

Reid's Colposcopic Index

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Reid's Colposcopic Index (RCI) is a systematic, objective method of colposcopically grading the severity of premalignant cervical lesions. The index considers four colposcopic signs: lesion margin, color of acetowhitening, blood vessels, and iodine staining. The RCI can accurately predict the histologic grade of cervical disease, readily permitting differentiation between low-grade

cervical disease and high-grade disease. Hence, use of the index helps direct the clinician to perform a biopsy of the most significant abnormal cervical lesions and enhances the formulation of the colposcopic impression.

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Colposcopic examination of the cervix following an abnormal cervical cytology report is universally accepted as the primary method of evaluating the uterine cervix for potential premalignant and malignant epithelial cell abnormalities.¹ As such, colposcopy and colposcopically directed biopsies have become essential tools for assessment and triage of patients with cervical intraepithelial neoplasia (CIN). Histologic confirmation of disease is currently the diagnostic criterion standard for CIN. An accurate colposcopic examination and subsequently formulated colposcopic impression correlated with cervical cytology and histology allow the selection of candidates for serial clinical observation and laboratory monitoring or for conservative, fertility-preserving treatment procedures.

The derivation of a colposcopic impression is clinically imperative and based on specific signs that may represent cervical pathologic features noted by the colposcopist. These features or colposcopic signs help the physician distinguish normal epithelium from abnormal epithelium. Various colposcopic signs have been identified as predictive of the disease continuum of squamous intraepithelial lesions. Many approaches to formulating a colposcopic impression or grading the severity of cervical

lesions have been developed.²⁻⁵ However, several of these systems have clinical application difficulties.^{2,3}

Using a colposcopic index to differentiate low-grade cervical disease from high-grade disease, as described by Reid, has been determined to be 97% accurate.^{5,6} The use of Reid's Colposcopic Index (RCI) by family physician colposcopists has enhanced the correlation of colposcopic findings with those of cytology and histology.⁷ By defining colposcopic signs used to accurately grade lesions, the index provides a means of standardizing the evaluation of cervical disease. A recent survey of family physician colposcopists⁸ found that approximately one third of these physicians formulate a colposcopic impression by simple conjecture. Otherwise, most use a single colposcopic sign.

Advantages of the RCI

There are numerous advantages to regular use of the RCI during colposcopy. First, the index permits a systematic approach to evaluating cervical lesions by using specific, objective criteria. Colposcopic impressions derived by conjecture jeopardize an accurate correlation with cytologic and histologic results and may adversely affect patient management selection. The index readily permits differentiation between low-grade cervical disease and high-grade disease. Skilled colposcopic assessment thereby enables accurate identification and biopsy of the most severe disease within a large complex lesion or of multifocal transformation zone lesions with varying grades of abnormality. Consequently, the pathologist is

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Table. Reid's Colposcopic Index

Colposcopic Sign	0 Points	1 Point	2 Points
Margin	Condylomatous or micropapillary contour Indistinct borders Flocculated or feathered margins Jagged, angular lesions Satellite lesions, acetowhitening that extends beyond the transformation zone	Regular lesions with smooth, straight outlines Sharp peripheral margins	Rolled, peeling edges Internal borders between areas of differing appearance
Color	Shiny, snow-white color Indistinct acetowhitening, semitransparent rather than completely opaque	Shiny, off-white Intermediate white	Dull, oyster gray
Vessels	Uniform, fine caliber Randomly arranged with poorly formed patterns Nondilated capillary loops Ill-defined areas of fine punctation or mosaic	Absence of surface vessels, following acetic-acid soaking	Definite punctation or mosaicism Individual vessels dilated, arranged in sharply demarcated, well-defined patterns
Iodine staining	Positive iodine uptake, producing a mahogany-brown color Negative iodine uptake by an area that is recognizable as a low-grade lesion by above criteria ($\leq 2/6$)	Partial iodine uptake Variegated, tortoise-shell appearance	Negative staining of a lesion, which is a high-grade lesion by the above criteria ($\geq 3/6$) Mustard-yellow appearance
Score	0-2 HPV or CIN I (Low-grade disease)	3-5 CIN I or CIN II (Intermediate-grade disease)	6-8 CIN II or CIN III (High-grade disease)

provided with a representative specimen reflective of the greatest severity of disease. Although cervical histology is the criterion standard for diagnosis, the interobserver agreement by pathologists for cervical histologic tissue is only a modest 65%.⁹ Because the histologic interpretation may be unconditionally accepted as the criterion standard by many novice colposcopists, an accurate colposcopic impression provided by a structured analysis is critically important. An appropriate balance between laboratory and clinical findings must be maintained.

Reid's Colposcopic Index

The RCI is depicted in the Table. The index is similar in design to the Apgar scoring system to assess newborn health status. In contrast to the five categories of the Apgar system, the RCI considers four lesion signs. The four colposcopic signs of lesion margin, color of acetowhitening, vessels within the lesion, and iodine staining are divided into three objective categories, which include lesion features characteristic of various specific levels of premalignant disease. Each category is assigned a numerical value from 0 to 2, with 0 representing potentially benign changes of human papillomavirus infection or mild dysplasia, 1 representing mild to moderate dysplasia, and 2 reflecting colposcopic findings predictive of severe or high-grade dysplasia. Once the colposcopist detects a

cervical lesion, each colposcopic sign is considered, and respective numerical scores are assigned, depending on the severity characteristics of the lesion. The scores for each sign are combined to establish the total RCI score. The value of the total score is used to estimate the severity of disease, which may be used as the critical colposcopic impression. The accuracy of the RCI is achieved by deriving an aggregate opinion for an estimate of lesion severity. After minimal practice, the colposcopist can systematically derive an index score in 30 seconds or less.

Colposcopic Signs

The RCI considers four unique attributes of premalignant cervical lesions. When jointly considered, lesion margin, color of acetowhitening, vessels, and iodine staining are effective predictors of lesion severity. These four colposcopic signs are evaluated separately when applying the index. The first three signs are evaluated following application of 5% acetic acid to the cervix. The final sign is dependent on a preliminary score of the first three signs and is determined after Lugol's (iodine) solution (25% strength) is applied to the cervix.

The first sign considers the nature of the lesion margin or border. Low-grade lesion margins (0 points) are described as irregular, flocculated, feathered, angular or "geographic," indistinct, with "satellite" lesions or exo-

phytic micropapilliferous (condyloma-like) in contour (Plate 1). Intermediate lesion margins (1 point) are smooth and fairly straight (Plate 2). High-grade margins (2 points) exhibit raised peeling edges (Plate 3), or are proximally located within a larger low-grade lesion and have an internal border or demarcation between the area of low-grade change and the squamocolumnar junction (Plate 4).

The lesion color of acetowhitening determines the second colposcopic sign. Low-grade lesions (0 points) are semitransparent or shiny snow white (Plate 5). High-grade lesions (2 points) are of a dirty oyster-gray color and dense appearing because of nuclear dense cells in proportion to the small amount of cytoplasm (Plate 6). An intermediate lesion (1 point) is off-white, positioned between the two extremes in the color spectrum (Plate 7). This is the most common category assignment for color.

Vascular patterns comprise the third colposcopic sign. The low-grade category (0 points) is characterized by fine-caliber capillaries, either as punctuation or a mosaic pattern (Plate 8). These vessels are not dilated and are configured in loose arcades. The intermediate category (1 point) displays an absence of superficial vessels (Plate 9). The high-grade category (2 points) features coarsely dilated vessels, found as coarse punctuation or mosaic (Plate 10).

The final colposcopic sign is evaluated following Lugol's solution staining of the cervix, provided the patient has no known hypersensitivity to iodine. Normal mature squamous epithelium contains glycogen and appears mahogany brown when stained. The low-grade category (0 points) may take up iodine and appear a mahogany-brown color (Plates 11 and 12) or reject iodine and appear a mustard-yellow color (Plate 13). The intermediate category (1 point) displays a variegated yellow-brown or "tortoise-shell" appearance resulting from partial or inconsistent iodine uptake (Plate 14). The high-grade category (2 points) rejects iodine and appears mustard yellow (Plate 15). Some low-grade lesions, all high-grade lesions, columnar cells, and atypical immature squamous metaplasia reject iodine and appear mustard-yellow. Therefore, a preliminary summated index score of the first three colposcopic signs influences the score for the last colposcopic sign.

Scoring the Lesion

Colposcopic signs are scored individually and sequentially. Each sign is assigned a score of between 0 and 2 points depending on the best description of the characteristic for that particular sign. A score of 0 points is indicative of mild or low-grade dysplasia or human papillomavirus condyloma, 1 point indicates mild to moderate

dysplasia, and 2 points defines high-grade dysplastic characteristics. Total RCI scores are reported as a ratio. The four separate scores from evaluation of the colposcopic signs are added and define the RCI numerator. The RCI denominator always remains 8, but the numerator or total score fluctuates. The maximum possible total score is 8 and the minimum, zero.

Following application of acetic acid to the cervix, the first three colposcopic signs are assessed and scored. A preliminary score (sum of these three signs) permits scoring of the 4th sign. Lesions demonstrating iodine rejection or a mustard-yellow color are assigned a score of zero if the preliminary score is 2 or less. Lesions that reject iodine and have a preliminary score of 3 or more receive 2 points. The total RCI score is then determined by adding the four individual sign scores.

The RCI Clinical Correlation

The total RCI score represents a weighted scoring system predictive of the severity of premalignant cervical lesions. In general, the lower the RCI score, the less serious the degree of disease. Numerator scores between zero and 2 are predictive of mild dysplasia (CIN I) or human papillomavirus infection. Scores between 3 and 5 are suggestive of mild or moderate dysplasia (CIN I or CIN II). Generally, total scores of 3 represent mild dysplasia, and scores of 5 represent moderate dysplasia. Total RCI scores of 6 to 8 are predictive of moderate or severe dysplasia. This systematic approach to colposcopic assessment of lesion severity also permits a critical and objective colposcopic appraisal. The decision-making process of determining where or on which lesion a biopsy should be performed is simplified to ensure a selective biopsy of the most severe cervical epithelium. The total RCI score correlation also may be used to objectively determine the colposcopic impression. The necessary colposcopic impression then may be used to correlate with the patient's previously documented cytology and subsequent histology interpretation of colposcopically directed biopsies.

Case Studies

The following two case studies demonstrate the use of the RCI to formulate a colposcopic impression.

In the first case, a 24-year-old dancer with a recent abnormal Papanicolaou (Pap) smear indicating a low-grade squamous intraepithelial lesion and clinical evidence of vulvar human papillomavirus infection was evaluated by colposcopy. Colpophotographs of her acetic acid-soaked cervix and Lugol's solution-stained cervix are shown in Plates 16 and 17. The acetowhite lesion margin

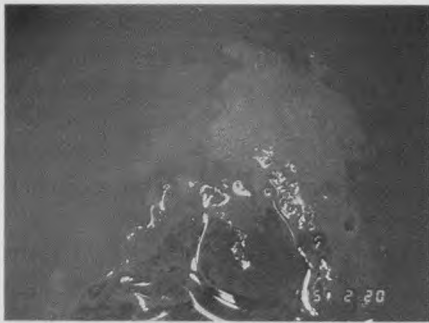


Plate 1



Plate 2

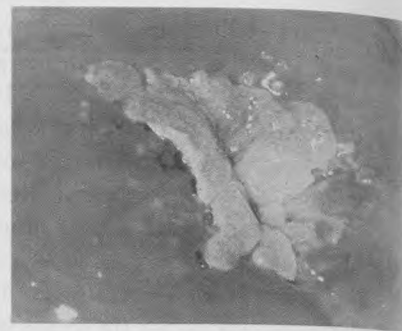


Plate 3

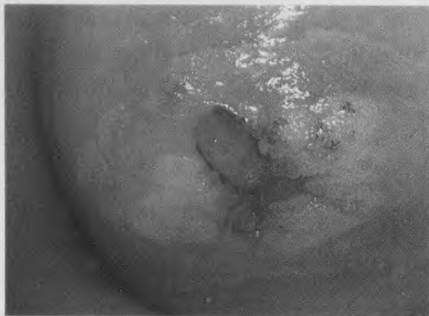


Plate 4



Plate 5



Plate 6



Plate 7



Plate 8

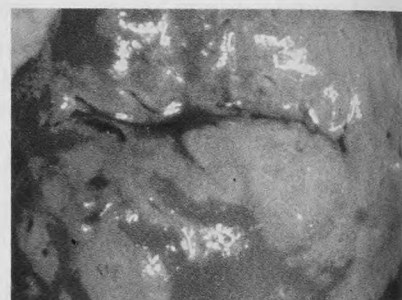


Plate 9



Plate 10

Plate 1. An acetowhite lesion with a geographic margin. A score of 0 points is assigned for margin. **Plate 2.** An acetowhite lesion of the anterior cervix with a smooth, regular margin. A score of 1 point is assigned for margin. **Plate 3.** A raised, densely acetowhite lesion of the cervix extending into the endocervical canal. The lesion margin is peeling in the 9 o'clock position. A score of 2 points is assigned for margin. **Plate 4.** A large, feathered acetowhite lesion of the cervix with 2 smaller, denser, acetowhite lesions with smooth borders located at the 3 and 9 o'clock positions. These lesions demonstrate an internal border more proximally located nearer the os. A score of 2 points is assigned for margin. **Plate 5.** Multiple shiny, snow-white lesions of the cervix. A score of 0 points is assigned for color. **Plate 6.** Oyster-gray lesion of the cervix. An ulceration and atypical vessels are also noted. A score of 2 points is assigned for color. **Plate 7.** A large intermediate white lesion with geographic margins contrasts with the smaller snowy white, smooth-margin lesions. A score of 1 point is assigned for color. **Plate 8.** A fine-caliber, mosaic vascular pattern noted in the peripheral acetowhite lesion. A score of zero points is assigned for vessels. **Plate 9.** No vessels are apparent in this acetowhite cervical lesion. A score of 1 point is assigned for vessels. **Plate 10.** Coarsely dilated punctation and mosaic vascular pattern indicative of a high-grade lesion. A score of 2 points is assigned for vessels.

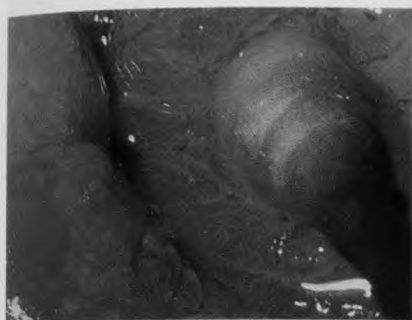


Plate 11

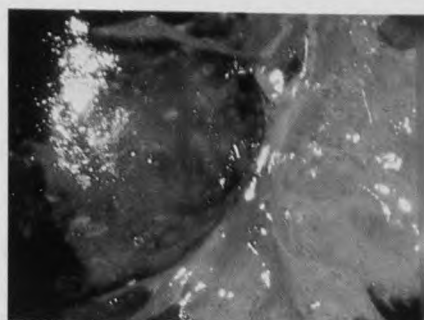


Plate 12



Plate 13

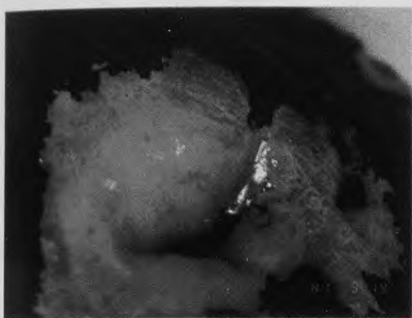


Plate 14



Plate 15

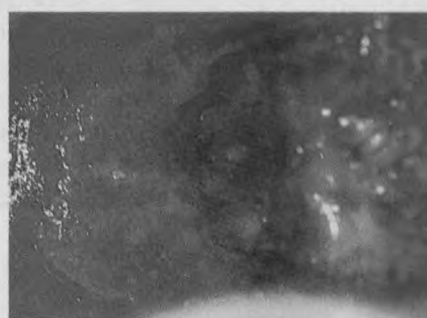


Plate 16



Plate 17



Plate 18



Plate 19

Plate 11. A faintly acetowhite lesion of the anterior cervix. A preliminary score of 2 points is initially assigned (margin, 1 point; color, 0 points; and vessels, 1 point). **Plate 12.** The lesion in Plate 11 appears mahogany brown following Lugol's (iodine) solution application. A score of 0 points is assigned for iodine. **Plate 13.** A mustard-yellow lesion after Lugol's solution application. Satellite lesions are located peripherally. **Plate 14.** A variegated iodine uptake noted following Lugol's solution application. A score of 1 point is assigned for iodine. **Plate 15.** Complete rejection of Lugol's solution and a mustard-yellow cervical lesion. A preliminary score of 4 points was initially assigned (margin, 1 point; color, 2 points; and vessels, 1 point). **Plate 16.** The acetic-acid-soaked cervix. Note lesion at the 9 o'clock position. **Plate 17.** The same cervical lesion noted in Plate 16 following application of Lugol's solution. **Plate 18.** An acetowhite cervical lesion. **Plate 19.** The same cervical lesion as in Plate 18 following the application of Lugol's solution.

is feathered, and satellite lesions are present. The margin score is zero points. The lesion is intermediate white in color and scores 1 point. There is a fine-caliber vascular pattern of mosaic and punctation. The vessel score is zero points. The preliminary score totals 1/6. The lesion rejects iodine and thus scores 0 points for iodine. The total RCI score is 1/8 and the pathology represents a low-grade lesion.

In the second case, a 48-year-old school teacher who had not had a Pap smear in 12 years received a report indicating a high-grade squamous intraepithelial lesion. Her acetic acid-soaked cervix and Lugol's solution-stained cervix are represented in Plates 18 and 19. The acetowhite lesion margin is smooth and straight. The margin score is 1 point. The lesion is intermediate in color and scores 1 point. A coarsely dilated mosaic pattern is noted. The score for vessels is 2 points. The preliminary score totals 4/6. The lesion rejects iodine and thus scores 2 points for iodine. The total RCI score is 6/8, which indicates a high-grade cervical lesion.

Conclusions

The RCI provides a systematic, objective approach to the colposcopic assessment of cervical premalignant lesions. The orderly method reassures novice colposcopists and prevents arbitrary, subjective estimates by experienced colposcopists. The critical colposcopic appraisal directs

selective biopsy of the most severe cervical disease, which improves patient care. Finally, with clinical correlation, a meaningful colposcopic impression may be formulated to fulfill the central tenet of colposcopic correlation with cytologic and histologic interpretations.

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