Colposcopy for Gland (Crypt) Openings

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■ **Abstract**

Systematic observation of the gland(crypt) openings of the uterine cervix is essential to colposcopy. ■

Key Words: cervical intraepithelial neoplasia (CIN), cervical carcinoma, colposcopy, gland openings, crypt openings, conization

Although cervical glands(crypts) are small, they are essential parts of a bigger system. For colposcopy, the acetowhite epithelium was, therefore, divided into two areas, the endocervical and the ectocervical area [1], or within the transformation zone and outside the transformation zone [2], in accordance with the distribution of gland openings. Furthermore, to some irritating circumstances the cells of the cervical glands do not always react in the same manner as those of the surface. For example, in histologic sections it is often observed that the epithelium of the cervical glands, regardless of whether it has already been replaced by cervical intraepithelial neoplasia (CIN), is spared from severe degenerative changes of the cells, while the surface epithelium of the uterine cervix shows some degree of cellular damage, or even desquamation. With colposcopy, too, inspection of gland openings can provide some important clinical information that could not be obtained by simple observation of the rather fragile surface epithelium [3]. Therefore, the authors stressed the significance of the changes of the gland openings, though the acetowhite epithelium of the surface is the principal finding of colposcopy.

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In 1969 the authors [4] proposed a colposcopic classification of the gland openings because little attention had been paid to this matter until then. Subsequently, this matter has received more careful attention, and the society to which the author belongs adopted normal or abnormal gland openings as basic items in colposcopic classification which is similar to that published in Europe [5]. Even now, however, it seems that colposcopists have not made sufficient use of the important clinical findings obtainable from the gland openings. This information is essentially important together with the changes found at the surface epithelium and those observed in the vascular patterns [6].

The present article deals with the items usually observed by the authors during colposcopy of the gland openings. They can be obtained easily or even exclusively by observation of the gland openings and may contribute to making better clinical decisions in some cases or for some critical portions of the cervix.

COLPOSCOPIC CLASSIFICATION OF GLAND (CRYPT) OPENINGS

As above-mentioned, the authors [1, 3, 4] classified the gland openings of the uterine cervix into the following five types for colposcopy, where the surface epithelium suffers from too severe inflammatory or other retrogressive changes to yield any clear colposcopic impressions.

Type I Normal gland opening
Type II Gland opening surrounded by a narrow white ring
Type III Gland opening surrounded by a rather indistinct white ring
Type IV Gland opening surrounded by a distinct and mostly thickened white ring (doughnut-like)
Type V Solid gland opening

Cases with directed biopsies or resected cervices showing CIN or more severe lesions were designated as "positive" [3]. The positive rate was 5% (18/356) for the cervices with Type I or II gland openings and 46% (41/89) for those with Type III. In cases with Type IV or V gland openings the positive rate was as high as 96% (235/244) [3]. In the remaining cases (4% 9/244) whose gland openings were evaluated as Type IV or V, no CIN was recognized in their directed biopsies. They were, therefore, false positive, and the histological diagnoses for most of them were usually squamous metaplasia or reserve cell hyperplasia [3].

The gland opening locating in the fine acetowhite epithelium was classified as type w and that in the dense acetowhite epithelium as type W.

DISAPPEARANCE OF GLAND OPENINGS

One of the most important findings is that cervical glands are usually destroyed by invasive cervical cancer. This finding aids the selection of biopsy sites or the avoidance of unnecessary biopsies [3, 7]. In 89% (171/193) of the cases with 5 mm or deeper invasive cancer, no gland openings were detected, at least in the main portions of the lesions [3].

No gland openings were observed either in 57% (24/42) of the cases with shallow (3~5 mm depth) invasive cervical cancer, nor in 18% (16/90) of the cases with microinvasive (3 mm or less depth) cancer. In 12% (37/299) of the cases with CIN no gland openings were found either, but they were postmenopausal and the lesions were small and more or less hidden in the cervical canal [3].

Adenoma malignum or well differentiated mucinous adenocarcinoma is a highly characteristic exception. In this disease, the gland openings of various sizes and shapes were clearly recognized and showed no tendency of whitening on application of acetic acid [3, 8].

INVASIVE CANCER HIDDEN IN THE CERVICAL CANAL

The localization of invasive cervical cancer is a very important clinical problem. It poses a major concern for colposcopists about whether any lesion, especially invasive cervical cancer, might be hidden in the high and invisible portion of the cervical canal. Such a cancer, if overlooked, is likely to be fatal. Some gynecologists prefer cervicoscopy, but usually either induction of bleeding by endocervical scraping or endocervical curettage or both are employed as simple clinical tests for invasive cervical cancer [9].

The author and co-workers examined the histological sections, cut through their maximal longitudinal diameter, of invasive foci in the cervices resected by means of radical hysterectomy [10]. No glands were detected in the lower area at a distance of 3 mm or more from the lowest margin of the foci of invasive cervical cancer. This means that the presence of any deep (5 mm or more) invasive cancer hidden high in the cervical canal would be unlikely when colposcopy confirms that the area 3 mm above the last gland opening is lesion-free.

More studies are necessary concerning the localization of the early stage of adenoma malignum, which was recently reported to express gastric phenotypes [11].

GLAND (CRYPT) OPENINGS AND NATURAL HISTORY OF CIN

In very few cases, the surface epithelium is normal or composed of mature metaplastic epithelium, whereas the epithelium of the cervical glands shows CIN [3]. Two processes are thought to be involved in this condition. First, both the surface epithelium and the gland epithelium are affected by CIN at some point in time. Thereafter, only the surface epithelium, which is too intensively damaged to be regenerated, is repaired through metaplastic changes, that is, through "local healing", while the epithelium of the cervical glands remains affected by CIN. In the second process, CIN primarily involves the glands alone. The former explanation seems more plausible, because histological sections often show that little cellular damage is found in the epithelium of the cervical glands, even if the epithelium has already been replaced by CIN, while some severe injury, even desquamation as mentioned above, is observed in the surface epithelium.

At present, many cases of CIN are detected through mass screening. It is necessary to determine their prognosis and to decide whether or not they should be treated at the time of detection. The variables most suitable for this purpose are the grade of cellular or histological changes of CIN, that is, mild or severe, and the type of human papilloma virus (HPV), that is, high risk or low risk. However, our findings suggest the presence and the grade of gland involvement of CIN could also answer the purpose. These variables may be

independent phenomena or only seemingly different ones which are the result of a common cooperative mechanism.

GLAND (CRYPT) OPENINGS IN POSTMENOPAUSE

With aging the cervix becomes atrophic and the endocervix retracts into the cervical canal. The cervical glands also become smaller in both size and number. The surface epithelium itself becomes atrophic and thinner, and often progresses to a state of senile cervicitis. This condition is unfavorable for colposcopy and the gland openings are often difficult to identify. In such cases, estrogenic agents are usually very useful to identify gland openings and to obtain the correct colposcopic impression [12].

GLAND (CRYPT) OPENINGS AND INDIVIDUALIZED EXCISION OF THE TRANFORMATION ZONE

Conization is usually employed to remove CIN. Excision of the transformation zone, however, needs to be individualized in quite a number of cases. For example, for young women who wish to have children, the excision should not be deep-and cone-shaped but shallow and plate-like to preserve a sufficient amount of healthy fibromuscular stroma. For postmenopausal women or for those with suspected early adenocarcinoma, however, the excision should be deep and cylinder-shaped or dome-like so as not to leave any early lesions located high in the cervical canal [13]. Even in cases showing some ectocervical acetowhite epithelium, it is essential to identify the last gland opening located around the external cervical os in order to decide the site of the incision line.

GLAND (CRYPT) OPENINGS AND MINIMAL INVASIVE THERAPY FOR CIN

In addition to conization, some minimal invasive procedures, such as LEEP, electrocauterization, high frequency electrocoagulation, cryosurgery, laser vaporization, photodynamic therapy and plate-like excision [12], are employed as therapy for CIN. These therapeutic modalities treat only the shallow zone of the cervix and may not reach the deepest portions of the cervical glands. In such cases, careful inspection of the distribution and degree of glandular involvement of CIN in the transformation zone is necessary before the operation. This examination is also indispensable for the postoperative follow-up of these cases.

As the summary; both HPV DNA testing and cytologic examination have been much improved recently and play important roles in cervical cancer screening. Under these circumstances, colposcopy is also required for greater accuracy. Careful observation of the gland(crypt) openings in addition to the surface epithelium and the vascular patterns [14] could further contribute not only to more accurate screening but also to better understanding of disease processes, which is essential to better diagnosis and treatment of CIN or cervical cancer.

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