Original Article / Özgün Araştırma

Comparison of Colposcopic Biopsy and Conization Results in Association with Overtreatment or Missed Diagnosis

Kolposkopik Biyopsi ve Soğuk Konizasyon Sonuçlarının Gereksiz Tedavi ve Tanı Atlanması Durumları ile İlişkili Olarak Karşılaştırılması

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Abstract

Objective: To compare pathological results of colposcopic biopsy and cold knife conization in association with overtreatment and missed diagnosis perspective.

Materials and Methods: The data of 72 patients who were referred to the gynecologic oncology clinic because of the presence of atypical cytology and/or high-risk human papillomavirus and underwent colposcopic biopsy and cold knife conization were retrospectively analyzed. Cases with discordant results were examined, particularly in terms of overtreatment and missed diagnosis.

Results: Efficacy of colposcopic biopsy was evaluated; the sensitivity, specificity, positive predictive value, negative predictive value was 95.7%, 48%, 77.5%, 85.7%, respectively. Fifty seven cases (79.2%) were consistent and 15 cases (20.8%) were inconsistent in histopathological findings between colposcopic biopsy and cold knife conization.

Conclusion: A satisfactory agreement was detected between colposcopic biopsy and cold knife conization pathologies. The reasons for the inconsistency between biopsy and excision results are; in addition to clinic and pathologic factors, clinicians are willing to use more surgical options because of the concern for missing a diagnosis of cervical cancer.

Öz

Amaç: Çalışmanın amacı kolposkopik biyopsi ve soğuk konizasyon patolojik sonuçlarının gereksiz tedavi ve tanı atlanması durumlarıyla ile ilişkili olarak karşılaştırılmasıdır.

Gereç ve Yöntemler: Jinekolojik onkoloji kliniğine anormal sitoloji ve/veya yüksek riskli insan papilloma virüsü varlığı nedeniyle sevk edilip, kolposkopik biyopsi ve soğuk konizasyon yapılan 72 hastanın verileri retrospektif olarak incelendi. Sonuçları uyumsuz olan olgular, özellikle fazladan tedavi ve gözden kaçan tanı açısından incelendi.

Bulgular: Kolposkopik biyopsinin etkinliğinin değerlendirilmesinde duyarlılık, özgüllük, pozitif öngörü değeri ve negatif öngörü değeri sırasıyla %95,7, %48, %77,5 ve %85,7 idi. Bu çalışma grubundaki olguların 57'si (%79,2) kolposkopik biyopsi ile soğuk konizasyon arasında histopatolojik bulgular açısından tutarlı ve 15'i (%20,8) tutarsızdı.

Sonuç: Kolposkopik biyopsi ve soğuk konizasyon sonuçları arasında tatminkar düzeyde uyum bulundu. Biyopsi ve eksizyon sonuçları arasındaki uyumsuzluğun nedenleri, klinik ve patolojik faktörlerin yanı sıra serviks kanseri tanısının atlanma endişesi nedeniyle klinisyenlerin daha fazla cerrahi seçeneği kullanmaya istekli olmalarıdır.

Introduction

Cervical cancer is most common gynecologic cancer in the world (1). Cervical cytology and/or high risk human papillomavirus [HPV (hrHPV)] tests are basic screening methods for prevention of cervical malignancies. In the presence of abnormal cytology and/or hrHPV results; main procedure for detecting cervical intraepithelial lesion is colposcopic examination and followed by cervical biopsies if any suspicious lesion was detected. With colposcopic examination, patients are selected for excisional procedures as cold knife conization (CKC) or loop electrosurgical excision procedure (LEEP) if the biopsy results were cervical intraepithelial neoplasia (CIN)-2 or higher (CIN-2+) lesions. While 70% of CIN-1 lesions can dissappear in a year, 30% and 12% of CIN-2+ lesions can progress to CIN-3 and carcinoma respectively (2). For these reasons; excisional procedures are important to get definitive pathological diagnosis and therapeutic effect. In comparison with LEEP procedure; cautery artefacts in surgical borders are rarely seen in conization while excised tissue volum is much more than LEEP. This can be negative factor for patients' obstetric outcome. After colposcopic examiation, instead of cervical biopsy, "see and treat" strategy with LEEP procedure is another management strategy. Although it is commonly applied, overtreatment ratios are higher than standard method (3). According to some studies which are support "see and treat" strategy, increased false negative ratios (30%) were seen with colposcopic biopsy (4). While small number of studies that confirmed high consistency between the pathologic results of CKC and colposcopic biopsy (5), many of others found up to 50% of false negative rates (6). Clinicians feel anxiety from this controversial situation as overtreatment or missed diagnosis for patients. This study aimed to investigate inconsistency between the colposcopic biopsy and CKC pathology results of patients with an abnormal cytology and/or hrHPV+ test. Furthermore, according to our findings; we aimed to discuss clinicians' tendency about the reality between the overtreatment and missed-diagnosis.

Materials and Methods

In this study; the data of patients who were referred to Adnan Menderes University Faculty of Medicine, Department of Gynecologic Oncology between July 2018 and December 2020 due to the presence of abnormal cytology and/or hrHPV and underwent colposcopic biopsy and CKC were retrospectively analyzed. This study was approved by Ethics Commitee of Adnan Menderes University Faculty of Medicine with a protocol number 2021/125 (date: 24.06.2021). The study was conducted in accordance with the ethical principles stated in the Declaration of Helsinki. Referred patients had cotest or only cytology results. According to American Society for Colposcopy and Cervical Pathology (ASCCP) 2020 guidelines, triage was applied for colposcopic examination and 332 patients among 437 referred patients underwent colposcopy and simultaneous biopsy procedures. The study included 72 patients who underwent excisional procedure due to CIN2+ lesion detected in colposcopic biopsy or suspicious lesion in colposcopy (Figure 1). In the colposcopy, patients were examined with the Carl Zeiss Colposcopy device (Carl Zeiss, Oberkochen, Germany) at magnifications between x6 and x40. Lesion control was performed by direct examination before colposcopy. Afterwards, 3-5% acetic acid was applied and after waiting for one minute, the examination was carried out. Acetowhite area, mosaic pattern, atypical vascularization, papillary structure, presence of ulceration were accepted as basic pathological findings. One to four biopsies were taken from the pathologically evaluated areas. Simultaneous endocervical curettage (ECC) was performed during the biopsy procedures of all cases. CKC and ECC were performed in 72 patients after evaluating the results of colposcopic biopsy in the light of ASCCP 2020 guidelines. Before the CKC procedure, Lugol application was made and unstained areas (Schiller Test +) were taken into surgical margins. Exclusion criteria from the study were the presence of a previous history of surgical and medical treatment for the cervix uteri, inadequate colposcopy cases, and a history of CIN.

Statistical Analysis

Statistical analyses were applied using Statistical Package for the Social Sciences (SPSS) version 16.0 (SPSS Inc., Chicago, IL, USA), while clinicopathological variables, including the categorical data, were analyzed as a descriptive method.

Results

The data of 72 patients who underwent CKC and ECC were analyzed retrospectively. The median age in the study group was 41 (minimum 28-maximum 72). Low-grade cytological anomalies [atypical squamous cells undetermined significance (ASCUS), low-grade squamous intraepithelial lesion (LSIL)] was detected in 23 cases (31.9%), while no pathology was found in 28 (38.8%) cases in the smear result. High-grade cytological anomalies [atypical squamous cell cannot exclude high grade lesion (ASC-H) and high-grade squamous lesion (HSIL)] was detected in 21 cases (29.1%). High risk HPV positivity was found in 52 (72.2%) cases, and HPV-16 and 18 positivity were detected in 40 (55.5%) cases.

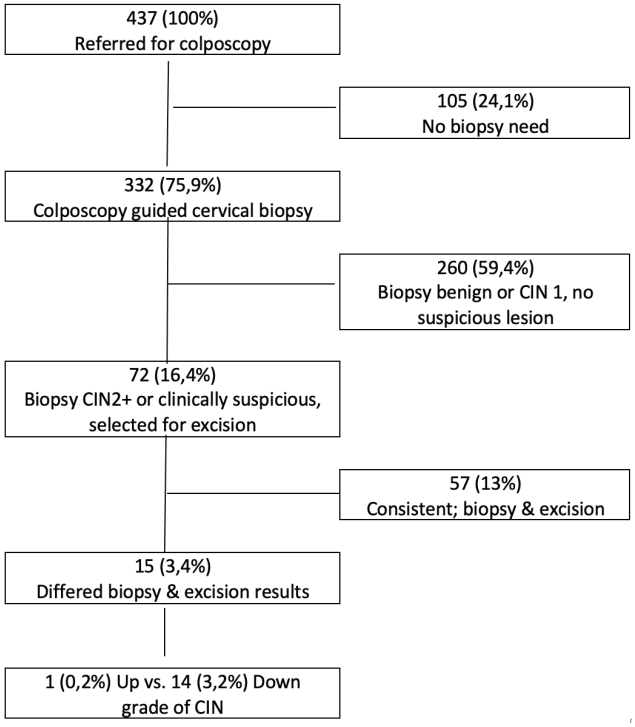

Figure 1. Study flowchart

CIN-2+ lesion rates in colposcopic biopsy were determined as 81.9%, 100%, 50%, 82.9%, 0% for ASCUS, LSIL, ASC-H, HSIL, AGC cytologies, respectively (Table 1). Rate of suspicious colposcopic findings in low grade and high grade lesions were 11% and 47% respectively. CIN-2+ were detected in 58 (80.5%) cases in biopsies, while they were detected in 47 (65.2%) cases in final pathology (Table 2).

The most common colposcopic biopsy pathology was CIN-2 (41.6%), while CIN-3 was detected mostly in CKC (40.2%) (Table 2).

Surgical margin was positive in 6 (8.3%) patients who underwent CKC. CIN-2 and CIN-3 were found in 4 and 2 patients, respectively. With reconization performed 8 weeks later, CIN-2 lesion was detected in only one case.

In terms of "cytology and histology mismatch", which is an excisional procedure indication; CKC was performed and in only 1 of 9 cases was detected CIN-2+ lesion. When the efficacy of colposcopic findings and biopsy results for CIN-2+ detection were evaluated; Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for CIN-2+ lesion of colposcopic findings were 48.9%, 84%, 85.1%, 46.6%, respectively while the sensitivity, specificity, PPV, NPV were determined for biopsy 95.7%, 48%, 77.5%, 85.7%, respectively. Detailed characteristics of the cases with inconsistency between biopsy and CKC

Table 1. Evaluation of cervical cytology findings with the colposcopic biopsy pathologies

		Cytologic results						
		Negative	ASCUS n (%)	LSIL n (%)	ASC-H n (%)	HSIL n (%)	AGC n (%)	Total
Colposcopic Biopsy	Negative	0	1 (9.1)	0	3 (21.4)	1 (16.7)	1 (100)	6
	CIN-1	3 (10.7)	1 (9.1)	0	4 (28.6)	0	0	8
	CIN-2	14 (50)	5 (45.5)	7 (58.3)	4 (28.6)	0	0	30
	CIN-3	11 (39.3)	4 (36.4)	5 (41.7)	3 (21.4)	4 (66.7)	0	27
	Cancer	0	0	0	0	1 (16.7)	0	1
	Total	28 (100)	11 (100)	12 (100)	14 (100)	6 (100)	1 (100)	72

ASCUS: Atypical squamous cells undeterminted significance, LSIL: Low grade Cervical Intraepithelial Lesion, ASC: Atypical squamous cell, ASC-H: Atypical squamous cell, Cannot Exclude High-Grade Squamous Intraepithelial Lesion, HSIL: High-grade cervical ıntraepithelial lesion, AGC: Atypical glandular cell, CIN: Cervical ıntraepithelial neoplasia

Table 2. Evaluation of colposcopic biopsy pathologies with the final (conization) pathology results

Normal n (%)		Conization pathology						Agreement*	
			CIN-I n (%)	CIN-II n (%)	CIN-III n (%)	Cancer n (%)	Total	Yes n (%)	No n (%)
Colposcopic biopsy	Normal	2 (18.1)	2 (14.2)	0 (0)	2 (6.8)	0 (0)	6	4 (66.6)	2 (33.3)
	CIN-I	5 (45.4)	3 (21.4)	0 (0)	0 (0)	0 (0)	8	8 (100)	0 (0)
	CIN-II	3 (27.2)	9 (64.2)	10 (71.4)	7 (24.1)	1 (25)	30	18 (60)	12 (40)
	CIN-III	1 (9.09)	0 (0)	4 (28.5)	20 (68.9)	2 (50)	27	26 (96.2)	1 (3.7)
	Cancer	0	0 (0)	0 (0)	0 (0)	1 (25)	1	1 (100)	0 (0)
	Total	11 (100)	14 (100)	14 (100)	29 (100)	4 (100)	72	57 (79.1)	15 (20.8)

CIN: Cervical ıntraepithelial lesion, *normal pathology and CIN-I lesions were isolated as a group from CIN-II+ (CIN-II, CIN-III, cancer) group of lesions

Table 3. Cases with discrepancy between colposcopic biopsy and conization

Patient	Menopausal status	Cytology	HPV	Colposcopic sign	Biopsy pathology	Excision pathology	Pathology up/down
1*	Postmenopausal	Normal	35+	None	CIN-II	CIN-I	↓
2	Postmenopausal	ASC-H	16+	Acetowhite change +	Cervicitis	CIN-III	↑
3	Premenopausal	Normal	Negatif	Ulceration	CIN-II	Cervicitis	↓
4	Postmenopausal	Normal	16+	None	CIN-II	Cervicitis	↓
5	Premenopausal	Normal	16+	None	CIN-II	CIN-I	↓
6*	Premenopausal	Normal	59+	None	CIN-II	CIN-I	↓
7	Premenopausal	ASCUS	16+	None	CIN-III	Normal	↓
8	Premenopausal	Normal	16+	None	CIN-II	CIN-I	↓
9	Premenopausal	ASCUS	16+	None	CIN-II	CIN-I	↓
10	Premenopausal	ASC-H	59+	Mosaic pattern	CIN-III	CIN-I	↓
11	Postmenopausal	ASC-H	Yok	None	CIN-II	Normal	↓
12	Premenopausal	LSIL	16+	None	CIN-II	Normal	↓
13	Premenopausal	ASCUS	58+	None	CIN-II	CIN-I	↓
14	Premenopausal	LSIL	35+	None	CIN-II	CIN-I	↓
15	Postmenopausal	ASCUS	16+	Acetowhite change+	CIN-III	Normal	↓

CIN: Cervical intraepithelial neoplasia, ASC-H: Atypical squamous cell, cannot exclude high-grade squamous ıntraepithelial lesion, ASCUS: Atypical squamous cells undeterminted significance, LSIL: Low grade cervical ıntraepithelial lesion, *Colposcopic biopsies were applied in these cases because of the persistance of Hr-HPV for 2 years

results were presented in Table 3. In 20.8% (n=15/72) of cases were inconsistent between biopsy and CKC. When 15 cases with discordance were examined; The degree of lesion in excision was found to be lower in all except 1 case (6.6%) (Figure 1).

Discussion

Cervical cytology and hr-HPV screening are basic methods in cervical cancer screening strategy. Particularly; CIN-2+ lesions should be recognized correctly because of the risk of progression to invasive cancer.

When the final pathology results were compared with biopsy; CIN-2+ lesion was detected in CKC and biopsy procedures 65.2% and 80.5%, respectively. 22.4% of cases with CIN-2+ in biopsy were reported as CIN-1 or less in CKC. In many studies, this rate was reported in the range of 11-18% (7-10). In the present study, the sensitivity, specificity, PPD and NPD in detecting CIN-2+ lesions of biopsy were respectively; 95.7%, 48%, 77.5%, 85.7% were determined. After

all; 79.1% agreement was detected between biopsy and CKC results. Agreement rates of 40.8% and 86% were found in two different studies (7,11). Invasive carcinoma cases unlike the CIN lesions were the main reason of lower overall agreement rate (40.8%) (7). The discordance between biopsy and CKC pathologies were detected in 15 cases. In only one case, the biopsy result was chronic cervicitis, while the CKC pathology was indicated as CIN-3. In all other cases, CIN-1 or normal pathology was found in the final pathology.

The reasons for this difference can be; totally excision of locally displastic areas with biopsy, evaluation of materials obtain from biopsy and excision by different and non-gynecopathologist and immune reaction may develop in the period between biopsy and CKC. In addition to the 6-50% probability of spontaneous regression of CIN-2+ lesions (12), the biopsy procedure itself can produce an inflammatory response-mediated immune reaction. Immunohistochemical p16 analysis is one of the methods that can be effective in reducing the discordance between CKC and biopsy results (13). The lack of p16 immunohistochemical staining data in pathological reports is one of the limitations of our study. Finally, another explanation for the presence of overtreatment status in 14 cases; probability of missing cervical cancer diagnosis is the clinician's main concern about this subject. In our opinion, clinicians prefer overtreatment instead of missing cervical cancer.

In this study, one or more suspicious lesions were observed on colposcopy in 37.5% of the cases who underwent CKC. It was reported that, a suspicious colposcopic finding was observed in 47% of the cases (14), while the other studies also revealed the inability of colposcopic examination to distinguish low-grade and high-grade cervical lesions (7). Similarly, in two different studies, the rate of compliance with colposcopic examination and pathology was found to be 59.3% and 57.9% respectively (14,15). CIN-2+ lesions were detected in 53.3% of the cases without suspicious lesions in colposcopic examination, and no suspicious colposcopic finding was detected in 62.5% of all excision cases; it is probably related to the inadequacy of the colposcope technology and pathologist' experience. The lack of a gyneco-pathologist is limiting factor in our study.

The sensitivity of the existence of suspicious lesion in colposcopy in terms of CIN-2+ lesion detection power was 48.9%, specificity 84%, PPD 85.1%, NPD 46.6%. In some studies, the sensitivity rates for detecting CIN-2+ lesions was found to be in the range of 49-61% (16,17). Therefore, it was observed that there was no colposcopic finding in approximately 30-50% of CIN-2+ cases. However, Mitchell et al. (18) reported that, sensitivity and specificity were found to be 85% and 69%, respectively. When the modified Swede Colposcopic index was used, the sensitivity, specificity, PPV, NPV, accuracy rates in detecting high-grade lesions were found to be 84.2%, 96.2%, 96%, 85%, and 90%, respectively when the cut-off score was measured as >11 in modified Swede Colposcopic index (19).

Surgical margin positivity was detected in n=6 (8.1%) cases of CKC, and CIN-2 lesion was detected in only 1 case in the reconization procedure performed 8 weeks after these. It was reported that, surgical margin positivity was found in 12% of low-grade cytological lesions and 40% in high-grade cytological lesions (20). The increased surgical margin positivity rates may be related with "see and treat" strategy and LEEP procedure in their study. In a meta-analysis including 35,100 cases; surgical margin positivity was found at a rate of 23% after excision in CIN lesions including all grades or cancer cases (21). But this rate varied between 17.8% and 25.9% according to subgroups of surgery (LEEP, CKC or laser conization) in this study (21). The possible reasons for low positivity of surgical margins in the present study; CKC were performed in all cases instead of LEEP and all conization procedures were performed by single gynecologic oncologist. Supporting the fact that the surgical margin positivity rate increases in LEEP procedures with lesions covering >2/3 of the cervix (22), >50 years of age, ECC positivity, >2 gravida, and high HPV load.

Conclusion

This study and many other studies revealed the insufficiency of colposcopic findings to distinguish low grade and high grade cervical lesions. If we look at it from the perspective of biopsy and CKC; in present study, 79.1% agreement was found between biopsy and CKC results. In our opinion, reasons for the inconsistency between biopsy and excision results are; in addition to clinic and pathologic factors,

clinicians are willing to use more surgical options due to the concern for missing diagnosis of cervical cancer.

Ethics

Ethics Committee Approval: This study was approved by Ethics Commitee of Adnan Menderes University Faculty of Medicine with a protocol number 2021/125 (date: 24.06.2021).

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Animal Care: A.S., Concept: A.S., Design: A.S., Data Collection or Processing: A.S., Analysis or Interpretation: E.A., Literature Search: A.S., E.A., Writing: A.S.

Conflict of Interest: No conflict of interest was declared by the authors.

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References

1. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, et al. GLOBOCAN 2012 v1. 0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11.
2. Pagliusi SR, Aguado MT. Efficacy and other milestones for human papillomavirus vaccine introduction. Vaccine 2004; 23: 569-78.
3. Kyrgiou M, Koliopoulos G, Martin-Hirsch P, Arbyn M, Prendiville W, Paraskevaidis E. Obstetric outcomes after conservative treatment for intraepithelial or early invasive cervical lesions: systematic review and meta-analysis. Lancet 2006; 367: 489-98.
4. Moss EL, Hadden P, Douce G, Jones PW, Arbyn M, Redman CW. Is the colposcopically directed punch biopsy a reliable diagnostic test in women with minor cytological lesions? J Low Genit Tract Dis 2012; 16: 421-6.
5. Barker B, Garcia F, Lozevski J, Warner J, Hatch K. The correlation between colposcopically directed cervical biopsy and loop electrosurgical excision procedure pathology and the effect of time on that agreement. Gynecol Oncol 2001; 82: 22-6.
6. Byrom J, Douce G, Jones PW, Tucker H, Millinship J, Dhar K, et al. Should punch biopsies be used when high-grade disease is suspected at initial colposcopic assessment? A prospective study. Int J Gynecol Cancer 2006; 16: 253-6.
7. 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 2019; 39: 110-4.
8. Noothong S, Inthasorn P, Warnnissorn M. Pathological discrepancy between colposcopic directed cervical biopsy and Loop Electrosurgical-Excision Procedures (LEEPs) in patients with biopsies proven high grade cervical intraepithelial neoplasia. Taiwan J Obstet Gynecol 2017; 56: 628-31.
9. Diakomanolis E, Haidopoulos D, Chatzipapas I, Rodolakis A, Stefanidis K, Markaki S. Negative cone biopsies. A reappraisal. J Reprod Med 2003; 48: 617-21.
10. Ryu A, Nam K, Chung S, Kim J, Lee H, Koh E, et al. Absence of dysplasia in the excised cervix by a loop electrosurgical excision procedure in the treatment of cervical intraepithelial neoplasia. J Gynecol Oncol 2010; 21: 87-92.
11. Duesing N, Schwarz J, Choschzick M, Jaenicke F, Gieseking F, Issa R, et al. Assessment of cervical intraepithelial neoplasia (CIN) with colposcopic biopsy and efficacy of loop electrosurgical excision procedure (LEEP). Arch Gynecol Obstet 2012; 286: 1549-54.
12. Li ZG, Qian de Y, Cen JM, Chen GD, Shu YH. Three-step versus "see-and-treat" approach in women with high-grade squamous intraepithelial lesions in a low-resource country. Int J Gynaecol Obstet 2009; 106: 202-5.
13. Zhang L, Li Q, Zhao M, Jia L, Zhang Y. Discrepancies between biopsy-based and excision-based grading of cervical intraepithelial neoplasia: the important role of time between excision and biopsy. Int J Gynecol Pathol 2015; 34: 221-7.
14. Ruan Y, Liu M, Guo J, Zhao J, Niu S, Li F. Evaluation of the accuracy of colposcopy in detecting high-grade squamous intraepithelial lesion and cervical cancer. Arch Gynecol Obstet 2020; 302: 1529-38.
15. Tatiyachonwiphut M, Jaishuen A, Sangkarat S, Laiwejpithaya S, Wongtiraporn W, Inthasorn P, et al. Agreement between colposcopic diagnosis and cervical pathology: Siriraj hospital experience. Asian Pac J Cancer Prev 2014; 15: 423-6.
16. Pretorius RG, Zhang WH, Belinson JL, Huang MN, Wu LY, Zhang X, et al. Colposcopically directed biopsy, random cervical biopsy, and endocervical curettage in the diagnosis of cervical intraepithelial neoplasia II or worse. Am J Obstet Gynecol 2004; 191: 430-4.
17. Soutter WP, Diakomanolis E, Lyons D, Ghaem-Maghami S, Ajala T, Haidopoulos D, et al. Dynamic spectral imaging: improving colposcopy. Clin Cancer Res 2009; 15: 1814-20.
18. Mitchell MF, Schottenfeld D, Tortolero-Luna G, Cantor SB, Richards-Kortum R. Colposcopy for the diagnosis of squamous intraepithelial lesions: a meta-analysis. Obstet Gynecol 1998; 91: 626-31.
19. Rodpenpear N, Pataradool K. The efficacy of modified Swede Colposcopic Index in prediction of high-grade lesion and cancer of cervix. J Gynecol Oncol 2019; 30: e78.
20. Demirkiran F, Kahramanoglu I, Turan H, Yilmaz N, Yurtkal A, Meseci E, et al. See and treat strategy by LEEP conization in patients with abnormal cervical cytology. Ginekol Pol 2017; 88: 349-54.
21. Ghaem-Maghami S, Sagi S, Majeed G, Soutter WP. Incomplete excision of cervical intraepithelial neoplasia and risk of treatment failure: a meta-analysis. Lancet Oncol 2007; 8: 985-93.
22. Chen Y, Lu H, Wan X, Lv W, Xie X. Factors associated with positive margins in patients with cervical intraepithelial neoplasia grade 3 and postconization management. Int J Gynaecol Obstet 2009; 107: 107-10.