PAPNET-Assisted Re-screening of Cervical Smears - Cost and Accuracy Compared with a 100% Manual Re-screening Strategy

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Source: gynecological cancer screening. It can detect cervical cancer along with vaginal and endometrial malignancies. It has reduced the cancer-associated mortality in cervical cancer, dramatically. But as with any pathological specimen that is evaluated in high volume, there remains a small factor of human error. In this article, a recently Food and Drug Administration-approved automated re-screening device (PAPNET) was compared to manual (human) re-screening.

Materials and Methods

The study was performed at the Armed Forces Institute of Pathology (AFIP) in Washington, DC. The AFIP screens approximately 40,000 pap smears per year from a multitude of armed forces hospitals. After an initial screening by a cytotechnologist or pathologist, a random 10% of the benign specimens are re-screened manually (another human reading). Over 90% of the cases are diagnosed as benign or normal smears. The others are pre-malignant lesions or carcinomas. Over 5,000 cases between 1994 and 1995 diagnosed as within normal limits or benign cellular changes by a cytotechnologist or pathologist were re-reviewed.

Results

5478 pap smears as described above were deemed as normal or benign by initial screening. After using the PAPNET system, 71% were established as negative without further review. The remaining cases were selected for further microscopic review. Of those, 1166 were chosen because no definite endocervical component was seen. This is essential in pap smears, because the junction of the exocervix and endocervix is where most cervical carcinomas arise. After manual review, it was discovered that 22% of the 1166 actually did have endocervical components that were missed by the PAPNET. The remaining 448 were chosen for a variety of reasons including scant squamous component or uninterpretable or atypical cells present on PAPNET display. Only eleven cases that were re-reviewed were deemed to have previously undiagnosed abnormal cells. Five of those 11 cases were classified as atypical squamous cells of undetermined significance and 1 as atypical glandular cells of undetermined significance. No cases of pre-malignant lesions were seen.

It was determined that manual screening was 3 times longer than PAPNET-assisted re-screening. This results in a saving of 2 minutes per case. The cost of PAPNET is $40 per case.

Discussion

As this study has shown, PAPNET-assisted re-screening identified only a few more cases of atypical cellular patterns of
unknown significance than manual re-screening. This probably contributes little to reducing mortality of cervical neoplasms, since the prognosis of such lesions have not been significantly associated with pre-malignancy. Since the cost of PAPNET per patient is much higher than manual re-screening, the very low decrease in false negative rate does not support the use of PAPNET rather than the current mandated standard of random 10% case re-screening. This might require more time, but in the age of cost containment, PAPNET may not be feasible.

We must not lose sight of the most important issue, which is reducing the mortality related to this malignancy. The sensitivity of the Pap smear is approximately 80%, which means a relatively high false negative rate for a screening test. But this is offset by the lengthy pre-clinical phase of this disease, when diagnosis yields a favorable prognosis. Thus, yearly routine Pap smears cannot be stressed enough. The more often Pap smear is performed, the less the chance of missing a pre-malignant or early malignant lesion in its curable phase.