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Short Communication

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Ultrasound Prediction of Colposcopic Visibility of the Transformation Zone: The Potential Role of Nabothian Follicles

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1. Introduction

Cervical cancer screening plays an important role in reducing the incidence and mortality of cervical cancer. Abnormal cervical screening results may require further assessment with colposcopy according to the cytological, HPV, and clinical findings. Colposcopy allows direct visualization of the cervix and assessment of the squamocolumnar junction (SCJ) and transformation zone. A colposcopic examination is considered limited when the SCJ or the upper limit of a relevant lesion cannot be completely visualized. The cervical transformation zone develops as the original columnar epithelium undergoes squamous metaplasia. The transformation zone lies between the original SCJ and the current SCJ and represents the area in which cervical intraepithelial neoplasia most commonly develops. Nabothian follicles are commonly encountered within the transformation zone. They develop when squamous metaplasia obstructs the openings of endocervical glands, resulting in retention of mucus within the glandular crypts and formation of cystic structures. Their presence can therefore provide an anatomical marker of previous or ongoing squamous metaplasia.

We propose a potential role for transvaginal ultrasound in predicting the extent to which the transformation zone may be accessible during subsequent colposcopy. On ultrasound, Nabothian follicles can be readily identified as small cystic structures within the cervical stroma. We hypothesize that their distribution may provide indirect information about the location and extent of the transformation zone. In women of reproductive age, when Nabothian follicles are absent or are confined to the distal or lower portion of the cervix and are located away from the external os, the SCJ and transformation zone may be more likely to remain accessible to colposcopic examination. Conversely, when multiple Nabothian follicles extend extensively toward or throughout the cervical canal, this may indicate a transformation zone extending more deeply into the endocervical canal, potentially increasing the likelihood that the entire SCJ will not be visualized during colposcopy.

Accordingly, we propose that ultrasound assessment of the number, distribution, and relationship of Nabothian follicles to the external os could potentially serve as a simple sonographic marker for predicting the visibility of the transformation zone during colposcopy. When ultrasound suggests that the transformation zone extends deeply into the endocervical canal, additional endocervical assessment may be considered when clinically indicated, particularly in women with high-grade cytological or HPV-related abnormalities. Current guidelines recommend endocervical sampling when the SCJ is not fully visualized and in several other high-risk clinical circumstances.

This proposed association should not be interpreted as replacing colposcopic assessment. Rather, ultrasound may potentially provide complementary anatomical information before colposcopy. The presence or absence of Nabothian follicles should not, by itself, be used to determine whether a colposcopy is adequate, because the actual visibility of the SCJ remains the defining criterion during colposcopy. This proposed sonographic approach is primarily applicable to women with a non-atrophic cervix. In postmenopausal women, age-related cervical atrophy and migration of the SCJ into the endocervical canal may alter the sonographic appearance and limit the applicability of Nabothian follicles as a marker of transformation-zone extent. Therefore, this proposed association requires prospective validation, particularly with correlation between pre-colposcopy ultrasound findings and the subsequently documented colposcopic type and SCJ visibility.

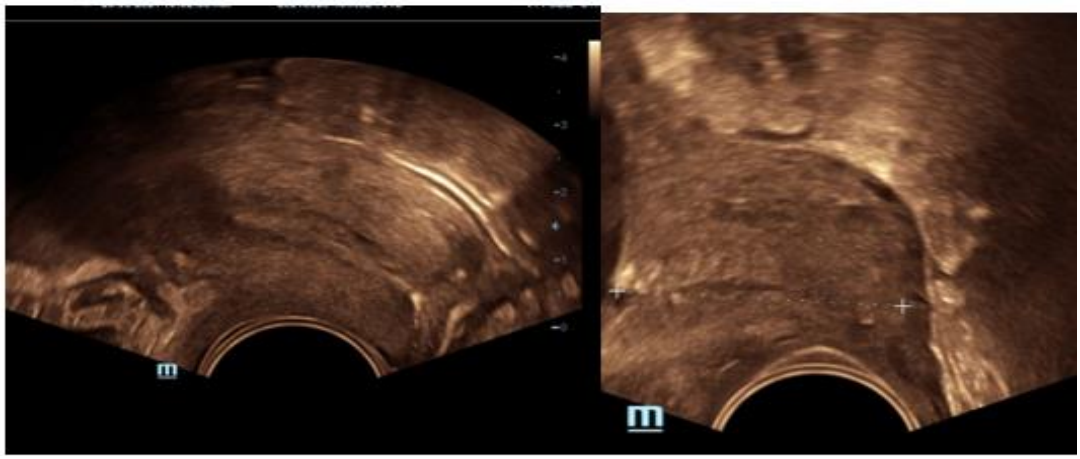

Figure 1: Transvaginal ultrasound demonstrates a normal cervix with a well-defined cervical canal, junctional zone, and characteristic arbor vitae appearance. Colposcopic examination subsequently confirmed complete visualization of the squamocolumnar junction and was considered satisfactory

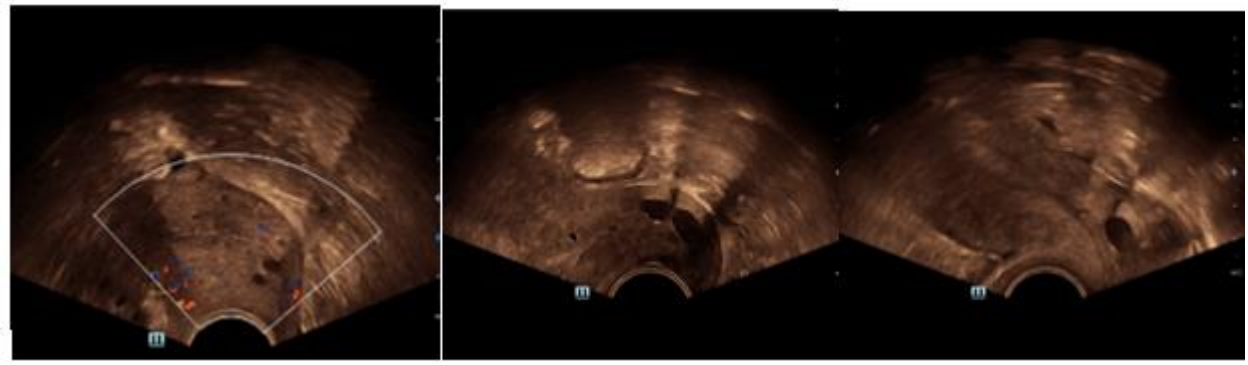

Figure 2: Transvaginal ultrasound demonstrates an abnormal cervix with multiple Nabothian follicles located adjacent to and extending along the cervical canal. Subsequent colposcopic examination was unsatisfactory, with incomplete visualization of the squamocolumnar junction

To our knowledge, the potential relationship between the sonographic distribution of Nabothian follicles and the accessibility of the transformation zone during colposcopy has not been adequately evaluated. We propose this as a simple, non-invasive hypothesis that may help predict the likelihood of a fully visualized transformation zone before colposcopy and potentially assist in selecting patients who may require more careful endocervical assessment [1,2].

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from the patient included in the study.

Authors' Contributions

Elagwany had done the diagnoses and surgery along with writing the article.

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