

# Complications of Loop Electrosurgical Excision Procedure for Cervical Neoplasia: A Prospective Study

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**Objectives:** To evaluate the complications following loop electrosurgical excision procedure (LEEP) for diagnosis and treatment of cervical neoplasia.

**Material and Method:** Descriptive cross sectional study in patients with abnormal cervical cytology who underwent LEEP at Chiang Mai University Hospital between November 2004 and July 2005 were prospectively evaluated for complications.

**Results:** During the study periods, 206 patients underwent cervical loop excision for a total of 226 procedures. The mean age of the patients was 41 years (range, 26 -72 years). Sixty (29.1%) women were menopausal. The most common abnormal cervical cytology was HSIL (56.3%) followed by LSIL (12.1%). Twenty-five (11.1%) patients received re-excision for positive margin after the first procedure. Intraoperative hemorrhage occurred in 7.9% of the procedures. Early and late postoperative hemorrhage occurred in 0.4% and 2.6% of the procedures, respectively. Eight (3.5%) had postoperative infections and were cured with oral antibiotics. By logistic regression analysis, there was no significant correlation between age, menopausal status, HIV status, re-excision procedure, final histopathology, cone dimension and the complications of LEEP.

**Conclusion:** Loop electrosurgical excision procedure is safe for evaluation and treatment of cervical neoplasia with an acceptable and manageable surgical morbidity.

**Keywords:** Loop electrosurgical excision procedure, Complication, Cervical neoplasia

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Loop electrosurgical excision procedure (LEEP) which was originally proposed by Prendiville<sup>(1)</sup> has become the preferred diagnostic and therapeutic methods for cervical neoplasia in gynecologic practice. In our institute, this procedure has almost entirely replaced cold-knife cervical conization. The surgical procedure is simple, efficient and can be performed in an outpatient department requiring only local anesthesia. Although LEEP is a relatively uncomplicated procedure, some complications may occur. The information of these complications will be useful for an informed treatment decision and patient counseling before the operation. However, almost all data of LEEP complications in the literature were reported from retro-

spective studies which may have potential limitation of data collection. The present study was undertaken in a prospective fashion to evaluate the complications occurring within 4 weeks after LEEP.

## Material and Method

Between November 2004 and July 2005, 206 patients with abnormal cervical cytology underwent LEEP for a total of 226 procedures in Chiang Mai University Hospital. LEEP was performed as an outpatient setting. A dental syringe was used to inject 10 mL of 1% lidocaine with 1:100,000 epinephrine intracervically in a radial pattern around the ectocervix. Loop selection was based on the extent of the lesion. The electrical power for loop electrode was set to 60 W cut and 40 W coagulation in blended mode. The authors attempted to remove the entire lesion in a single pass. If the first excision pass failed to remove the entire

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lesion, the second or third pass would be carried out. Endocervical curettage was routinely performed after LEEP. The edge first and then bed of the craters were coagulated by 5 mm ball electrode using a pure coagulation frequency with protection of the endocervical os. The authors did not routinely prescribe prophylactic antibiotics for this procedure. Avoiding sexual intercourse and vaginal douching for 4 weeks were recommended.

Intraoperative hemorrhage was defined as complication when adequate hemostasis took more than 30 minutes of diathermy, or needed cervical suturing, vaginal packing or emergency hysterectomy. Early and late hemorrhages were defined as bleeding occurring within 24 hours and that occurring later 24 hours after the procedure and required some hemostatic interventions including, an application of Monsel solution over the base of the cervical bed, cervical suturing, vaginal packing or hysterectomy. Postoperative infection was defined as purulent vaginal discharge, cervicitis, endometritis, and pelvic inflammatory disease. The first follow-up visit was scheduled 2 weeks after the procedure. Subsequent follow-up was based on detailed histopathologic diagnosis of LEEP specimen. All patients were also called by a gynecologic nurse 24 hours and 4 weeks after LEEP to inquire about any complications. The present study was approved by the Research Ethics Committee.

Descriptive statistics with number and percent, mean  $\pm$  SD were described. Logistic regression analysis was used to determine the independent risk factors of variables on complications following LEEP. A p-value of  $<0.05$  was considered significant.

## Results

The mean age of the 206 patients was 41.2 years with a range of 26-72 years. The clinical characteristics of the patients are summarized in Table 1. Fifteen (7.3%) patients had positive screening for HIV status. More than half of the patients had high grade squamous intraepithelial neoplasia (HSIL) on Pap smear. Over one third of the patients had LEEP performed for HSIL cytology in a see and treat setting. Of the 226 LEEP specimens, 176 (77.9%) had maximum base diameter of at least 20 mm and 142 (62.8%) had cone length of at least 10 mm.

Excessive intraoperative hemorrhage occurred in 18(7.9%) procedures and required cervical suturing and vaginal packing for hemostasis. Postoperative hemorrhage were found in 1 (0.4%) early and 6 (2.6%) late procedures. All could be treated by cauterization

and/or an application of Monsel solution at the bleeding site. Purulent cervicitis occurred in 8 (3.5%) procedures but could be cured with oral antibiotics. No severe infections including endometritis and pelvic inflammatory disease were detected.

Excessive watery vaginal discharge, slight vaginal bleeding and lower abdominal pain were common postoperative symptoms following LEEP. All patients experienced watery vaginal discharge and slight vaginal bleeding in  $14.3 \pm 4.6$  days and  $4.2 \pm 3.8$  days after procedure, respectively. Lower abdominal pain occurred in 87.4% of patients. It was mostly mild and easily relieved by non-narcotic analgesics and affected only 1-2 days after the procedure.

A computed logistic regression analysis was performed to determine the independent risk factors for LEEP complications. However, there was no significant predictor when variables including age at LEEP, menopausal status, HIV status, re-excision procedure, LEEP histopathology and cone dimension were entered into the model (Table 2).

**Table 1.** Clinical characteristics (N = 206\*, 226\*\*)

Characteristics	N (%)
Menopausal status*	
Premenopause	146 (70.9)
Postmenopause	60 (29.1)
Severity of abnormal Pap smear*	
HSIL	116 (56.3)
LSIL	25 (12.1)
SCCA	20 (9.7)
ASC-H	16 (7.8)
ASC-US	8 (3.9)
Unknown	15 (7.3)
Others	6 (2.9)
Indications for LEEP**	
HSIL on Pap smear	80 (35.4)
HSIL on colposcopic biopsy	75 (33.2)
Unsatisfactory colposcopy	35 (15.5)
Margin involvement of previous LEEP	25 (11.1)
Others	11 (4.9)

\* of 206 patients

\*\* of 226 procedures

HSIL = High grade squamous intraepithelial lesion

LSIL = Low grade squamous intraepithelial lesion

SCCA = Squamous cell carcinoma

ASC-US = Atypical squamous cells of undetermined significance

ASC-H = Atypical squamous cells cannot rule out high grade squamous intraepithelial lesion

**Table 2.** Logistic regression analysis to determine the independent effects of variables on the complications following LEEP in 226 procedures

Variable	Odds ratio	95%CI (low-high)	p-value
Age at $\geq$ 45 yrs	2.32	0.86-6.28	0.09
Postmenopausal status	1.18	0.38-3.74	0.78
HIV seropositive	0.61	0.15-2.51	0.49
Re-excision	1.15	0.49-2.70	0.77
Cone base $\geq$ 20 mm	1.06	0.31-3.69	0.92
Cone length $\geq$ 10 mm	0.40	0.14-1.18	0.09
Invasive histopathology	0.99	0.75-1.29	0.91

### Discussion

The most common short term complications following LEEP are hemorrhage and infection. Among 226 procedures in the present study, intraoperative hemorrhage occurred in 7.9% which was higher than 0.2-1.6% of the previous publications<sup>(2-5)</sup>. However, it should be noted that 77.9% and 62.8% of LEEP specimens in the present series had maximum cone base and cone length at least 20 mm and 10 mm, respectively. An attempt to achieve clear cone margins may lead to performing a large specimen and possibly resulting in a higher incidence of excessive bleeding intraoperatively. Early postoperative hemorrhage occurred in only 0.4%, which was comparable to the reported incidence ranging from 0.5-2.0%<sup>(1,3,4,6)</sup>. Late postoperative hemorrhage were observed in 2.6% which did not differ from those of 0.6-6% in the other studies<sup>(1,3,4,7-10)</sup>. Both early and late postoperative hemorrhage were easily treated with cauterization and/or an application of Monsel solution over the bleeding site at an outpatient department.

Luesley et al reported an association between cone dimension and bleeding complication in 788 procedure of cervical cone excision<sup>(8)</sup>. However, the present study failed to confirm this finding. The authors believe that the present study size may not be large enough to document this association because of the observed infrequent occurrence of bleeding morbidity in the current study.

Postoperative infection occurred in 3.5% of the procedure, which was in accordance with the reported incidence of 0.8-14.4%<sup>(1,4,5,11)</sup>. All affected patients in the present study were successfully treated with oral antibiotics in an outpatient setting. In recent years, prophylactic antibiotic administration has been shown to have a clinical benefit in several gynecologic surgeries<sup>(12)</sup>. However, the incidence of post-cervical

loop electrosurgical excision infection was lacking. The most precise recommendations should be obtained from a randomized controlled study. However, to the best of the authors' knowledge, there is no randomized study investigating the role of prophylactic antibiotic for LEEP. Therefore, based on the present series, which did not routinely use prophylactic antibiotics for LEEP, the authors strongly believed that the observed infrequent occurrence of infectious morbidity dose not justify prescribing prophylactic antibiotics for this procedure.

Some rare serious complications have been reported including bowel injury during operation, rectovaginal and vesicovaginal fistula formation<sup>(2,13)</sup>. These complications were not observed in the present study.

Although the postoperative symptoms following LEEP including watery vaginal discharge, slight vaginal bleeding and lower abdominal pain were commonly observed, these symptoms were mostly mild and did not pose any clinical risk to the patients.

In conclusion, the use of loop electrosurgical excision procedure for diagnosis and treatment of cervical neoplasia is safe and acceptable with manageable operative morbidity.

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## ภาวะแทรกซ้อนจากการตัดปากมดลูกด้วยขดลวดไฟฟ้า: การศึกษาแบบเก็บข้อมูลไปข้างหน้า

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**วัตถุประสงค์:** ศึกษาถึงภาวะแทรกซ้อนจากการตัดปากมดลูกด้วยขดลวดไฟฟ้า (loop electrosurgical excision procedure) เพื่อการวินิจฉัยและรักษาโรคบริเวณปากมดลูก

**วัสดุและวิธีการ:** การศึกษาตัดขวางผู้ป่วยที่มีผลการตรวจเซลล์วิทยาปากมดลูกผิดปกติและได้รับการตัดปากมดลูกด้วยขดลวดไฟฟ้าที่โรงพยาบาลมหาราชนครเชียงใหม่ ระหว่างเดือนพฤศจิกายน พ.ศ. 2547 ถึง เดือนกรกฎาคม พ.ศ. 2548 เป็นการศึกษาแบบเก็บข้อมูลไปข้างหน้า

**ผลการศึกษา:** ในระยะเวลาที่ศึกษา พบผู้ป่วย 206 รายได้รับการตัดปากมดลูกด้วยขดลวดไฟฟ้า จำนวน 226 ครั้ง อายุเฉลี่ยเท่ากับ 41 ปี (ช่วงอายุระหว่าง 26 ถึง 72 ปี) ผู้ป่วย 60 ราย (ร้อยละ 29.1) อยู่ในวัยหมดระดู ความผิดปกติของเซลล์วิทยาปากมดลูกที่พบมากที่สุดได้แก่ HSIL (ร้อยละ 56.3) รองลงมาได้แก่ LSIL (ร้อยละ 12.1) ผู้ป่วย 25 ราย (ร้อยละ 11.2) ได้รับการตัดปากมดลูกด้วยขดลวดไฟฟ้าเป็นครั้งที่สองเนื่องจากตรวจพบรอยโรคที่ขอบชิ้นเนื้อจากการตัดปากมดลูกครั้งแรก ภาวะตกเลือดระหว่างผ่าตัด (intraoperative hemorrhage) เกิดขึ้นร้อยละ 7.9 ภาวะตกเลือดภายหลังการผ่าตัดระยะแรกและระยะหลัง (early and late postoperative hemorrhage) พบได้ร้อยละ 0.4 และ 2.6 ของการผ่าตัดตามลำดับ ส่วนการติดเชื้อภายหลังการผ่าตัด (postoperative infection) พบได้ร้อยละ 3.5 ของการผ่าตัด การศึกษานี้ไม่พบความสัมพันธ์ระหว่างอายุ ภาวะประจำเดือน การติดเชื้อเอชไอวี การผ่าตัดปากมดลูกซ้ำ ผลพยาธิ วิทยา ขนาดของชิ้นเนื้อรูปกรวยและการเกิดภาวะแทรกซ้อนจากการวิเคราะห์โดย logistic regression

**สรุป:** การตัดปากมดลูกด้วยขดลวดไฟฟ้าเพื่อประเมินและรักษารอยโรคบริเวณปากมดลูกเป็นหัตถการที่มีความปลอดภัยเนื่องจากเกิดภาวะแทรกซ้อนต่ำและไม่รุนแรง

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