

Controlling cervical cancer in the developing world

A report on an IAEA/WHO project to help fight the disease

by Mohamed Nofal

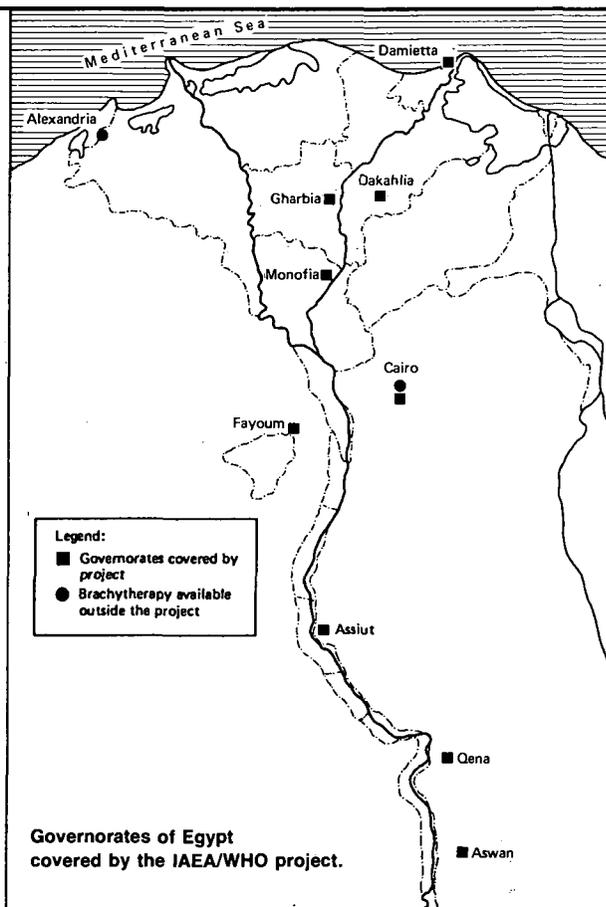
Carcinoma of the uterine cervix (the neck of the uterus) is the second most common malignancy of the female reproductive system. Women between the ages of 40 and 55 are most commonly affected, and the incidence is higher among women from lower socio-economic groups. Trauma associated with viral and bacterial infection probably is related to the malignant process in the cervix.

It usually takes 5 to 10 years for the carcinoma to invade the tissues, after which death usually occurs in 3 to 5 years in untreated patients. The disease remains localized, without distant metastases for a long time, and its spread is by infiltration and local lymphatics. In addition, being a common tumour, much clinical experience concerning its natural history and response to treatment is available.

Detecting the disease

Early cervical malignancy can be detected preclinically by cytologic examination of cervical smears obtained during annual pelvic examinations, since it is asymptomatic at this stage.* The "Pap" test can detect 90% of early cervical malignancy and its use has reduced death rates from cervical cancer by more than 50% through recognition and treatment of the pre-invasive stage. The Imperial Cancer Research Fund has reported that "with the exception of stopping the population from smoking, cervical cytological screening offers the only major proved public health measure for significantly reducing the burden of cancer today".

It was further reported that cervical cancer could be eliminated as a cause of death if all women had an annual "Pap" test. Unfortunately, very few in developing countries do so. Moreover, in these countries few hospitals have the proper facilities for treatment. Even when



treatment is administered, in many cases it begins too late and can only control the course of the disease with less prospect of real cure. Thus, the mortality rate in these countries remains high.

The "Pap" test usually is suggestive or positive. However, if the smear is negative but cancer still is suspected, biopsy then is required. Biopsy confirmation of even a positive cytology examination always is advisable before definitive treatment is given.

The basis for estimating the prognosis and planning therapy is clinical staging of cervical carcinoma by clinical examination. In addition, cytoscopy and sigmoidoscopy (with biopsies as needed in each), metastatic survey, intravenous pyelography, and chest X-rays always are done.*

Under these conditions, cancer education is very important. Before seeking medical advice, women should recognize that cancer of the cervix is a life-threatening disease and that many women are susceptible to it. They must realize that prevention of serious consequences can be achieved only by early detection and treatment.

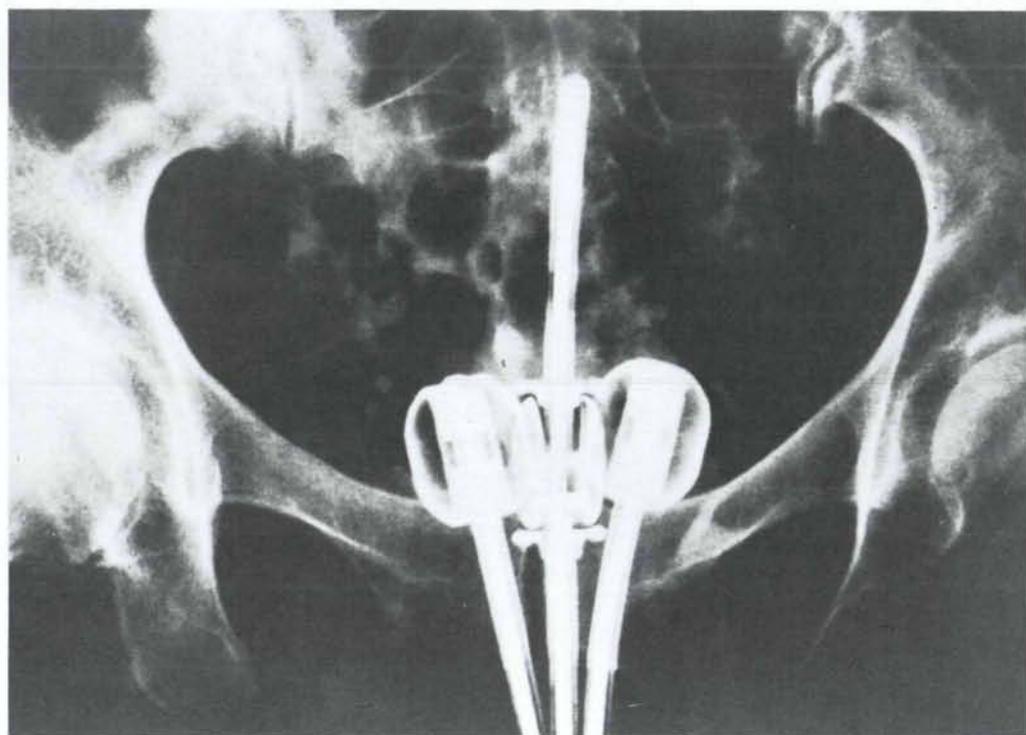
Control and treatment

The causes of cervical cancer still are unknown. However, the incidence can be reduced by certain measures, such as improved personal hygiene and avoidance

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* Cytology is a branch of biology dealing with the structure, function, multiplication, pathology, and life history of cells.

* Sigmoidoscopy refers to a technique for examining the large intestine; pyelography is an X-ray examination of the urinary tract.



Radiograph showing an intracavitary plastic applicator in position for treating cancer of the cervix. The applicator has been loaded with three caesium-137 radioisotope sources through the guide tubes visible at the bottom.
(Credit: Royal Free Hospital, London)

of sexual contact at an early age, frequent cancer cytoscreening of women (especially those who have had multiple pregnancies in deprived circumstances), as well as prompt removal of suspect cervical lesions.

In the major clinics of the developed world, the overall 5-year arrest rate of carcinoma of the cervix is about 45%. Percentage arrest rates are inversely proportional to the stage of the cancer, ranging from 90% in the pre-clinical stage to about 5% in the advanced stage.

Localized pre-invasive disease (carcinoma *in situ*) may be successfully treated surgically with diligent follow-up. Radiation therapy may be used alternatively, especially in poor operative risk patients. In the invasive type, the usual line of treatment is surgery and radiotherapy, either alone or together; the survival rates are nearly identical. Chemotherapy also has been tried, but it was found to provide only temporary pain relief in most cases; only 25% to 30% of the tumours show objective regression.

In radiotherapy, the usual method consists of intracavitary radiation treatment to be followed by external radiation therapy. The objectives of irradiation are destruction of primary and secondary carcinoma within the pelvis and preservation of tissues that have not been invaded. However, it has been found that in the early stage, optimal results can be achieved with intracavitary radiation therapy alone.

Role of the IAEA

The International Working Party for the Treatment of Cancer of the Uterus in the Developing World — founded in 1972 and sponsored by the IAEA and World

Health Organization (WHO) — always has encouraged earlier diagnosis and early treatment of this disease using intracavitary techniques and radium substitutes. It was hoped that knowledge of the disease, its management by surgery and radiotherapy, and of the technology involved in its treatment could be transferred from central regional university hospitals to peripheral hospitals.

Thus, in 1983 a project was suggested by the IAEA and WHO for implementation in Egypt. This was accepted by the Government of Egypt and received support from the Government of Italy with a generous fund that would make possible its promotion for a period of 4 years. In addition to expanding application of cytological examinations for early detection of the disease, the project aimed to disseminate brachytherapy (or treatment at close range) by using intracavitary techniques with caesium-137 radiation sources in areas where radiotherapy services were rather inadequate.

The treatment plan's essential features are that it:

- Involves relatively inexpensive equipment
- Is relatively simple to use and requires training of personnel for a relatively short time
- Is easy to introduce in remote, small, rural hospitals with no available facilities for teletherapy
- Should be such as to be eventually applied, where radiotherapists and physicists are not available, by teams of radiologists and gynecologists.

A technical advisory committee was set up that includes members of the IAEA, WHO, Egypt, and four eminent highly experienced radiotherapists and physicists. Committee members communicate by correspondence and meet in Cairo every year to discuss the different scientific aspects of the project.

Project in Egypt

Egypt has proved very suitable for the development of the project, which it is hoped can be extended to other developing countries later. Additionally the country, although classed as "developing", has a very high standard of health care and expertise at its university and large regional hospitals. Yet it shares the overall problems of a growing population and, consequently, an enormous number of patients and a relative scarcity of staff and equipment.

The relative frequency of carcinoma of the cervix in Egypt has been reported to be about 10.8%, representing the third site of malignancy in females.

Training courses

In the Egyptian project, transfer of information and technology is effected by annual training courses at Cairo University Hospital (NEMROCK) for teams consisting of a gynecologist, radiotherapist, and physicist from hospitals participating in the project. Following completion of this course, applicators and sealed caesium-137 sources are supplied to these hospitals by the IAEA. Teams from peripheral district hospitals, where staff and work are restricted, may not include a physicist or a radiotherapist. In these cases, a part-time radiologist replaces the radiotherapist.

For the "teams" of specialists selected, a training course, extending to three weeks, is planned every year. During the course, participants attend lectures as well as clinical and dosimetry practical demonstrations. Each trainee attends the treatment of all cases and participates in at least two brachytherapy insertions. Special practical training in cytology and pathology is given to the clinicians.

The course covers the topics of epidemiology of cancer of the cervix, anatomy, pathology, radiation biology, surgical procedures, brachytherapy, radiation protection, instrumentation, cancer statistics, physics, dose calculation and computation, treatment planning, cytological examination, and surveying of cases as well as case presentation seminars. Refresher courses for trainees who attended previous courses also are planned.

Three training courses have been held so far in Cairo and 75 trainees from about 20 hospitals in nine governorates of Egypt attended (see accompanying map). This number included some specialists from other African countries — Kenya, Sudan, and Tanzania — thus giving the project a rather regional scope.

Treatment plan

The Amersham Manchester "afterloading" technique was chosen as a simple system included in the training of many radiotherapists. It is one in which much clinical experience has been gained over the years. The technique involves the insertion of caesium-137 sources (usually three) at the top of the vagina and in the uterus itself, through plastic applicators. Before the sources are



The faculty and participants of a training course held in Cairo in November 1985.

inserted, the patient is X-rayed to check that the applicators are in the right position. Then the radioactive sources are passed, through guide tubes, into the applicators. Treatment takes about three weeks and usually is given in two courses of about three days. With this method, the exposure of medical staff can be reduced to an insignificant level.

The "standard" patient suitable for intracavitary treatment by newly trained physicians in hospitals starting this treatment must be in the early stages of the disease (stage one or early stage two), which offer a good chance of cure with the "standardized" treatment. Cases outside this group (where the disease is more advanced) should not be treated at a peripheral hospital, but rather referred to the well-qualified, experienced team at NEMROCK where full dosimetry, teletherapy, and fractionated treatment are available. Moreover, advanced surgical procedures, if required, can be offered at NEMROCK.

It is believed that this system will make possible the cure of early cases at hospitals near the patient's home, will encourage the referral of more early cases, will avoid the discouragement of patients and staff at the developing peripheral services, and will offer the best possible treatment for advanced cases.

Screening programmes

The entire programme is associated with an attempt to improve early diagnosis of carcinoma of the cervix with a view especially to bringing patients for treatment at an early and, therefore, curable stage. This must be associated with an increase in the national cytological service, which requires education of the general public as well as the medical and allied professions, and an increase in the diagnostic and screening programmes.

An outline was drawn up for a cytological screening programme to patients attending gynecological outpatient clinics of "associated" general hospitals. As outlined, the cytological laboratories of this hospital group apply the tests for detection of early cervix cancer to this large pool of patients and the test results are passed to NEMROCK for recording and analysis.

Taken into consideration are the three basic requirements for an effective screening programme — administrative will, clerical and organizational support, and a system for inviting women to come for smears. There is evidence from developing countries that, if approached in the right way, more than 90% of the women will respond to the invitation to have a smear.

Taking a cervical smear is a simple procedure: A sample of cells is removed from the cervix, usually with a wooden spatula. The cells are then spread on a slide, stained, and examined under a microscope — abnormal cells have larger nuclei that take up the stain more strongly.

Future needs

It is anticipated that this project will result in a permanent establishment of effective early detection and brachytherapy services in many general hospitals throughout Egypt, and that the organization involved

will be of value to other developing countries to which a similar transfer of both knowledge and technology may follow.

Africa can be considered the continent with the smallest number of radiotherapy facilities. In the region of Southeast Asia, the number of people per existing radiotherapy services also is very high, and the same can be said for some countries in South America and the Western Pacific.

This picture stresses the need for expanding the project outside Egypt and to try and find financial support for its wider implementation. In the process of project expansion, further training centres, such as NEMROCK, will have to be established, and NEMROCK's experience will be a most valuable asset.

Further reading

Readers interested in technical and general references for this article may consult:

- *Merk Manual of Diagnosis and Therapy*, published by Merk Sharp and Dohme Research Laboratories (1982).
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