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Does a diagnosis of Atrophic Vaginitis on a pap smear signify the presence of inflammation?

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Abstract:

Objective: Vaginal atrophy of menopause shows increased parabasal cells on cytology. This may be accompanied by abundant neutrophils. A shift in the maturation index in the absence of significant inflammation is more accurately termed atrophic pattern. The purpose of this study was to determine whether the diagnoses “atrophic vaginitis” or “atrophic pattern” rendered on a pap were reliable indicators of what was present on the slide.

Methods: A retrospective review of pap smear slides from University Hospital, Newark was performed. Cases that had been diagnosed with either “atrophic vaginitis” (n=100) or “atrophic pattern” (n=100) were selected. Exclusion criteria included any additional diagnosis of neoplasia. Slides were re-reviewed and scored based on abundance of neutrophils (0-5, 5-10, or >10 neutrophils/high power (40x) field, with 10 fields per slide reviewed. Data were analyzed by Chi squared analysis.

Results: Among the 200 cases with “atrophic vaginitis” or "atrophic pattern", the proportion of those diagnosed with "atrophic vaginitis" versus "atrophic pattern" increased across three increasing neutrophil categories ( $p < 0.0001$ )

Conclusion: A diagnosis of “atrophic vaginitis” on a pap smear was reliably associated with increased numbers of neutrophils. A diagnosis of “atrophic pattern” was indicative of low numbers of neutrophils. As the pap diagnosis of atrophic vaginitis does not correlate with clinical symptomatology, a single diagnostic term that does not suggest a disease process would more reliably communicate the cytology findings to clinicians.

Key words: Atrophic vaginitis, neutrophils, Papanicolaou test

**Introduction:**

The loss of estrogen in menopause leads to vaginal changes that manifest on a pap smear, with a shift in the maturation index to more parabasal cells. The vaginal mucosa becomes thinner, there is a decrease in lactobacilli, and an increase in pH, with a shift in the vaginal flora, some potentially pathogenic (1). There may be accompanying inflammation as well. Laboratories may separate a diagnosis of atrophy from atrophy with inflammation (atrophic vaginitis). The term “Atrophic Vaginitis” may be used interchangeably with the diagnosis of “Atrophic pattern” in the cytology laboratory, and not convey what is present on the slide. Atrophic vaginitis rendered on a pap smear does not correlate with patient symptomatology (2). This study was performed to investigate whether a cytology diagnosis of “Atrophic Vaginitis” is a reliable indicator of histologic inflammation.

## Methods:

A retrospective review of results from pap smears read between 6/13/13 and 3/17/14 in the Department of Pathology & Laboratory Medicine of University Hospital, Newark was performed. The first cases that had been diagnosed as either “atrophic vaginitis” (n=100) or “atrophic pattern” (n=100) were included. Pap smears from patients with any additional diagnosis of neoplasia were excluded. Pap Smear slides were re-reviewed and scored based on the abundance of neutrophils, categorized as either 0-5, 5-10, or >10 neutrophils/high power (40x) field, with 10 fields per slide reviewed. Data were assessed using Chi-square tests for trend to determine associations between the proportion of subjects with a histologic diagnosis of atrophic vaginitis and increasing numbers of neutrophils. All statistical evaluations were performed using InStat software (Graphpad Software Inc, LaJolla, CA). A P value of less than 0.05 was considered significant.

**Results:**

A total of 200 cases, consisting of 100 cases of atrophic vaginitis and 100 cases of atrophic pattern, were scored (Tables 1,2,3). There was a significant linear trend among the three categories of neutrophil abundance (0-5, 5-10, >10 neutrophils/hpf) and the proportion of subjects with the diagnosis of atrophic vaginitis ( $p < 0.0001$ ). Thus, the proportion of subjects in the vaginitis group is significantly increased with increasing numbers of neutrophils. This did not differ regardless of whether the diagnosis was rendered by a cytotechnologist screener alone, or in conjunction with a physician.

## Discussion:

In our study, the term “atrophic vaginitis” on pap was significantly associated with abundant neutrophils. Conversely, an atrophic pattern diagnosis was indicative of low numbers of neutrophils. While the Bethesda System online atlas breaks out the diagnoses of atrophy and atrophy with inflammation (<http://nih.techriver.net>), the diagnosis of atrophic vaginitis on pap smear is not reflective of patient symptomatology (2,3), so it appears to be unnecessary to have multiple terms. In fact, reference slides with a reference diagnosis of atrophic vaginitis from the College of American Pathologists Cervicovaginal Interlaboratory Comparison Program in Gynecologic Cytopathology did not perform well (3). The authors of the study suggest use of a single term, “atrophic pattern” due to the lack of clinical significance of atrophic vaginitis on pap.

Limitations of our study include the retrospective nature of the data. In addition, cases were retrieved from the Pathology Department archives, and clinical information, including menopausal status, was not confirmed. It is likely that our findings are generalizable, because most laboratories evaluating Pap smears utilize the Bethesda System of terminology, and laboratories across the United States participate in the College of American Pathologists Interlaboratory Comparison Program.

Recently, the International Society for the Study of Women’s Sexual Health in concert with The North American Menopause Society convened a consensus group to explore new terminology for the symptomatology of vulvovaginal atrophy, and developed the term Genitourinary Syndrome of Menopause (GSM) to reflect the broader spectrum of organs involved by symptoms, and to facilitate development of future treatment options. The

discussions included consideration of the patient's perspective as well. In discussions, it was found that women did not like the term atrophy, as women in the menopause as a group remain sexually active, and that new terminology was somewhat akin to how the less desirable term "impotence" had been replaced by "erectile dysfunction". As cytology laboratories do not always receive clinical information on menopausal status with submitted pap smears, a corresponding terminology to GSM would not be functional. However, the use of a single term that did not suggest a disease state on a pap smear would convey the appropriate information to the clinician.

#### Conclusion:

In summary, the term "atrophic vaginitis" on a pap smear was associated reliably with abundant neutrophils, while the term "atrophic pattern" was less discriminating in this study. While the rare case of Desquamative Inflammatory Vaginitis (DIV), more common after menopause, is associated with large numbers of neutrophils, that diagnosis will be made clinically, and not on pap smear, and the overwhelming majority of atrophic pap smears with inflammation simply reflect the menopausal state. As the term "atrophic vaginitis" on a pap smear does not correspond to clinical symptomatology, or lead on its own to therapeutic intervention, a single term reflective of the hormonal status would convey the appropriate information to clinicians without implication of a disease state.



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Table 1-Neutrophil abundance on Pap smears

|                                | 0-5<br>neutrophils/high<br>power field | 5-10<br>neutrophils/high<br>power field | >10<br>neutrophils/high<br>power field |
|--------------------------------|--|---|--|
| Atrophic Vaginitis<br>(n=100)* | 11 (15.9)                              | 31 (57.4)                               | 58 (75.3)                              |
| Atrophy (n=100)                | 58 (84.1)                              | 23 (42.6)                               | 19 (24.7)                              |
| Total Number                   | 69                                     | 54                                      | 77                                     |

N= number of cases in the indicated neutrophil category

(%) = percent of cases in the indicated neutrophil category

\*Chi-Squared for trend  $P < 0.0001$

Table 2-Neutrophil abundance, slides read by screener only

|                               | 0-5<br>neutrophils/high<br>power field | 5-10<br>neutrophils/high<br>power field | >10<br>neutrophils/high<br>power field |
|-------------------------------|--|---|--|
| Atrophic Vaginitis<br>(n=35)* | 5 (19.2)                               | 8 (47.1)                                | 22 (81.5)                              |
| Atrophy (n=35)                | 21 (80.8)                              | 9 (52.9)                                | 5 (18.5)                               |
| Total                         | 26                                     | 17                                      | 27                                     |

N= number of cases in the indicated neutrophil category

(%) = percent of cases in the indicated neutrophil category

\*Chi-Squared for trend  $P < 0.0001$

Table 3-Neutrophil abundance, slides read by physician after screener.

|                               | 0-5<br>neutrophils/high<br>power field | 5-10<br>neutrophils/high<br>power field | >10<br>neutrophils/high<br>power field |
|-------------------------------|--|---|--|
| Atrophic Vaginitis<br>(n=65)* | 6 (13.9)                               | 23 (62.2)                               | 36 (72.0)                              |
| Atrophy (n=65)                | 37 (86.1)                              | 14 (37.8)                               | 14 (28.0)                              |
| Total                         | 43                                     | 37                                      | 50                                     |

N= number of cases in the indicated neutrophil category

(%) = percent of cases in the indicated neutrophil category

\*Chi-Squared for trend  $P < 0.0001$