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Loop Electrosurgical Excisional Procedure (LEEP) in the Management of High-Grade Cervical Dysplasia in Abidjan

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Abstract

Objective: Evaluate the results of the practice of LEEP in Abidjan by reporting our experience. **Patients and method:** This is a retrospective descriptive cohort study carried out in a private medical clinic in Abidjan from 2020 to 2023 covering 40 patients who benefited from LEEP for high-grade cervical dysplasia. We analyzed the epidemiological and clinical parameters of the patients in order to assess the results of the procedure. **Results:** The average age of our patients was 37.6 years. The pap smear revealed 12.5% ASCH, 5% ASCUS, 70% HSIL and 12.5% LSIL. Colposcopy in our study revealed 87.5% TZ2. The biopsy performed revealed 2.5% CIN 2+ lesions, 47.5% CIN2 and 50% CIN3. The average duration of LEEP in our study was 18 min and the complication rate was 10%. We noted two postoperative hemorrhages and two postoperative pelvic pain resistant to usual analgesic treatment. The histopathological results after LEEP in our study showed 10% CIN1, 25% CIN2, 55% CIN3, 5% chronic cervicitis, 2.5% metaplasia and 2.5% cancer. The overall concordance rate with colposcopic biopsy was 65%. The resection was at positive endocervical margins in 12.5% of cases. LEEP was repeated in 7.5% of cases. **Conclusion:** LEEP is a minimally invasive, safe, effective and reproducible technique in the management of high-grade cervical dysplasia in African settings.

Keywords

LEEP-Cervical Dysplasia-Colposcopy-Biopsy

1. Introduction

Cervical cancer is a major public health problem worldwide. It ranks fourth after breast, prostate, and colorectal cancer. According to estimates from the IARC (International Agency for Research on Cancer), in 2020 there were 604,127 new cases and 341,831 deaths. The mortality rate varies by country, with more than 85% of deaths occurring in low- and middle-income countries [1]. In Côte d'Ivoire, cervical cancer also represents a national burden, especially since it is the second most common cancer among women according to IARC figures. In 2020, the incidence was 2,067 new cases. In the same year, 1,417 deaths from this cancer were recorded [2]. In our country, the national cancer control program integrates the "screen and treat" approach into its 2022-2025 strategic plan to strengthen the fight aimed at eliminating cervical cancer. It also recommends loop electrosurgical excisional procedure (LEEP), of which the effectiveness is not anymore to be proved [3]. Despite this, our research found very few scientific studies specifically addressing LEEP in the management of high-grade cervical dysplasia, not only in Côte d'Ivoire but also in French-speaking African countries [4]. Therefore, we wanted to evaluate the results of the practice of LEEP for the management of precancerous cervical lesions in Abidjan by reporting our experience.

2. Materials and Methods

Our study was conducted at the Fatima Medical Clinic in Abidjan, Ivory Coast, where all patients were seen and treated. This was a retrospective descriptive cohort study covering a four-year period from January 1, 2020, to December 31, 2023. The study population consisted of patients who underwent colposcopy combined with biopsy that have revealed high-grade cervical dysplasia (CIN2, CIN3) and who underwent LEEP. Patients with incomplete records or who were lost to follow-up were excluded from the study. Our sample consisted of 40 patients. Initially, 49 records were collected. After applying exclusion criteria, 9 records were excluded. Seven patients were lost to follow-up (two at 1 month, four at 6 months, and one at 1 year) and two patients had incomplete records. The examinations performed prior to the LEEP included:

• A pap smear which revealed the following histological abnormalities: ASCUS (Atypical squamous cells of undetermined significance), ASCH (Atypical squamous cells cannot exclude HSIL), LSIL (Low-grade squamous intraepithelial lesion), HSIL (High-grade squamous intraepithelial lesion).

• A colposcopy followed by a biopsy which revealed the following histological abnormalities: CIN2 or CIN3.

All the LEEP were performed under general anesthesia by two surgeons qualified for this procedure. After cervical resection, the surface of the excised funnel was fulgurated using an electrode set to coagulation mode to control hemostasis. The procedure was performed on an outpatient basis, with patients discharged the same day. The sample taken was sent for histopathological analysis to a specialized

pathology center where the lesion diagnosis was confirmed by a leading pathologist specializing in gynecological oncology. Four weeks after the procedure, a follow-up evaluation was performed, with the pathological results used to decide between conservative management or further surgical intervention. If the lesion was discovered at the margin of the surgical specimen (incomplete excision), subsequent management was decided by the physician and the patient. The management options were: 1) a 6-month follow-up with cytology, 2) a second LEEP, and 3) a hysterectomy. If the excision was complete, patients were seen for a follow-up appointment six months and one year after the procedure, with a follow-up Pap smear or HPV test performed. These examinations allowed for the assessment of recurrence or persistence of cervical dysplasia lesions. Recurrence or persistence of lesions was defined as cervical dysplasia of any kind, evidenced by subsequent cytological or histological examinations carried out during follow-up. Data were collected from patient records, including operative reports and post-operative follow-up information. The parameters studied were: the epidemiological characteristics of the patients (age, gravidity, parity), clinical examination data, paraclinical investigations performed, the modalities of the intervention, and postoperative course. Statistical analysis of the data was performed using Epi Info 3.5.3 software. We conducted a comprehensive description of the patients' sociodemographic and clinical characteristics. Qualitative variables were described in terms of median and interquartile range (IQR). Quantitative variables were described in terms of weighted frequencies rounded to the nearest whole number along with their percentages. Concordance was used to compare the two different diagnostic methods.

3. Results

The mean age of our patients was 37.6 years, ranging from 28 to 55 years. 45% of our patients were paucigravida and 70% were pauciparous. 7.5% were postmenopausal. Routine screening was the primary reason for consultation in 45% of cases. The cervix showed signs of inflammation in 45% of cases. HSIL accounted for 70% of cervical dysplasias (Table 1). Colposcopy revealed 87.5% of cases with TZ2, and biopsy showed 50% of CIN3 lesions (Table 2). HPV testing was performed in 27.5% of cases and was positive in all cases. The mean duration of LEEP was 18 minutes, ranging from 7 to 39 minutes. The complication rate was 10%. We observed two postoperative hemorrhages requiring two corrective surgeries and two cases of postoperative pelvic pain unresponsive to standard analgesic treatment. Histological results after LEEP revealed 55% CIN 3 lesions (Table 3). The mean size of the resection cone was 16 mm, with a range from 9 mm to 30 mm. The resection was at positive endocervical margins in 12.5% of cases. LEEP was repeated in 3 patients (7.5% of cases). Hysterectomy was performed in 2 patients (5% of cases) for carcinoma in situ. At the one-month follow-up, 92.5% of our patients (37/40) had a healed cervix. One LSIL was found at the six-month follow-up, and two LSILs and one ASCUS were found at the one-year follow-up. The

concordance between the results of the biopsy after colposcopy and the final histology after LEEP was 65%. The concordance between colposcopic biopsy and LEEP was 47.36% for CIN2 and 85% for CIN3. (Table 4).

Table 1. Pap smear results.

Pap smear results	Frequency	Percentage (%)
ASCH	5	12.5
ASCUS	2	5
HSIL	28	70
LSIL	5	12.5
Total	40	100

Table 2. Biopsy results.

Biopsy results	Frequency	Percentage (%)
CIN 2+	1	2.5
CIN 2	19	47.5
CIN 3	20	50
Total	40	100

Table 3. LEEP Histopathology results.

LEEP Histopathology results	Frequency	Percentage (%)
Chronic cervicitis	2	5
Malpighian metaplasia	1	2.5
Carcinoma in situ	1	2.5
CIN 1	4	10
CIN 2	10	25
CIN 3	22	55
Total	40	100

Table 4. Concordance between biopsy and LEEP Histopathology.

Biopsy \ Histopath	Chronic cervicitis	Malpighian metaplasia	Carcinoma in situ	CIN 1	CIN 2	CIN 3	Total
CIN 2+	0	0	0	0	0	1	1
CIN 2	2	0	0	4	9	4	19
CIN 3	0	1	1	0	1	17	20

4. Discussion

The mean age of our patients was 37.6 years, with a range from 28 to 55 years. Our patients' ages are close to those reported by Inal [5] in Turkey and Kasongo [6] in

Zambia, who reported mean ages of 38 and 36.3 years, respectively. However, our mean age is lower than the age of Kim's J [7] patients in South Korea, who found a mean age of 42.7 years in women who underwent cervical smear testing. 7.5% of our patients were postmenopausal. This result is close to Inal's [5] result, who found 10.5% postmenopausal patients in her study. Pap smears revealed 12.5% ASCH, 5% ASCUS, 70% HSIL, and 12.5% LSIL. Inal [5] reported 11.1% ASCH, 11.2% ASCUS, 54.5% HSIL, and 20.1% LSIL. According to data from the literature [8], pap smear has a sensitivity for detecting precancerous lesions between 51% and 53% and a specificity between 96% and 98%. The interpretation of this test is subjective and varies among observers, which is a limitation.

In our study, the HPV test was performed in only 27.5% of our patients and was positive in all cases. This low HPV testing rate is explained by the fact that in our country, the HPV test is significantly more expensive than a standard Pap smear (cytology), with prices often double or tripled depending on the healthcare facility. The price of a Pap smear generally ranges from $8 to $24 USD, while the HPV test costs between $18 and $54 USD, excluding consultation fees. In Inal's study [5], the HPV test was positive in 83.2% of cases. According to the results of the studies analyzed [9] and compared to cytology: the HPV test has better sensitivity for detecting precancerous lesions and is more effective in reducing the incidence of precancerous lesions and invasive cancers in women over 30. Therefore, from age 30, the French National Authority for Health (HAS) now recommends that the HPV test replace cytology for primary screening of cervical cancer [9].

Colposcopy in our study revealed 87.5% of cases of TZ2. Biopsy showed 2.5% CIN 2+ lesions, 4.5% CIN 2, and 50% CIN 3. In the Inal study [5], biopsy showed 17.1% CIN 1, 19.2% CIN 2, 42.8% CIN 3, and 1.2% cancer.

The average duration of the LEEP in our study was 18 minutes, and the complication rate was 10%. In the Inal study [5], the complication rate was 3.1%, with 0.9% pelvic pain and 2% bleeding. The most significant complications of LEEP reported in the literature are postoperative bleeding and pain, ranging from 2% to 4% for the former and 0.5% to 2% for the latter [10] [11].

In Kim J's study [7], the rate of bleeding complications was 14%. Several methods exist in the literature for preventing severe bleeding after cervical surgery. Lee *et al.* [12] conducted a randomized trial of vasopressin in patients undergoing laser vaporization of the cervix. They concluded that there was no significant difference in the risk of troublesome bleeding between women receiving vasopressin and those receiving placebo. Doyle *et al.* [13] reported that application of Monsel's solution after LEEP appeared to reduce the duration of postoperative vaginal bleeding, although it did not significantly prevent serious complications. Consistent with the results of previous studies, Kim J's findings [7] showed that the application of Tachosil after LEEP did not significantly reduce the incidence of postoperative vaginal bleeding. In contrast, according to the study by Kim *et al.* [14], the use of Tisseel reduced the incidence of severe postoperative bleeding after LEEP. In our study, we did not use either of these methods to prevent bleeding.

The histopathological results after LEEP in our study showed 10% CIN1, 25%

CIN2, 55% CIN3, and 2.5% cancer. The overall concordance rate with colposcopic biopsy was 65%. The concordance between colposcopic biopsy and LEEP was 47.36% for CIN2 and 85% for CIN3.In the Inal study [5], 19% CIN1, 15.4% CIN2, 48.4% CIN3, and 1.2% cancer were observed. The concordance between colposcopic biopsy and LEEP was 85.9% for CIN1, 71.2% for CIN2, 98.4% for CIN3, and 85.7% for cancer diagnoses. The overall concordance for all lesions was 73.2%. There are no clear data in the literature regarding the concordance between LEEP and colposcopic biopsy results. In previous studies, the concordance between colposcopic biopsy and LEEP results ranged from 60% to 85% in LSIL and 80% to 95% in HSIL [15]. The reason why concordance in LSIL is lower than in HSIL may be due to the variability in the histopathological diagnosis of LSIL, whereas this variability is lower in HSIL [10]. The number of patients diagnosed with CIN 2 by colposcopic biopsy decreased in the definitive histopathological diagnoses after LEEP in our study. This may be due to the removal of the cervical dysplasia lesion during biopsy or to its spontaneous regression. According to some authors, the overall concordance between colposcopic biopsies and histology after LEEP ranges from 46% to 90% [16] [17].

Resection was performed at an unclear margin in 5 cases, representing 12.5% of cases. Endocervical margins are affected in approximately 40% of LEEP samples, requiring a choice between colposcopic follow-up and repeat conization [18]. LEEP was repeated in 7.5% of cases. One LSIL was found at the 6-month follow-up (2.6%). Two LSILs and one ASCUS were found at the 1-year follow-up (7.9%). Published studies have shown that despite treatment, the persistence rate of cervical dysplasia is between 2% and 5%, and the recurrence rate is between 0.5% and 4% [2] [5]. The reason for these differences in rates is due to the difference in surgical confidence intervals and therefore to the depth of resection.

LEEP has a higher efficacy and results in fewer complications compared to cold knife conization and can be performed under local anesthesia on an outpatient basis. It is relatively easy to remove the lesions or the transformation zone of the cervix with the resection loop because it is made of a thin tungsten or steel wire [19].

Previous studies have shown that less than half of women have residual high-grade disease after repeat conization or hysterectomy up to 6 months after the primary conization and have cited multiple cervical quadrants with positive margins as an independent risk factor for recurrence, providing a possible consideration for repeat conization in this population [20]. Another recently published study found that positive margins were a risk factor for recurrence but suggested the application of additional risk factors, including the anatomical location of positive margins and high-risk HPV DNA status, to help determine which patients might potentially benefit from further surgery. Like any clinical study, this one has limitations. It is a single-center retrospective study which introduced a selection bias. The other limitations of the study are the small sample, incomplete HPV testing, and limited follow-up duration.

5. Conclusion

LEEP represents an effective technique for the treatment of high-grade cervical dysplasia. It is a simple, safe, and reproducible minimally invasive method. It is performed on an outpatient basis, complications are minimal, and the success rate is high with low rates of persistence and recurrence. Our results also show acceptable concordance between cervical colposcopic biopsy and LEEP results. These data highlight the feasibility and efficiency of LEEP in resource-limited countries, confirming its place as a viable strategic option for the management of precancerous lesions of the cervix.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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