea.

One hundred five women received preoperative medication. The majority ($n=98$) were treated with nonsteroidal anti-inflammatory drugs. Either no discomfort or mild discomfort were reported by 89% of women; the remainder reported moderate discomfort. No women reported severe discomfort with the procedure.

Of the 198 women who had an electrosurgical loop excision, complete follow-up data were available for 132 of the 148 women who returned for at least one follow-up examination. One hundred two women were assessed twice, and 62 women completed a third evaluation. Of those 132 women, no residual lesion was identified in 119 (90.2%) by colposcopic and cytologic assessment (Table 4). Abnormal cervical cytologic results were reported at follow-up for 10 women: 8 low-grade squamous intraepithelial lesions (SIL) and 2 high-grade SIL. Only 10 women were considered treatment failures by histologic assessment: 6 with low-grade lesions and 4 with high-grade lesions, for an apparent cure rate of 92.4%. Of the

Table 2. Histologic Results from Cervical Biopsy Compared with Electrosurgical Loop Excision (N=134)

Loop Excision Histologic Results	Cervical Biopsy Histology			Total
	Negative*	LGSIL†	HGSIL‡	
Negative*	1	6	15	22
LGSIL†	4	22	26	52
HGSIL‡	3	7	48	58
Cancer	0	0	2	2
Total	8	35	91	134

*Negative equates to normal, inflammation, or atypia.

†LGSIL equates to mild dysplasia (cervical intraepithelial neoplasia [CIN] 1) or human papillomavirus associated cellular changes.

‡HGSIL equates to moderate dysplasia (CIN 2) or severe dysplasia (CIN 3 or carcinoma in situ).

LGSIL denotes low-grade squamous intraepithelial lesion; HGSIL, high-grade squamous intraepithelial lesion.

Table 3. Patient Characteristics, by Type of Procedure

	ELECTZ	ELECTZ Conization	P Value
Subjects, n	110	87	
Age in years, mean	25.1	32.2	.02
Lesion size (mean quadrants)	1.7	1.9	NS
Complications			
Loop specimen margins involved, n/total (%)	17/90 (18.9)	9/79 (11.3)	NS
ECC after ELECTZ positive,* n/total (%)	3/72 (4.1)	4/49 (8.1)	NS
Loop stalling,† n/total (%)	8/103 (7.8)	5/84 (6.0)	NS
Vaginal sidewall struck with electrode, n/total (%)	2/103 (1.9)	5/84 (6.0)	NS
Hemorrhage, operative, mL	6.7	7.6	NS
Postoperative vaginal discharge, mean days	1.8	2.9	NS
Postoperative infection, n/total (%)	3/56 (5.3)	4/64 (6.2)	NS
No complications, n/total (%)	91/103 (88.3)	72/84 (84.7)	NS
Postoperative SCJ position‡			
Ectocervical, %	54.3	18.9	
At the os, %	37.0	48.6	.002
Endocervical, %	8.7	32.4	
Cervical button, n/total (%)	3/51 (5.9)	2/58 (3.4)	NS
Cervical stenosis, n/total (%)	2/53 (3.8)	15/58 (25.9)	.001
Tobacco use, %	46.7	36.6	NS

*Endocervical curettage demonstrated cervical neoplasia.

†Temporary interruption of procedure due to excessively rapid technique.

‡Location of squamocolumnar junction following treatment.

ELECTZ denotes electrical loop excision of the cervical transformation zone; SCJ, squamocolumnar junction.

NOTE: NS = $P > .05$.

110 women treated by ELECTZ, 7 experienced treatment failure, and of the 87 women treated by ELECTZ conization, 3 experienced treatment failure. As lesion size increased, so did the percentage of treatment failure. For women with cervical disease involving three or four quadrants, 17% experienced treatment failure, whereas only 4% of failures occurred in women with two or fewer quadrants of disease.

Women who failed treatment were more likely to smoke tobacco. Sixteen percent of women who smoked had residual disease, compared with only 4% of women who did not smoke ($\chi^2=4.85$, degree of freedom [df]=1, $P=.027$). The postoperative squamocolumnar junction was more likely to be positioned within the endocervical

canal than at the os or more distally located for women who used tobacco ($\chi^2=4.51$, $df=1$, $P=.03$).

Discussion

This is the first clinical study of women who received ELECTZ and ELECTZ conizations from family physicians. The procedures were performed by faculty, a few residents, and physicians in private practice. In many cases, the results reported represent the early experience of these physicians in performing this procedure. Except for the postoperative position of the squamocolumnar junction and rate of cervical stenosis, there were no significant differences between the two procedures.

There was a 92.4% rate of therapeutic success as determined by histologic assessment in the group of women who returned for at least one follow-up examination within 6 months of their surgery. This compares favorably with similar cure rates of 90% to 95% reported in the gynecologic literature.^{4,5,9-17} The complication rates for posttreatment bleeding and posttreatment infection were also similar to those previously reported.^{4,9,10,12,16} Posttreatment vaginal discharge was noted in 23% of subjects in this study. This contrasts with the posttreatment vaginal discharge reported previously by 10.6% to 100% of subjects.^{9,18,19} The mean duration of vaginal discharge of 5 days following electrosurgical loop excision was also much shorter than the mean days of discharge of 13.1 days reported by Lopes et al¹⁹ and 2.17 weeks reported by

Table 4. Patient Cure Rates, by Type of Procedure

Type of Evaluation on which "cured" status was based	% ELECTZ (n=110)	% ELECTZ Conization* (n=87)	Total, % (n=197)
Cytology	91.2	88.3	89.7
Colposcopic Impression	84.6	89.7	86.8
Cytology and Colposcopy†	—	—	90.2
Histology‡	—	—	92.4

*Electrosurgical loop cervical conization.

†Postoperative cytology and colposcopic impressions jointly considered.

‡Patients without histologic evidence of cervical neoplasia during postoperative follow-up.

ELECTZ denotes electrical loop excision of the cervical transformation zone.

NOTE: Cure rates are defined as absence of cervical neoplasia.

Luesley et al.⁹ Of concern is that the vaginal sidewalls were inadvertently struck in 7 subjects. It is unknown whether these injuries were from a loop or ball electrode.

The presence of thermal artifact that interfered with interpretation in 5.5% of histologic specimens was less than the 26% to 48% reported by other authors.²⁰⁻²² Thermal artifact has been reported more frequently for endocervical excisions of the ELECTZ conization than for simple loop excision.²¹ The cause for more extensive tissue injury in the endocervical specimen is most likely the result of failure to properly readjust the power to a lower setting required by a smaller loop electrode. Otherwise, thermal artifact may be minimized by use of a pure cut current²³ rather than a blended current mode.

The correlation between cervical biopsy specimens and histologic specimens from electrosurgical loop excision of 89.6% is somewhat better than the 46% to 76% concordance reported in previous studies.^{14,24,25} However, our use of a bipartite dysplasia scale of low grade and high grade likely biases our results in comparison with the tripartite scale used by other investigators. Unlike other studies, our loop excision histologic specimens were more severe than the cervical biopsy specimens in 11% of subjects, compared with the 14% reported by Bonardi et al,²⁵ the 24% reported by Howe et al,¹⁴ and the 47% reported by Buxton et al.²⁴ It is unknown whether our colposcopists were more precise or took more cervical biopsies than the other investigators to account for these reported differences.

Incomplete loop excision of cervical neoplasia is more common with large lesions, severe lesions, and lesions that involve the endocervical canal.²⁶ Most women with positive excision margins (72.2%) or positive post-loop endocervical curettage were eventually judged as tentatively cured by minimal follow-up cytologic, histologic and colposcopic evaluation. These findings compare favorably with previous studies.²⁷ In a smaller study, Ferenczy²⁸ found that after loop conization, 20% of women with positive surgical margins had residual neoplasia at the first follow-up examination. Only 9% of women with a positive post-ELECTZ endocervical curettage have persistent disease.⁵ Few women (10% to 15%) with a positive specimen margin or post-ELECTZ endocervical curettage will actually have residual disease identified at follow-up examination.²⁶ Women with a positive margin should be followed closely by means of cytologic and colposcopic examination rather than directed automatically for a second excisional procedure. Only follow-up histologic results suggestive of high-grade disease, invasion, or deep glandular extension merits a second excisional procedure.²¹ Similarly, a minority of women (10%) with abnormal cytologic results following ELECTZ have persistent cervical neoplasia.²⁹ The fulguration of the

wound margins after excision may be sufficient to ablate any remaining neoplastic tissue. Residual dysplasia also may respond to the effects of the immune system. It is certainly possible that with further follow-up, a small minority of these women would present with evidence of recurrent or residual dysplastic tissue. However, the loop excision method of treatment may reduce the likelihood of residual disease failure compared with ablative methods.^{14,30}

With the more widespread adoption of excisional procedures in preference to destructive procedures for treatment of cervical intraepithelial neoplasia, there have been numerous reports describing the unexpected identification of invasive carcinoma in patients who would otherwise have been treated with local destructive treatment such as cryotherapy. This study included two such patients with severe dysplasia reported on prior cervical biopsy. Most previous studies report a prevalence of unsuspected microinvasive or invasive carcinoma of 1% to 6% in patients undergoing the loop excision procedure.^{4,13,17,24,25,31-35} Spitzer et al¹⁷ unexpectedly detected two cases of microinvasive cancer and two cases of invasive cancer in a study of 236 inner-city women who were treated by electrosurgical loop excision. The capability of the excisional technique to detect unanticipated cancer is a significant attribute when compared with ablative procedures.

The moderate frequency of cervical stenosis in our study may be a cause for concern, since we used a liberal definition for stenosis, ie, the inability to place a cotton-tipped swab in the cervical os. Using a less liberal definition, Luesley et al⁹ reported that only 1.3% of women experienced postsurgical stenosis. Although only one patient required dilatation of the cervix, this is an area that should be followed closely in the future for its potential impact on obstetrical outcomes.

Only a small number of patients have been followed through pregnancy following electrosurgical loop excision. One study has demonstrated that women who gave birth after electrosurgical loop excision had significantly smaller infants, possibly a result of confounding variables such as smoking.³⁶ Bigrigg et al³⁷ found few fertility complications for 250 women followed for 3 years after electrosurgical loop excision. Based on prior studies of pregnant patients who had undergone cold knife conization, complications do not occur until there is considerably greater cervical tissue excision than that which occurs in electrosurgical loop excisions.³⁸

Few women experienced significant pain with the ELECTZ procedure. Luesley et al⁹ reported that 85% of subjects reported no pain and 13% reported mild discomfort; these rates are similar to the 89% of women in this study who reported either mild or no discomfort.

Cigarette smoking has been shown to increase the risk of cervical cancer.³⁹ We are unaware of any studies that have shown that women who smoke and are treated by ELECTZ have a significantly greater treatment failure rate than women who do not smoke. Local immunologic effects of tobacco on the cervical epithelium⁴⁰ may explain the increased treatment failure rates among smoking patients documented by this study.

This study had a significant limitation. Therapeutic cure is usually defined as three normal postoperative Pap smears and normal colposcopic findings in the 12 months immediately following treatment. Few subjects complied with this requirement and as such, our definition of cure very likely overestimated the actual cure rate. Only two thirds of the patients received follow-up cytologic or colposcopic evaluation within 6 months of their treatment by electro-surgical loop excision. Such noncompliance may reflect the reality of many practices serving a high proportion of medically indigent patients who have transportation, economic, and educational limitations that affect follow-up.

ELECTZ and ELECTZ conization are safely and effectively performed in office settings by family physicians. The results reported here reflect patient and treatment outcomes quite similar to those reported to date by other investigators.

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