RESEARCH ARTICLE

Reid Colposcopic Index Evaluation: Comparison of General and Oncologic Gynecologists

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Abstract

The Reid colposcopic index (RCI) helps physicians for interpret the results of colposcopic examination. To compare the accuracy of RCI in colposcopic evaluation between general and oncologic gynecologists, this prospective trial was conducted by invited women over 20 years of age who were scheduled for a colposcopy at Chiang Mai University Hospital between August, 2008 and May, 2014 to participate. Pregnant patients or those having a history of hysterectomy or conization were excluded. During the colposcopy, all patients were simultaneously evaluated by general and oncologic gynecologists utilizing the RCI. Further management with either a biopsy or LEEP in each patient was dependent on the decision of the attending oncologic gynecologist. The accuracy of the RCI in diagnosing HSIL or more was calculated by the comparison with the final histology. Finally, 135 patients were recruited into this study. The sensitivity, specificity, PPV, NPV, and accuracy of RCI in diagnosing HSIL or more in general gynecologists were 45.2%, 80.7%, 41.1%, 83.2% and 72.6% while in the oncologic gynecologists were 51.6%, 85.6%, 51.6%, 85.6% and 77.8%, respectively. The difference in accuracy between evaluator groups was not significant (p-value=0.28). Of 3 patients with invasive cervical cancer, all were undetected by the general gynecologists using RCI while only 1 invasive cervical cancer was missed via RCI by the oncologic gynecologists. We conclude that RCI could be used by general gynecologists in provincial hospitals with major concerns about missing invasive cervical cancer. A short training period regarding colposcopy might help to resolve this problem

Keywords: Reid colposcopic index - high-grade cervical intraepithelial lesions - colposcopy

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Introduction

Thai patients who have abnormal cervical cytology and/or positive Human Papilloma Virus (HPV) tests from cervical cancer screening are usually referred for a colposcopy with the oncologic gynecologists in the tertiary care hospitals (Kietpeerakool et al., 2014). This practice was inconvenient for the patients requiring a journey to the larger hospital and often created anxiety for patients (Jerachotechueantaveechai et al., 2015) due to the long waiting time for a limited number of specialists. For example, in Maharaj Nakorn Chiang Mai Hospital, the biggest tertiary care hospital in the Northern part of Thailand, the waiting time before a colposcopy for these patients is at least two months (Kietpeerakool et al., 2011). Therefore, to resolve this burden, a short colposcopy training course for general gynecologists was conducted. Many general gynecologists who attended this course established a colposcopy unit in their hospital. However, the accuracy of the colposcopy in each unit varied among the colposcopists depending on their skill and experience (Tatiyachonwiphut et al., 2014). To control the quality of the colposcopy units, the Reid Colposcopic Index (RCI) was conducted to help the physicians evaluate the colposcopic impression (Shojaei et al., 2013; Mousavi et al., 2007; Ferris et al., 1994; Reid and Scalzi, 1985). RCI was a scoring system originated to help the colposcopists predict the histological diagnosis by using four basic colposcopic features: margin, color, vessels, and iodine staining. Reid and Scalzi suggested that this scoring system would improve the efficacy of clinical skills. From the previous report, the RCI showed accuracy in forecasting cervical intraepithelial neoplasia as high as 97 (Reid and Scalzi, 1985). However, the colposcopic features in RCI were subjective for some features.

We conducted this study with two objectives. The first one was to compare the interpretation of RCI between the general and oncologic gynecologists with the final pathology and the second one was to identify the inter-observer agreement between the general and oncologic oncologists in RCI interpretation. If the RCI results corresponded in both groups and also in the final pathology, then the RCI could be suitable for general gynecologists for colposcopic impression.

Materials and Methods

Between August, 2013 and May, 2014, after the

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protocol was approved by the local Ethics Committee, the patients more than 20 years of age who were scheduled for a colposcopy at Chiang Mai University Hospital were invited to participate in this study. They were recruited if their colposcopic finding was satisfactory and they needed a cervical biopsy. The patients who were pregnant or had a history of hysterectomy or conization were excluded.

After informed consent, the participants were prepared in a lithotomy position; the speculum was inserted followed by the colposcopic examination. The colposcopy step was started by using the cotton wool soaked with normal saline to cleanse the cervical secretions then the vascular pattern was evaluated with a green filter. Afterward the cervix was washed with 5% acetic acid and left for one minute. If a transformation zone was clearly seen and an abnormal lesion was identified, the general gynecologists and gynecologic oncologists separately evaluated the colposcopic lesion according to the RCI and recorded their findings on a paper form. The RCI scores were classified as zero, one, or two depending on the degree of four standardized colposcopic patterns: acid staining, iodine staining, margin of lesion, and vascular pattern. All the details of the RCI score were printed on one page of the RCI paper form. After the general and oncologic gynecologists finished the first part of the RCI scoring, the last step was done by applying Lugol's solution to check the iodine staining and both the general gynecologist and the gynecologic oncologist completed the last part of the RCI score. Then, the total score was calculated. The score from zero to five was classified as normal or low grade squamous cell lesion (LSIL) while the score from six to eight was classified as high grade squamous cell lesion (HSIL). All colposcopic images were connected to a TV monitor in the real time, so the general gynecologist and oncologist could be viewing the process simultaneously.

The clinical data of the participants was concealed until the general and oncologic gynecologists finished and interpreted the RCI score. Further management with either biopsy or loop electrosurgical excision procedure (LEEP) in each patient was dependent on the decision of the attending gynecologic oncologist for that period. All specimens were sent to the gynecologic pathologists who were blinded to the RCI score results.

The demographic and clinical data that consisted of age, parity, cervical cytology with or without HPV test results, the RCI score, the colposcopic impression and the final histology were collected.

Six gynecologic oncology fellows were rotated as colposcopists and were instructed to use similar techniques when performing all colposcopies. In addition, eight final-year residents who represented the general gynecologists and seven gynecologic oncologist staff were rotated to be the evaluators of the RCI score in this study. The sample size in the present study was calculated by using data from the previous study that revealed that the accuracy of RCI interpretation by the experienced colposcopists should be at least 80% related to the final histology (Arbyn et al., 2010; Strander et al., 2005). More than 10% difference in the accuracy of the RCI was selected as the smallest effect that would be of clinical importance. After that, the data was calculated by using alpha value set at 0.05 (one-tailed) and the power set at 90%. Finally, the sample size result was at least 125 subjects.

To achieve the primary objective, the colposcopic impression results of the RCI score in each evaluator was compared with the final pathological outcome by using a two by two table. The accuracy, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and false negative rate of RCI scores from both evaluators in diagnosing HSIL were calculated and compared with final pathologic results between both groups by McNemar Chi-square test. The differences were considered as significant when the P-value was less than 0.05. The secondary objective addressed the strength of inter-observer agreement between the two evaluator groups. The agreement was assessed by using Kappa coefficient and 95% confidence intervals. Kappa values of 0.8-1.0 were considered as excellent, of 0.6-0.8 as good, of 0.4-0.6 as moderate, 0.2-0.4 as fair, and of less than 0.2 as poor. SPSS version 17.0 (SPSS, Chicago, IL, USA) was applied to analyze the entire outcome.

Results

Between May 1, 2013 and August 31, 2014, 364 women visited the colposcopic clinic at Chiang Mai University Hospital. Of these patients, 259 patients were excluded due to pregnancy (22), previous hysterectomy (17), history of conization (54), history of cervical cancer (39), unavailability of both of evaluators simultaneously at examination time (32), unsatisfactory colposcopy (88) and normal transformation zone (7). Thus 135 women met the inclusion criteria.

The clinical characteristics of the studied patients were noted in Table 1. The mean age of the patients was 40 years old with a range from 22-66 years. About 13% of the patients were menopausal and 12% were nulliparous. Human immunodeficiency viral (HIV) infection was noted in 5.2% of the studied patients. All patients except one underwent cervical cytologic examination with approximately half of them using conventional pap smear while the rest used a liquid based cytology with HPV testing. One patient who did not previously have a Pap smear test was sent to the colposcopy unit with the indication of an abnormal looking cervix. However, her final histology showed only chronic cervicitis.

The proceeding cytologic results were presented in Table 1. About 30% of the patients showed LSIL and only 17% showed HSIL. The HPV test was positive in 43% of the studied patients. The final pathology of the cervix was obtained by colposcopic-directed biopsy in 105 cases (77.8%) while the rest were collected by LEEP and the final pathology from both methods were descending in sequence as the following: in sequence as the following: cervical intraepithelial neoplasia (CIN), 54 (40%); no lesion, 50 (37%); CIN, 26 (19.3%); invasive cervical cancer, (2.2%); and adenocarcinoma in situ (AIS), (1.5%).

The agreement between each evaluator and the final histology were presented in Tables 2. In the general gynecologist group, the sensitivity, specificity, PPV, NPV and accuracy of RCI in diagnosing HSIL or more were

45.16%, 80.76%, 41.17%, 83.17% and 72.59% while in the oncologic gynecologists were 51.61%, 85.57%, 51.61%, 85.57% and 77.78%, respectively. The accuracy in both evaluators showed no significance with a p-value of 0.28. Overestimation in the general gynecologist group was less than the oncologic gynecologist group (7.4% vs 8.1%) whereas underestimation in the general gynecologist group was more than the oncologic gynecologists (16.2% vs 13.3%), p-value<0.05.

The strength of the correlation between colposcopy impression from the RCI and biopsy histology in the oncologic gynecologists group (Kappa=0.34) was more than the general gynecologist group (Kappa=0.22).

In the three patients with invasive cervical carcinoma from the final histopathology group, all RCI exams by the general gynecologist were diagnosed as low-grade lesions but only one RCI by the oncologic gynecologists were diagnosed as a low-grade lesion.

In the inter-observer agreements between gynecologic oncologists and general gynecologists in the colposcopic interpretation using RCI scores, both evaluators agreed on colposcopic interpretation using RCI scores in 104 (77%) cases and disagreed in 31 (22.9%) cases. The strength of the correlation between both evaluators was fair (kappa = 0.37, 95%CI 0.19-0.55). Regarding the strength of agreement in the components of the RCI scoring system between both evaluators, the strengths of the presence of color, margin, vessels, and iodine staining were considered as poor in color and vessels while fair in margins and iodine staining item that are shown in Table 3.

Table 1. Demographic Characteristics

		Number	%
Age(y)	<30	19	14.1
	30-39	49	36.3
	40-49	37	27.4
	>50	30	22.2
Parity	Nulliparity	17	12.6
	Multiparity	118	87.4
Menopausal Status	Premenopausal	117	86.7
	Postmenopausal	18	13.3
HIV Status	Positive	7	5.2
	Negative	128	94.8
Preceding Pap	Not done	1	0.7
	Negative for malignancy	27	20
	ASC-US	33	24.4
	ASC-H	8	5.9
	LSIL	41	30.4
	HSIL	23	17
	AGC-NOS	2	1.5
HPV Testing	Positive	58	43
	Negative	11	8.1
	Not done	66	48.9
Biopsy	Colpo-directed biopsy (CDB)	105	77.8
	LEEP	30	22.2
Histology from Biopsy			
	Normal	50	37
	CIN I	54	40
	CIN III	26	19.3
	SCCA	3	2.2
	AIS	2	1.5

HIV, human immunodeficiency virus; HPV, human papilloma virus; ASC-US, atypical squamous cells of undetermined significance; ASC-H, atypical squamous cells, cannot exclude high-grade squamous intraepithelial lesion; LSIL, Low-grade squamous intraepithelial lesion; HSIL, High-grade squamous intraepithelial lesion; AGC-NOS, atypical glandular cells, not other specified; SCCA, squamous cell cervical cancer; AIS, adenocarcinoma in situ; LEEP, loop electrosurgical excision procedure; CIN I, cervical intraepithelial neoplasia grade 1; CIN III, cervical intraepithelial neoplasia grade 3

Table 2. Agreement between RCI Colposcopic Impression and Final Cervical Histology

Colposcopic Impression by RCI	Histopathologic Report Normal/CIN1	CIN3 or More	Total
General gynecologist group			
Low-grade Lesion	14	20	34
High-grade Lesion	17	84	101
Gynecologic oncologist group			
Low-grade Lesion	16	15	31
High-grade Lesion	15	89	104

CIN 1, cervical intraepithelial neoplasia grade 1; CIN 3, cervical intraepithelial neoplasia grade 3

Table 3. Kappa Coefficients of RCI Components between General and Oncologic Gynecologists

RCI Components	Kappa (95% Confidence Interval)
Color	0.19 (0.06-0.32)
Margins	0.28 (0.15-0.41)
Vessels	0.17 (0.04-0.30)
Iodine Staining	0.26 (0.13-0.39)

Discussion

In the present study, the accuracy in diagnosing HSIL from colposcopy when using RCI was comparable between the oncologic and general gynecologist (77.78% *vs* 72.59%). This finding suggested that colposcopy performed by the general gynecologists were similarly accurate as the oncologic gynecologists. This information might provide confidence in general gynecologists regarding colposcopic impression by RCI. When compared to previous study by Shojaei et al., colposcopy was performed on 260 women by the third or fourth year gynecologic residents under the guidance of attending oncologic gynecologists. They showed a significant association between RCI and histopathology results in HSIL with the sensitivity, specificity, PPV, and NPV as 95.6%, 70.2%, 89% and 86%, respectively. The results from Shojaei et al. showed RCI was a rather higher standard than our study because they had attending oncologic gynecologists to guide the RCI colposcopic impressions and they were not blinded regarding preceding Pap smear results (Shojaei et al.,2013).

The inter-observer agreements for colposcopic interpretation using RCI in the assessments of HSIL from our study was fair. It was estimated that the inter-observer agreements between oncologic and general gynecologists in colposcopic interpretation using RCI scores were inconsistent. Massad et al. reported the exact agreement between colposcopic impression using RCI and biopsy histology in only 37% and the strength of the correlation was poor (Kappa =0.20). However, the sensitivity for RCI with a threshold of any lesion detected was 90%

that higher than our study. This difference might be from the non-similarity of the evaluator in Massad's study that recruited only the expert colposcopists (Massad et al., 2003). Baum et al. also evaluated the strength of correlations between colposcopic impression using RCI and biopsy histology by gynecologic training residents and reported that the association between cervical biopsy and the impression was highly significant (P<0.001). However, the strength of the correlation was only slight (Kappa = 0.197). This outcome was similar to the present study (Baum et al., 2006).

The strengths of this study included that it was a prospective study and no missing data was noted. Moreover, the study was conducted in the real practice situation that the evolution of acetowhite changes over the course of a colposcopic evaluation could be detected without bias by the previous cervical cytologic results due to the blinded Pap smear results. This can reflect the actual colposcopic impression by RCI. However, some limitations should be mentioned included the high rate of excluded patients and the colposcopic interpretation via TV monitor, not from the direct colposcopy. Furthermore proper biopsy site/technique and management in unsatisfactory colposcopies that were widely used in colposcopic situations were not tested in this study.

In conclusion, the RCI could be used by general gynecologists in provincial hospitals with major concerns about missing invasive cervical cancer. A short training period regarding colposcopy might be helpful to ensure that invasive cervical cancer not be missed.

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