

Cervical Dysplasia Recurrence Rates Among University Women: Cryosurgery Compared with Loop Excisional Electrical Procedure

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Abstract

Women with cervical dysplasia are at risk for developing invasive cancer, yet there is no consensus regarding optimum treatment. The purpose of this retrospective chart review is to compare recurrence rates of cervical dysplasia following cryosurgery and Loop Electrical Excisional Procedure (LEEP). A literature review covering the past six years found a large body of literature regarding each procedure separately, and a single comparison study. Demographics and outcome data were analyzed from charts of those women ($N = 63$) with abnormal Pap smears who were treated with cryosurgery ($n = 48$) or LEEP ($n = 15$) through a university clinic from 1993 to 1996. Results supported the study's hypothesis that there is a greater dysplasia recurrence rate post cryosurgery than post LEEP. While the sample size prohibited extensive analysis of correlation between demographic variables and results, a possible relationship was noted between oral contraceptive use and a decreased dysplasia recurrence rate. Further research is needed in this area.

Introduction

Cervical Dysplasia Recurrence Rates Among University Women:
Cryosurgery Compared with Loop Excisional Electrical Procedure

Every year practitioners in university health clinics across the country diagnose cervical dysplasias through abnormal Papanicolaou (Pap) smears related to the human papillomavirus (HPV). This abnormality is a precursor to cervical cancer, and must be treated carefully and promptly. Until recently, cryosurgery was the most common treatment of choice for cervical dysplasias. However, over the past several years the Loop Electrical Excision Procedure (LEEP) has increased in popularity based on preliminary data suggesting lower dysplasia recurrence rates than after cryosurgery. It is even considered that LEEP can replace cold knife conization as a diagnostic procedure (Eduardo, Dinh, Hannigan, Yandell, & Schnadig, 1996).

It is imperative that cervical dysplasia be eliminated on the first treatment attempt. Women with failed initial treatment of cervical intraepithelial neoplasia (CIN) have a higher risk of invasive cancer than those whose first treatment succeeds. Successful initial treatment of CIN is essential in helping to prevent cervical carcinoma (Manetta & Bhaumik, 1994).

Background

HPV is considered an epidemic in the United States. A woman has an 80% chance of acquiring some sort of HPV virus, which is by far the largest cause of cervical dysplasia leading to cervical cancer (Ackerman, 1996). An estimated 10% of individuals with HPV will develop some level of dysplasia (Hanson, 1996).

After an abnormal Pap smear, a clinician may proceed with a colposcopy to further investigate the cervix and may decide to take a biopsy. An endocervical curettage (ECC), a sampling of tissue inside the cervix, is also usually done. An ECC helps to determine the extent of the spread of the dysplasia up into the cervix (Ferris, 1992). Moderate and severe dysplasias diagnosed by colposcopy and ECC require treatment such as cryosurgery or LEEP.

Cryosurgery is an ablative treatment that destroys abnormal tissue by freezing. A probe is placed against the cervix, cooling it to sub-zero temperature with liquid nitrogen or carbon dioxide. Dead cells are then shed over a period of time. Disadvantages of cryosurgery are: (a) the inaccuracy in depth of tissue affected, (b) no tissue remains for biopsy, and (c) abnormal healing can contribute to future problems. The benefits of the procedure are that it is simple to do, historically requires no anesthetic, is relatively inexpensive, and is readily available (Ferenczy, 1995).

LEEP, also known as Large-Loop Excision of the Transformation Zone (LLETZ), is an excisional treatment in which abnormal tissue is removed by a thin wire loop electrode carrying a low voltage, high frequency alternating current of electricity. This current destabilizes the cell by causing a water imbalance and destroying it (Apgar, Wright, & Pfenninger, 1992). All of the dysplasia is removed, preferably in one sweep, preserving the abnormal tissue for histologic interpretation. Local anesthesia is used, and there is a small risk of excessive bleeding. LEEP is the least expensive of the excisional treatments available, and is considered safe, effective and reliable (Manneta & Bhaumik, 1994). Early studies suggest no difference between fertility of LEEP patients and regular patients, but all authors note that further studies need to be done on this issue (Ferris et al., 1995).

Literature Review

While there is a large body of research concerning cryosurgery and LEEP separately, only one study was identified that compared their dysplasia recurrence rates. This randomized clinical trial compared cryotherapy, laser vaporization and LEEP and found no statistically significant complication or recurrence rate differences between the treatments (Mitchell et al., 1998). The hypothesis of this study looked for a 10% statistically significant difference in complications, and a 20% statistically significant difference in dysplasia recurrence. At a descriptive level, dysplasia recurrence rates were 19% for cryosurgery and 13% for LEEP. In the study, 498 patients were stratified according to disease classification and assigned randomly to treatments.

Patients were eligible if they: 1) were not pregnant, 2) were 18 years of age or older, 3) were using contraception, 4) had a CIN lesion proven with biopsy and PAP, and 5) had a positive endocervical curettage. This study appears to be a strong study and well designed.

Mayeaux and Harper (1993) reviewed separate studies of dysplasia recurrence following cryosurgery and LEEP. Success rates with no recurrence were between 90% to 98% for LEEP and 81% to 95% for cryosurgery. Because the data were compiled from multiple studies, the potential for accurate comparison of dysplasia recurrence rates is limited. Ferenczy (1995) stated that cryosurgery for high-grade squamous intra-epithelial lesions (HGSIL) smaller than 2.5 cm resulted in a 90% cure rate after a single treatment of cryosurgery, but the cure rate dropped to 50% for treatment of large HGSIL. A more recent retrospective study found considerable variation in LEEP dysplasia recurrence rates, ranging from 6.7% with CIN1 to up to 21.7% with CIN3 (Hulman et al., 1998). Another large retrospective study examining recurrence rates with LEEP over a period of four years showed a 10% cumulative recurrence rate (Flannelly et al., 1997). In a non-experimental study looking at LEEP performed by family physicians, there were numerous reports of unexpected discoveries of invasive carcinoma. These discoveries would probably not have been made if the tissue had been destroyed with cryotherapy (Ferris et al., 1995). Recent published research for cryosurgery has focused on the use of anesthesia during the procedure (Harper & Cobb, 1998).

Research Question and Hypothesis

The research question for this study asks what the difference is in dysplasia recurrence rates between cryosurgery and LEEP. We hypothesize that LEEP will have a lower dysplasia recurrence rate than cryosurgery. This hypothesis is based on literature and on a pilot study done in 1995 at the university health clinic chosen as the study site.

Methods

This study was a retrospective study of all abnormal Pap smears with dysplasia levels CINII(HPV) or CINIII diagnosed from September 1, 1993 to September 30, 1996 at a state university health clinic. Data collectors retrieved medical records and analyzed data from them using an investigator-designed data collection tool that focused on demographic and dysplasia data including treatment and follow-up Pap smears. The inclusion requirements were: (a) no known history of abnormal Pap smears, (b) no known history of HPV before initial abnormal Pap smear documented in chart, and (c) at least one post procedural Pap smear done after treatment.

Investigators reviewed medical history forms, progress notes, laboratory and pathology reports of 200 women with abnormal Pap results. Most records ($N = 147$) did not meet the inclusion requirements. The final sample ($N = 63$) included records of patients who were treated with cryosurgery ($n = 48$) and/or LEEP ($n = 15$). Six of the recurrences post cryosurgery had LEEP

procedures afterward as well. These LEEP procedures were not included in the recurrence rate analysis. All data collectors and researchers signed confidentiality statements required by the institutional review board. No patient names or identifying information were included on the data collection tool.

Descriptive statistics, including cross-tabulation tables and percentages, were calculated. Inferential tests, including the Chi Square test and the Mann-Whitney U-test were considered, but were ruled out due to the small sample size. The results are presented according to the type of treatment received for the cervical dysplasia, LEEP and cryosurgery. Descriptive statistics were applied to the demographic data using percentages (see Table 1). Sample sizes of the LEEP treated group ($n = 15$) and the cryosurgery treated group ($n = 48$) prohibited statistical analysis of correlation between demographics and recurrence rates.

Results

Demographic data are displayed in Table 1. A higher percentage of the LEEP group used oral contraceptives, had a familial history of cancer, used alcohol, tobacco, or recreational drugs, or had a history of a sexually transmitted disease (STD).

Overall, the dysplasia recurrence rate was higher after cryosurgery (17%) than after LEEP (13%) (Table 2). There was a higher ratio of CINIII dysplasias treated with LEEP, while CINII dysplasias were treated more often with cryosurgery. The dysplasia recurrence rate of the CINII group was slightly less for LEEP treated patients (13%) than for cryosurgery patients (15%). No recurrence of dysplasia occurred in the women with CINIII treated with LEEP, but a 17% recurrence was evident among the cryosurgery treated CINIII group.

A potential relationship was noted between oral contraceptive use and lower dysplasia recurrence rates. Incorporating both groups, the women using oral contraceptives ($n = 27$) had a 5% recurrence rate while the women not using oral contraceptives ($n = 36$) had a 36% recurrence rate. Further research is needed to sort out a possible relationship between oral contraceptive use and a lower recurrence of cervical dysplasia post treatment.

Six of the cryosurgeries with recurrences were treated with LEEP. Of the six, four patients returned to Stage I in their post procedure Pap smears. Two others were unsuccessful and required cone biopsies before returning to a Stage I Pap smear. Though the sample size is small, this does show a 67% success rate for LEEP following an unsuccessful cryosurgery treatment. Further research with a larger population is needed to explore this area.

Discussion

The goal of treating cervical dysplasia is to eliminate the abnormal cells before they have a chance to progress to invasive carcinoma. Within this sample, women treated with cryosurgery had a dysplasia recurrence rate 4% higher than women treated with LEEP. While this difference may seem unimpressive, the LEEP patient sample carried more risks, and a higher level of dysplasia than the cryosurgery group. In spite of these disadvantages, the recurrence rates were still lower in the LEEP group than in the cryosurgery group.

These results suggest that LEEP is more effective in reducing recurrences of dysplasia than cryosurgery. However, there were several limitations to this study that could affect the accuracy of the data. The sample sizes, and the retrospective style of the study made data collection and analysis limited. Further research in this area is needed to determine the impact of individual health characteristics on the effectiveness of treatments. In particular, research exploring the relationship between oral contraceptive use and reduced cervical dysplasia recurrences is indicated.

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Table 1

Age and health history for treatment groups.

Characteristics	LEEP treated (<u>n</u> = 15)	Cryosurgery treated (<u>n</u> = 48)
Age:		
<20 years	13% (<u>n</u> = 2)	32% (<u>n</u> = 15)
21-24 years	53% (<u>n</u> = 8)	53% (<u>n</u> = 26)
25-29 years	20% (<u>n</u> = 3)	11% (<u>n</u> = 5)
>30 years	13% (<u>n</u> = 2)	4% (<u>n</u> = 2)
Oral Contraceptive Use	67% (<u>n</u> = 10)	35% (<u>n</u> = 17)
Family Cancer History	47% (<u>n</u> = 7)	27% (<u>n</u> = 13)
Alcohol Use (> than monthly)	42% (<u>n</u> = 6)	26% (<u>n</u> = 12)
Tobacco Use	27% (<u>n</u> = 4)	7% (<u>n</u> = 3)
Recreational Drug Use	8% (<u>n</u> = 1)	5% (<u>n</u> = 2)
STD History (besides HPV)	27% (<u>n</u> = 4)	21% (<u>n</u> = 10)

Table 2

Dysplasia classification and recurrence rates for treatment groups.

Results	LEEP treated (<u>n</u> = 15)	Cryosurgery treated (<u>n</u> = 48)
Initial Pap Results:		
CINII	47% (<u>n</u> = 7)	62.5% (<u>n</u> = 30)
CINIII	53% (<u>n</u> = 8)	37.5% (<u>n</u> = 18)
Recurrence Rates		
Class II/SIL	13% (<u>n</u> = 2)	15% (<u>n</u> = 5)
Class III/CIN	--	17% (<u>n</u> = 3)
Total Recurrence Rates	13% (<u>n</u> = 2)	17% (<u>n</u> = 8)

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