





Application of Cytology in Cancer Screening

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Outlines

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Background

 Cancer burden is raising rapidly despite of few resources in LMICs

Stresses already weak healthcare system and poses unique challenges.

• In LMICs most patients must pay out of pocket for diagnostic tests, not feasible for many.

Background cont...

- Pathology services are often not readily available and expensive
- Precise ancillary diagnostic methods, (IHC and molecular) are rarely available
- Thus, many patients are misdiagnosed and treated inappropriately.
- This further adds to the cancer burden in LMICs.

What is Cytology?

- Cytology is examination of a single cell type often found in fluid biological specimens.
- It's mainly used to diagnose or screen for cancer.
- The cells can be obtained through various methods:

i. Scraping or brushing the tissue surface, such as during a Pap smear

- *ii. Collecting body fluids, such for urine or ascetic fluid*
- *iii.* FNA- drawing cells through a fine needle *i.e* breast lump, thyroid, etc



Role and strength of cytology in cancer care

- Effective cancer screening technique and procedures need to be: reliable, available, affordable, cost-effective, simple and acceptable.
- Cytology is simple, accurate, standardized, low-tech procedure, largely fulfils these criteria
- Causes minimal discomfort and enables collection of sufficient material for diagnostic purposes
- Neither time-consuming nor complicated
- Has potential to be effective tool to provide early cancer detection in LMICs

Role of cytology cont...

- Cytology is becoming increasingly important in cancer diagnosis.
- Mass screening of high risk groups has been done for various cancers such cervix, lung, urinary bladder, stomach, colon, oral cavity etc.
- Can be applied with or without USS guidance.
- Can often provide a definitive diagnosis, supported in the clinical context with imaging and ancillary studies.
- Reasonably high sensitivity and specificity, has the potential for automation.

Pap smear and cervical cancer

- Conventional Pap smear is validated and proven useful screening tool
- Is the most prevalent tool for the prevention of cervical cancer
- In LMICs major challenges related to inadequate infrastructure and trained manpower.
- Other barriers include the financial cost and a lack of political commitment.

Bronchogenic Carcinoma

- Sputum cytology can yield good diagnostic results
- The success of sputum cytology depends obtaining a suitable specimen.
- But sputum specimens are usually inadequate containing saliva, tobacco juice, etc.
- Despite this limitation, it helps in diagnosing lung cancer earlier since most patients present in the late stages

Urinary bladder cancer

- Cancer cells can be found in urine of patients with bladder carcinoma.
- However, the value of urinary cytology as a screening procedure has been questioned.
- Distinguishing prostate or renal cell carcinoma may can be challenging
- Seems a worthwhile in high risk population, and patients with hematuria.
- A complement to cystoscopy (less unpleasant for the patient)

Gastric cancer

- If properly performed, examinations of the gastric contents can be used to diagnose gastric cancer up to 90 % of the cases
- The major problem in gastric cytology has been in obtaining diagnosible specimens.
- The success or failure of the procedure depends almost entirely on the details paid to the technique of collection.

Esophageal cancer

- Brush cytology is an effective diagnostic screening method in LMICs. It's highly sensitive and specific.
- The best alternative to Endoscopy which is not feasible for mass screening
- Sponge cytology of the esophagus may also be used for surveillance
- Again, the methods of collection vary and the problem is to obtain well preserved cells for cytologic diagnosis.

Cytologic Examination for Colorectal Cancer

- Brush cytology can be as accurate as colonoscopic biopsy for the diagnosis of CRC.
- Obtaining a satisfactory specimen for cytologic examination is especially difficult.
- However, the procedure is still less expensive than a diagnostic laparotomy and colonoscopy and cytology permits one to make a definitive diagnosis

Oral carcinoma

- Oral cancer cytology is simple, non-invasive, relatively painless, and tolerated well by the patients.
- Since the oral cavity is so accessible to examination, there has been little interest in utilizing cytodiagnosis for this area.
- Numerous reports indicate that oral cytology is very accurate.

Breast cancer

- FNAC has a long and successful history in the workup of breast lesions including BC.
- It is inexpensive, accurate, and minimally invasive, as well as a powerful tool in the assessment of these lesions with a high degree of accuracy.
- In HICs, mammography is used for routine diagnostics and screening programs along with CNB.

Soft tissue and bone tumors

- FNAC provides valuable information to the clinician for the diagnosis of soft tissue and bone lesions.
- To avoid time-consuming and costly investigations, FNAC can be used as the initial diagnostic method
- Triage cases for more expensive radiologic examinations, laboratory tests, and surgical biopsies that are frequently not available or expensive options in LMICs.

Cytology for Other Areas

• CSF cytology has also role in high risk population

Barriers to Effective Use of Cytology in LMICs

- Shortage of well-trained cytologists and cytotechnologists
- Low health literacy
- Cancer stigma
- Lack of awareness among clinicians regarding the potential uses of cytology because these services have not been generally available.
- Insufficient numbers of pathologists interested in cytology
- Financial barriers,
- Sociocultural barriers

Conclusion & Take Home Message

• Cytology is useful screening/diagnostic tool in cancer control

• Simple, fast, low-tech, acceptable, feasible and cost effective.

• Has an important role in early cancer detection on a mass screening basis.

 To maximize its potential, awareness of its strength/limitation is essential

Take home message cont...

 If used appropriately, can be integrated into national cancer control programs so as to reduce stating at diagnosis; thus improve outcomes.

 Investment in training, research, and implementation at the regional hospital levels can alleviate the cancer burden to a great extent.

Thank you for your attention





