

## Role of cytology in cancer screening (Citiscreeen experience)

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### Abstract

#### Introduction:

Papanicolaou (PAP) smears started the revolution of the cytopathology field. Recently, gynecologists are moving to fluid-based technology, which provides more accurate interpretation and allows for molecular testing for the HPV infection. [1,3]

Besides PAP smears, cytology is successfully used for detection of other malignancies, such as:

- Respiratory/exfoliative cytology (bronchial washing, sputum, bronchoalveolar lavage, and bronchial brushing). Those are used to detect lung cancer.
- Urinary cytology (urine cytology, bladder washing, and brushing cytology). Kits utilizing the Fluorescent in Situ Hybridization (FISH) are already in use [4,7].
- Body cytology (pleural fluid, pericardial fluid, peritoneal fluid, and cerebrospinal fluid (CSF) cytology). Those are mainly used to detect malignancies.
- Gastrointestinal Tract: Sampling the mucosa is a routine procedure during endoscopy.
- Discharge cytology: The most common example is nipple discharge used as a screening for breast cancer.

Detection of premalignant oral lesion improves the survival and the morbidity of patients. Cytological study of oral cells is a technique that is an attractive option for the early diagnosis of oral cancer. [8] Obvious advantages of cytology are fourfold: cheap, quick, safe, and simple.

Advances in cytology research led to the development of more sophisticated techniques which may be summarized as follows: [9]

- Regular smears.
- Cyto centrifuge smears. This method concentrates cells and is advantageous when few cells are present.
- Centrifuge smears using membrane filters. This method utilizes paper filter with small pores to trap contaminating material.
- Monolayer liquid-based cytology. The smears are superior to their conventional ones and also allow testing for viral DNA.

### Diagnostic Pitfalls:

[8] No single cell characteristic is pathognomonic of malignancy. The following are cytological signs of possible premalignant or malignant disease: High cellularity, increased nuclear/cytoplasmic ratio, prominent and large nucleoli, increased mitotic activity, nuclear membrane abnormalities, cellular and nuclear pleomorphism among others. As a rule, cytological assessment, if abnormal requires confirmation via definite histology. Technical problems (inadequate sampling, poor fixation, etc.) make cytological diagnosis challenging at times. Cellular changes (inflammation, necrosis, atypical appearances, etc.) may be due to non-neoplastic conditions (infection, trauma, infarction, hemorrhage, etc.) and require an experienced cytologist.

### Smears in Gynecology:



popular and well recognized screening technique is the PAP smear in cervical cancer prevention. Very few in the medical community, let alone general public, know that pioneering authors (Papanicolaou and Traut) targeted endometrial rather than cervical cancer. [10,11] Since 10-15% of uterine cancers are detected in premenopausal women, we suggested a new screening test based on the endometrial cells' evaluation. The endometrial cells were obtained from the menstrual content of menstrual pads, cups, and intravaginal tampons, [12, 13] Later this technique was expanded to obtaining smear from the content of post-menopausal bleeding. [13] Studies have suggested that endometrial cells on cytology in women over 40 years of age may be correlated with a greater risk of endometrial pathology. [14, 15] In 2001, the Bethesda System for cervical cytology recommended the reporting of endometrial glandular cells identified in the PAP tests of women  $\geq 40$  years of age. [16] These cells may be found in the cervical smear. [17,18] Thin-layer Pap tests have a sensitivity of 88.3% and a specificity of 87.5% for the detection of endometrial carcinoma. [19] The cytological distinctions among normal endometrial cells and adenocarcinoma are well established: enlarged nuclei and presence of nucleoli in abnormal endometrial cells, variation of nuclear size, coarse chromatin, and irregular nuclear membrane. [19] In the absence of abnormal cells, the presence of normal endometrial cells did not increase the risk of endometrial malignancy. Adding the results of the PAP smear to endometrial thickness could detect incidental endometrial cancers that are missed by transvaginal sonography. [20] Citiscreen incorporates a number of smears (urine, cervical, dental, etc.) into its screening protocols. [21] Further advances in cytology will allow for more accurate utilization of these safe and reliable technologies into cancer screening algorithms. [22]

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