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Cervical Cytology in Zambia

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SUMMARY

The problem of cervical cancer in Zambia is discussed. The pathogenesis of carcinoma of the cervix is described and the benefits of cervical cytology are highlighted. The role of cervical cytology in the context of a developing country is also discussed and a plea is made for a selective mass screening programme, the objective of which will be to limit and prevent cancer of the cervix. The establishment of a Central Cytology Laboratory at the University Teaching Hospital is described in some detail. This service could be extended in stages until it is possible to screen all

women over the age of 20 years, at least every 3 years.

INTRODUCTION

Cancer of the cervix was the commonest type of female cancer reported over the five year period 1968-1972 in the Southern Cancer Registry of Zambia. Similar results are reported by workers in East Africa (Kisia and burkit 1968; Linsell 1969). Hutt and Wright (1967) reported that in Uganda, the cervix was the site in 11% of all registered cases of cancer. The majority of patients come to hospital late, when they are nearly untreatable. Lewis (1964) calculated that one of every 100 women would die of the disease. Yet by reason of its accessability, cervical cancer is one of the most easily diagnosed malignancies (Feroze 1972). Clinically obvious cervical cancer may be diagnosed by naked eye examination followed by histological confirmation. However, in precancerous lesions and some early cancer cases the cervical epithelim can appear normal. Diagnosis in the absence of symptoms can be made by cervical cytology.

Histological Background

Exfoliative cytology is not new. Walshe (1851) observed fragments of malignant tissue in sputum. Dugeon and Patrick (1927) examined tissue scrapings for malignant cells. In 1928 Papanicolau used an aspiration technique for diagnosing cancer of the female genital tract. His monograph was published in conjunctions with Traut in 1943 and was entitled "The Diagnosis of Uterine Cancer by Vaginal Smear". This discovery opened the way for further research into the early detection of cervical cancer. Ayre (1947) developed the cervical scrape technique as distinct from Papanicolau's original aspiration method. The taking of cells from the squamo-columnar junction by Ayre's spatula technique is superior in the detection of cervical lesions to aspirations of the vaginal pool (Mclaren et al, 1961). Fidler et al (1968) demonstrated that the routine use of cervical cytology in a given population will eventually lower the incidence of invasive carcinoma in that population.

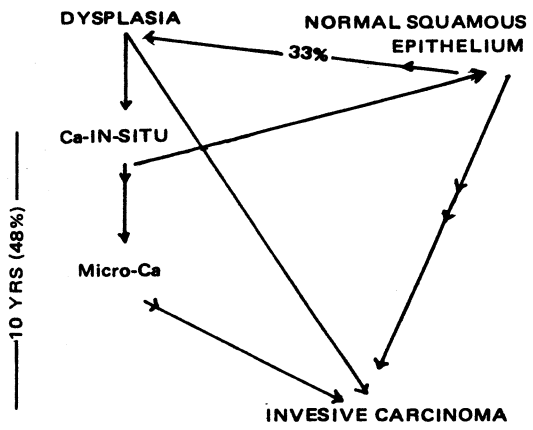
Pathogenisis of Carcinoma of the Cervix

There is broad general agreement with the hypothesis that invasive carcinoma may be a sequelae to dysplasia (Figure 1). On average the earlier lesions in the sequence should occur in younger patients. In the Caucasian population, patients with dysplsia are usually in the age group 35–38, those with carcinoma in-situ 37–43, microcarcinoma 41–46 years, and with invasive carcinoma 48–51 years (Langley and Crompton, 1973). In developing countries and in particular in the African population carcinoma of the cervix develops in much younger age groups. In Ugandan Africans, dysplasia and carcinoma-in-situ reach peak frequency at about 30 years of age and the mean age of invasive cancer is 42 years (Trussell et al, 1968).

Premalignant lesions may progress to frank carcinomatous change in 10 years (Kashgarian and Dunn, 1970) and some may take up to 20 years (Boyes et al, 1962). Fidler et al, (1968) stated that 48% of precancerous lesions progress to invasive cancer. The

FIG. I

PATHOGENESIS OF CARCINOMA CERVIX



other cases regress to normality. Stern (1969) stresses that among women who showed regression to normality there was a recurrence of dysplasia in approximately 33%, indicating the need for continued surveillance.

Alternative lines of evolution are possible. Ahsley (1966) argues that there are two different forms of cervical cancer, a slowly growing type, susceptible in therapy, which may be preceded by carcinoma-in-situ; and a more rapidly growing type which occurs later in life and is not preceded by carcinoma-in-situ. Not only may carcinoma develop directly from normal squamous epithelium (Pattern 1969) but it may also develop from dysplastic epithelium without passing through the morphological phase of carcinoma-in-situ.

Role of cervical cytology in Zambia

There is convincing evidence that cervical cytology can detect lesions of the cervix that are not clinically evident. These lesions are either premalignant or early invasive carcinoma. Dysplastic lesions or carcinoma-in-situe can be treated conservatively and successfully in young patients. Moreover early lesions of carcinoma cervix respond well to conventional therapy the 5 year survival of Stage 1 cases following radiotherapy or radical surgery being over 80% (Lewis, 1964).

Cervical cytology would seem to be particularly of value in Zambia where carcinoma of the cervix is the commonest female malignancy reported and the disease is detected at a late stage. At present radiotherapy is not available in Zambia. Although its advent will improve the available palliation, it will take

a long time before its contribution can match the results of an extended programme of exfoliative cytology screening. The cure rate of advanced carcinoma cervix by radiotherapy is poor.

Stage 3 and 4 lesions are attended by 5 year survival rates of 18–37% and 0–14% respectively, following treatment (Kottmeier 1963).

A mass screening programme of the female population may limit or prevent cancer of the cervix successfully. However such a programme is often considered to be costly not only financially, but in time and manpower as well. Can Zambia afford this at the present time? Is carcinoma of the cervix on the list of health priorities in Zambia? The answer to the second question is easier. Evidence has been presented that carcinoma of the cervix is the commonest type of malignancy encountered in the population, and it is prevalent in younger age groups than those reported for western countries. The disease is often detected in its late stages when it is inoperable and moreover radiotherapy is not available. Consequently carcinoma of the cervix should be a health priority in Zambia.

The cost of mass screening should not be excessive if the programme is carried out selectively and by degrees. This could best be achieved in the first place by taking smears only from patients attending gynaecological, antenatal and family planning clinics, as these comprise the section of the population particularly at risk. These sources in the University Teaching Hospital place at our disposal at least 12,500 patients annually. The service could then be extended as funds and manpower become available.

Whom to Screen

A selective screening system is possible and advantageous. In western countries, it was suggested that all women 25 years old and above should be screened with one PAP smear being taken every three year (Edit. 1976). In view of the prevalence of premalignant and malignant lesion of the cervix in younger age groups in the African population, screening should probably include women from the age of 20 years.

In the Central Province, the total population in 1976 was 1,004,000 of which 516,000 were female. Fifty six percent of the female population are under the age of 20, and therefore a screening programme will have to cater for 225,000 women. But if a smear is taken every 3 years, the total number of smears which have to be examined by the Central Laboratory every year will be in the region of 75,000 smears. In a year of 260 working days this will mean 290 slides per day. Assuming that a cyto-screener only spends 4 hours on microscopical work in his working day, he/she will be able to examine about 36 slides per day. Therefore, 8 trained cyto-screeners will be needed in order to cope with the work load of such a selective screening programme.

Organization of a Central Laboratory

A Central Cytology Laboratory was established in the Department of Obstetrics and Gynaecology at the University Teaching Hospital, in 1974 (Figure 2). It was financed jointly by the Ministry of Health, the University of Zambia and the World Health Organization. It is presently staffed by a cytologist, a chief technician, a technician and two cyto-screeners. The demand on the laboratory has been progressively increasing and to facilitate the work load an automatic staining machine (Shannon Elliot Varstan 23 – Figure 3) was installed. The latter is capable of staining 48 slides per hour and will therefore be able to meet the demand of preparing 290 slides per day, when the programme is extended to a mass screening level. However, before this stage can be reached, it is essential to increase the number of screeners to eight.

So far it has only been possible to screen patients attending the gynaecological, postnatal and family planning clinics. All the smears examined so far have been analysed and the results are reported in another paper.

It is only possible here to highlight some of the important aspects of cytology screening.

(i) Technique of taking smears:- Cervical scraping has been found to be the most satisfactory method. This can be done with an ordinary wooden throat spatula, although an Ayre's spatula, is better, but costlier. The smear should be obtained before a digital examination is performed. The use of lubricants for the introduction of a vaginal speculum to expose the cervix is condemned. The spatula is rotated through 360 degrees within the Cervix and the material so obtained is transferred immediately to a clean glass slide and spread uniformly with the spatula. Before it has had time to dry, the slide, previously labelled with the patient's number inscribed with a diamond pencil, is placed in a mixture of equal parts of ether and 95% alcohol. Fixation should continue for half-an hour. The slide can be dispatched to the laboratory in the mixture (the practice in use at the U.T.H. at present) but in the event of the slides being referred from outside the hospital, they should be taken out of the mixture and allowed to dry before despatch to the Central Laboratory. Another method for taking smears which is gaining popularity for the purpose of mass screening is the vaginal irrigation pipette Davis (1962), which can be used by the patient herself. Every slide must be accompanied by a completed request form, giving information regarding the patient and other clinical data.

(ii) Preparation of slides:- On receipt by the laboratory, the slides are matched with their forms and are then stained by a modification of the Papanicolau

FIG. II

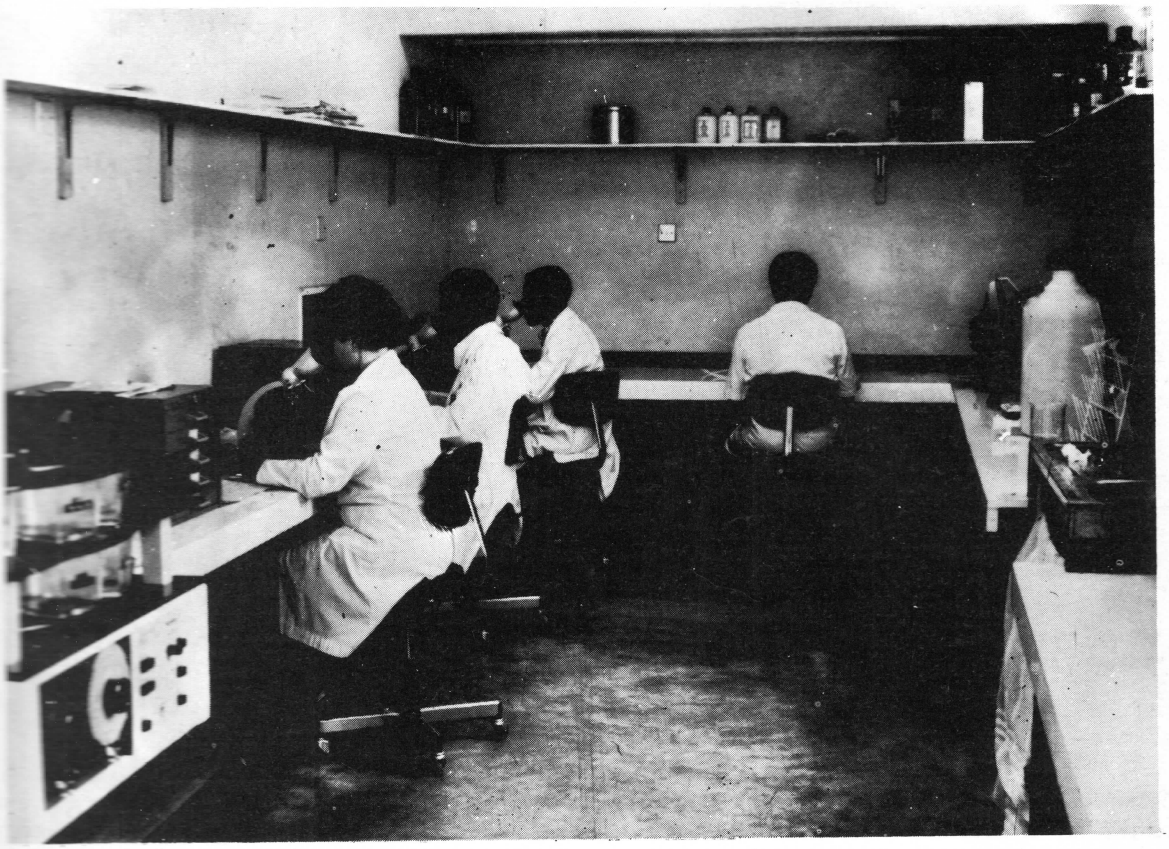
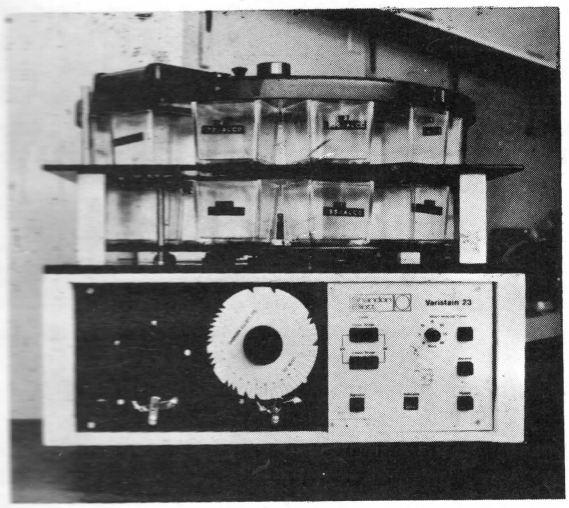


FIG. III

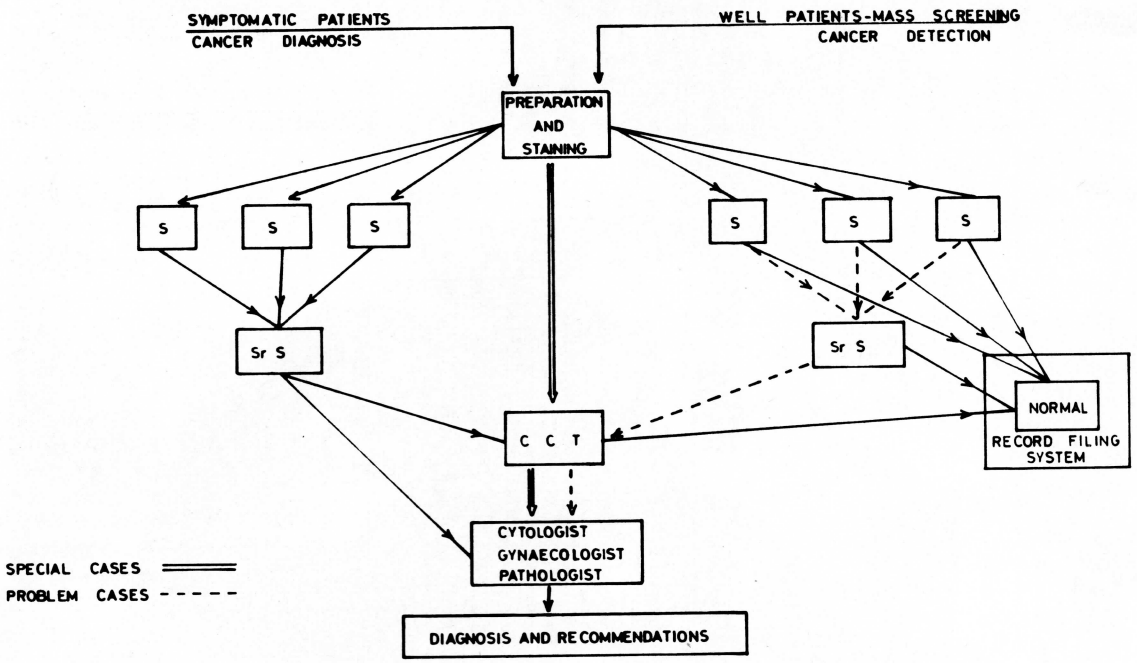


method using additional fast green. This can be done manually, which is laborious or by an automatic staining machine.

(iii) Technical personnel:- Slides are examined by screeners. For a programme of mass screening as envisaged in Lusaka a total of 8 cytoscreeners will be essential. Figure 4 demonstrates the system of screening that could be used in the central laboratory (Koss 1968). The staff should be composed of three levels of technical expertise. The cytoscreeners may be relatively junior laboratory workers who have received 6—12 months of special training. The level of education for this cadre of staff need not be more than Form III or IV. It is preferable if they have a knowledge of histology and are able to use a microscope before training, but not absolutely essential. They can be appointed at a Laboratory Assistant level. After 6 months training, these workers can be used for examining slides from well patients. After completing their full training they will be experienced enough to examine slides from high risk patients without supervision. In recruiting staff for training as cytotechnicians, one must realise that the more responsible positions of Senior screeners (technicians/Senior technicians) and Chief Cyto-technologist have to be filled eventually from candidates undergoing in-service training. Therefore candidates identified for these positions should have attained a higher level of education i.e. 'O' level standard, which will make them eligible for a training course in laboratory technology.

FIG. IV

ORGANIZATION OF A CENTRAL CYTOLOGY LABORATORY



It is important that the training programme provides incentive for promotion. It is equally important to ensure reliability in identifying suspicious smears. When a slide is suspected of being abnormal it should be passed to the more senior cytotechnicians. If the abnormality is confirmed, it is then considered at a specially arranged weekly joint meeting between the Chief cytotechnician, cytologist/gynaecologist and a pathologist, when a final report is decided on and recommendations for further action made.

(iv) Training:- For the continued availability of cyto-screeners a training programme is an essential component of the organization of the Central Laboratory. For junior screeners this should be in the form of an apprenticeship. Screening may occupy four hours each day, and the rest of the working period may be spent in staining, classifying and filing results. For senior screeners further training is called for and a formal laboratory technology course is essential. It will be necessary for the senior screeners to be proficient in the preparation of biopsy material for histological examination.

(v) Record system:- An efficient record system is important. The system adopted in UTH is that every slide which reaches the laboratory is registered in a book and ascribed a number. The details entered are date, patient's name, age, parity and source of referral. The report is entered when the screening process has been completed. Reports are typed, checked and signed by the chief technician or cytologist. One copy of the report is sent to the source of referral and the other filed for easy reference. Likewise all slides are filed after they have been classified. Slides for normal smears are disposed of after they have been reviewed for possible errors. When the mass screening stage of the programme has been reached a computerised system of recording would be more economical and beneficial for evaluation purposes. Periodic analysis of results are essential to identify the pick up rate of abnormal smears.

CONCLUSIONS

In view of the high prevalence rate of carcinoma of the cervix in the Zambian population, the authors believe that cervical cytology does have a significant part to play in the attack on female cancer in this country. A case could be made for at least equal priority to be given to cytology as to radio-therapy and ideally the two should be introduced at the same time to a country that lacks either. The Central Cytology Laboratory in the department of Obstetrics and Gynaecology at the University Teaching Hospital was established with this objective in mind. The first phase of the programme would be reached when all patients attending the obstetric, gynaecological and family planning clinics can be screened. The service could then be extended on a selective mass screening basis as the demand and opportunity arose. The scope