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Comparison of punch biopsy and Loop Electrosurgical Excision Procedure (LEEP) on abnormal colposcopy findings in daily use which is preferable

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ABSTRACT

Cervical cancer has become a global problem with high mortality and morbidity and contributed to around 311,000 deaths in 2018 which tends to rise every year. Detection of cervical cancer is very necessary to provide appropriate management to patients. Various detection and diagnosis approaches to cervical cancer continue to be developed along with advances in technology. However, comparisons of the types of methods used have not been widely reported. A biopsy is a tool used to detect a suspected malignancy that has been used for many years. One of them is a punch biopsy, a method often used to detect cervical cancer. Currently, technology is developed with the discovery of various other diagnostic tools such as Loop Electrosurgical Excision Procedure (LEEP). LEEP is an excisional procedure in high-resource settings to provide tissue for histopathology. However, the role of punch biopsy can't be ruled out. This article discusses the differences between a punch biopsy and a LEEP procedure and the advantages and disadvantages of both.

Keywords: cervical carcinoma, LEEP, punch biopsy.

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INTRODUCTION

Cervical carcinoma has now become a global concern with new cases estimated to reach 604,000 in 2020, making it the fourth most common cancer in women in the world. Human Papilloma Virus (HPV) detection, cervical cytology, or both can be used to identify cervical cancer (cervical intraepithelial neoplasia) early in the disease process. Fifty percent of high-grade cervical pre-cancers, or CIN, are caused by two strains of the human papillomavirus (HPV), including 16 and 18.¹ To avoid cancer, it is critical to diagnose and treat CIN. Patients with high-grade cervical punch biopsy results are currently required by CIN treatment approaches to undergo ablation or conization.² The conventional histologic interpretation of submitted samples following screening and colonoscopy-guided biopsy is the basis for the diagnosis of preinvasive cervical neoplasia.³ Previously, cervical biopsies have been

obtained by punch biopsy, which uses a hollow, circular scalpel. However, new developments have allowed for the use of a small electrosurgical wire loop in LEEP (Loop Electrosurgical Excision Procedure) to get biopsies for diagnostic purposes.⁴ However, the role of punch biopsy can't be ruled out. This article aims to discuss the differences between a punch biopsy and a LEEP procedure and the advantages and disadvantages of both.

DISCUSSION

Punch biopsy and Loop Electrosurgical Excision Procedure (LEEP) are methods used to detect and confirm the diagnosis of cervical cancer. This method is used to take tissue samples from the cervical spine and the surrounding area. Both of these methods have several different characteristics and each has its advantages and disadvantages.⁴ A description of these two methods is shown in Table 1 below.

Punch Biopsy

During colposcopy, a punch biopsy can be performed to confirm or exclude high-grade cervical intraepithelial neoplasia in women with abnormal cervical cytology, including cervical intraepithelial neoplasia grade II or III. A punch biopsy is performed using biopsy forceps such as Kevorkian, Tischler Morgan, Townsend, Keys, and conventional cervical punch biopsy forceps. A study conducted by Kahramanoglu et al. concluded that the Positive Predictive Value and Negative Predictive Value, specificity, and sensitivity of colposcopic punch biopsy were 79.5% and 66%, 47.1, and 89.4%, respectively, based on patient-based analysis. The numbers increased with the increasing number of cervical biopsies in the low-grade cytology group. They suggested that low-grade cytology should be managed with a colposcopic punch biopsy, while high-grade cytology may be managed according to the see-and-treat protocol with LEEP.⁸

Table 1. Comparison Between Punch Biopsy and Loop Electrosurgical Excision Procedure (LEEP)⁵⁻⁷

Parameters	Punch Biopsy	Loop Electrosurgical Excision Procedure (LEEP)
Characteristic		
Sampling methods	Use the punch biopsy tool to remove a small piece of tissue.	Use the loop electrosurgical excisional tool, which has a heated circular wire to cut and remove a large portion of the affected tissue.
Sampling depth	From the top layer of tissue (epithelium) and a little from the bottom layer.	Deeper layer, including the epithelial layer and some of the stromal layer.
Size of samples	Small sample (3-4 mm in diameter)	Larger and thicker samples
Indication	Used to obtain small samples to diagnose or evaluate pathological conditions such as precancerous lesions or early cancer	LEEP is typically used to take larger samples and for the removal of larger precancerous lesions or early cancers.
Advantage	a. Simple and faster procedures b. Less invasive c. Cost-effective	a. Better sample quality b. Performing the therapeutic benefit to remove larger and potentially malignant lesions c. High accuracy
Disadvantage	a. Limited sample size b. Not suitable for large lesions	a. More invasive b. Higher risk of complications, including infection and bleeding

Advantages and Disadvantages of Punch Biopsy

Punch biopsy forceps have several advantages; punch biopsy forceps are easy to use and less time-consuming, especially for experienced clinicians. They are widely used and are less expensive than the loop electrode. However, specimen tissue may slide from the forceps, causing tissue fragmentation, which affects the quality of the specimen.⁹ Punch biopsy has a lower risk of bleeding. Previous research showed that 8 cases (2%) of the punch biopsy cases were managed by vaginal packing which had considerable bleeding. Twenty patients in the loop biopsy group had moderate bleeding (50 %). Furthermore, only 8% of the punch biopsy group and 33% of the LEEP group had a serous discharge. It was concluded that the difference was statistically significant.⁷

In the next explanation, the study by Arora, et al (2017) also compare further between biopsy using punch biopsy forceps versus a loop electrode to screen for pathological conditions in the cervix in the Indian population. The study demonstrates that in eight instances of colposcopy punch biopsy, healthy granulation tissue was visible at the biopsy site showing a positive result on this approach. The site was discolored in 12 of the LEEP group's patients. Both of these treatments were deemed relatively safe, as there were no instances of the cervical surface becoming diseased or friable in either group.⁷

Loop Electrosurgical Excision Procedure (LEEP)

Loop Electrosurgical Excision Procedure (LEEP) is one of the procedures used to treat cervical intraepithelial neoplasia (CIN). This procedure is very commonly used given the increasing prevalence of CIN. Cervical conization (cone biopsy) has been used to treat high-grade cervical dysplasia for many years. Cervical conization is the surgical removal of the cone-shaped part of the cervix that surrounds the cervix, including all areas that are deformed. Ablation therapy can be carried out in various ways. These include scalpels ('cold knife conization'), lasers, and electrosurgery. The advantage of LEEP is that it allows pathologists to fully examine superficial or invasive intraepithelial lesions. However, in certain situations (pregnancy, extension of the lesion into the vaginal cavity, or high position in the cervical canal), this method does not provide a complete picture of the lesion. Additionally, although thermal ablation reduces blood loss during resection, thermal artifacts can occur, complicating specimen interpretation.

LEEP is an excisional procedure that is the first choice of treatment in high-resource settings to provide tissue for histopathology, but less common in low-resource settings as it requires electrical equipment to heat the wire loop and clinicians must be trained to use it.¹⁰ The goal of LEEP is to obtain specimens by excision of the squamocolumnar junction

in patients with suspected high-grade squamous intraepithelial lesions.¹¹

Advantages and Disadvantages of LEEP

LEEP has several advantages compared to punch biopsy. The tissue quality in the LE group was significantly better than the tissue in the PB group based on the total tissue scores. As for the pain patients felt during the procedure, the VAS score was similar between LEEP and Punch Biopsy.⁹ Several studies report that LEEP can provide better sample quality by taking samples deeper into the epithelial layer and some of the stromal layer. With good sample quality, this will of course increase the accuracy of detection and confirmation of diagnosis of cervical abnormalities. In addition, by removing large samples and samples with potential malignant lesions, LEEP also provides the opportunity for the detection and treatment of malignancies.¹² Previous research by Sahai, et al showed that as many as 60% of the LEED group had the highest score in network size scores compared to 12% in the PB group ($p=0.001$). Additionally, the entire sample (100%) from LEED procedures also had the best quality (3) in tissue site scores versus 72% in the punch biopsy group ($P=0.001$).⁵

Although safe, LEEP has some disadvantages. LEEP is usually well tolerated in patients, but the procedure carries risks of bleeding, infection, and reproductive complications. It should be

noted that LEEP is advised when there are clear indications. Identifying the significant factors that may influence the discrepancy in pathologic imaging can be important, especially if punch biopsy is sufficient to diagnose CIN accurately.⁶ The effect of thermal artifacts on the critical histology evaluation of the samples becomes the main concern about LEEP. This condition caused by the limitation of diagnostic and therapeutic capability will seriously be limited because of the high rate of surgical-margin thermal destruction with related limitations of interpretability of the examination result. The positive rate of resection margins after LEEP was 15.1%, meaning that some of the tumor was not removed, which led to the recurrence of the disease and required further clinical treatment.¹³

CONCLUSION

A biopsy is a tool used to detect a suspected malignancy that has many approaches. Punch Biopsy and LEEP are two of many procedures that are available to produce samples for histopathologic examination to confirm the diagnosis. Punch biopsy, the more traditional approach, uses a hollow, circular scalpel to cut into a lesion, while LEEP as the more advanced tool uses a small electrosurgical wire loop to excise the lesion. Both have their advantages and disadvantages. The advantages of Punch Biopsy over LEEP are easier to use, cheaper, and lower the risk of bleeding, while LEEP shows better samples for histopathological evaluation. The sensitivity and specificity between Punch biopsy and LEEP are not significantly different. For punch biopsy, the sensitivity is 89.4%, and the specificity is 47.1%. The pain felt by the patients shows no difference in punch biopsy and

LEEP. The disadvantages of punch biopsy are the tissue collected may slide which results in lower quality scores of the tissue collected, while LEEP has a higher bleeding incidence and a relatively high positive margin rate.

DISCLOSURE

Author Contribution

All of the authors have contributed to the preparation of this manuscript

CONFLICT OF INTEREST

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REFERENCE

1. World Health Organization (WHO). Cervical Cancer [Internet]. 2022 [cited 2022 Aug 29]. Available from: <https://www.who.int/news-room/fact-sheets/detail/cervical-cancer>
2. Jung Y, Lee AR, Lee SJ, Lee YS, Park DC, Park EK. Clinical factors that affect diagnostic discrepancy between colposcopically directed biopsies and loop electrosurgical excision procedure conization of the uterine cervix. *Obstet Gynecol Sci*. 2018;61(4):477–88.
3. Wihandani DM, Adiputra PAT, Supadmanaba IGP. Low prevalence of Caveolin-1 oncogenic polymorphism G14713A and T29107A among breast cancer patient in Sanglah General Hospital. *Bali Med J*. 2017;6(3):109.
4. Arora R, Malik A, Zutshi V, Bachani S. Comparison of Cervical Biopsy Using Punch Biopsy Forceps Versus Loop Electrode. *Int J Clin Biomed Res*. 2018;(February 2016):6–12.
5. Sahai A, Bansal V, Singh P. Comparison of Punch Biopsy and Loop Biopsy for the Management of Severe Cervical Intraepithelial Neoplasia (CIN). *J Obstet Gynecol India* [Internet]. 2022;72(s1):248–54. Available from: <https://doi.org/10.1007/s13224-021-01525-7>
6. Jung Y, Lee AR, Lee S-J, Lee YS, Park DC, Park EK. Clinical factors that affect diagnostic discrepancy between colposcopically directed biopsies and loop electrosurgical excision procedure conization of the uterine cervix. *Obstet Gynecol Sci*. 2018 Jul;61(4):477–88.
7. Arora R, Malik A, Zutshi V, Bachani S. Comparison of cervical biopsy using punch biopsy forceps versus loop electrode. *Int J Clin Biomed Res* [Internet]. 2018; Available from: <https://api.semanticscholar.org/CorpusID:76655715>
8. Kahramanoglu I, Demirkiran F, Turan H, Bese T, Yilmaz N, Ilvan S, et al. The use of colposcopic punch biopsy in the management of abnormal cervical cytology: a 5-year retrospective audit. *J Obstet Gynaecol J Inst Obstet Gynaecol*. 2019 Jan;39(1):110–4.
9. Wetcho T, Rattanaburi A, Kanjanapradit K. Quality of tissue from punch biopsy forceps vs. round loop electrode in colposcopically directed biopsy: a randomized controlled trial. *J Gynecol Oncol*. 2018 Jul;29(4):e52.
10. Greene SA, De Vuyst H, John-Stewart GC, Richardson BA, McGrath CJ, Marson KG, et al. Effect of Cryotherapy vs Loop Electrosurgical Excision Procedure on Cervical Disease Recurrence Among Women With HIV and High-Grade Cervical Lesions in Kenya: A Randomized Clinical Trial. *JAMA*. 2019 Oct;322(16):1570–9.
11. Parra-Herran C, Malpica A, Oliva E, Zannoni GF, Ramirez PT, Rabban JT. Endocervical Adenocarcinoma, Gross Examination, and Processing, Including Intraoperative Evaluation: Recommendations From the International Society of Gynecological Pathologists. *Int J Gynecol Pathol Off J Int Soc Gynecol Pathol*. 2021 Mar;40(Suppl 1):S24–47.
12. Sasmana IGAP, Wiranata S, Yogananda KC, Wihandani DM, Supadmanaba IGP. Clinicopathological and Prognostic Significance of SRY-Box Transcription Factor 2 (SOX2) Overexpression in Central Nervous System Tumor : A Meta-Analysis. *Bali Med J*. 2023;12(2):1733–9.
13. Zhu M, Yu M, Chen Z, Zhao W. Construction and Evaluation of a Clinical Prediction Scoring System for Positive Cervical Margins Under Colposcopy. *Front Med*. 2022;9:807849.



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