

NOTICIAS Y EVENTOS

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HEALTH. Dr. Raj Menon visited TDJ to explain a new method of screening for cervical cancer

Advances in cancer screening

The automated microscope and camera replace human cytologists with a system that produces rapid and accurate results. While a large investment is needed to install the product, it can be centralized to function as a workstation thus increasing productivity. After 18 years in the making, the system is now ready for purchase.

Lisa Blackmore & Liza Figueiroa-Clark
TDJ Staff Caracas

On a recent visit to Venezuela where he gave a talk at the Universidad Central, Dr. Raj Menon also stopped by at TDJ to explain the development and benefits of an innovative system for pap testing. The process begins conventionally enough with the manual collection of a swab from the entrance to the patient's cervix. The sample is sent to the laboratory where the cells are painted onto a slide. It is here that changes have been made and the sample is checked for abnormalities by a microscope and digital camera, which is able to capture the image in its entirety. Software generated by Dr. Menon produces test results as a percentage derivation from 100% normality. The results are burned onto a CD and can subsequently be sent anywhere in the world.

Research and Development

Dr. Menon's method of checking pap, or smear test results with the use of digital technology represents a significant advance in screening for cervical cancer and has numerous beneficial aspects. The system is the result of 18 years research and project development by Dr. Menon, who is based in Canada.

As far back as 1989, the doctor presented the pap screening project to the Department of Health in London. The meeting provided some valuable criticisms. "From this experience we learned the problems with an analogue camera. Both the microscope and camera have to work with automatic focus and that was not easy."

"There were spaces of the image that were not captured, so we only got 100% of the image when we began using digital cameras, three years ago," he explained. After 15 years of experimenting with other solutions, technology finally provided the answer that made the project viable. "Finally when we got the digital camera it changed the whole thing. We were able to look at all the cells completely," Dr. Menon told TDJ.

Practical Implementation

Apart from the introduction of the camera into the process, in logistical terms the screening method is not hugely different from what is happening now. Where the process varies is in the substitution of human analysts by the digital camera and the software developed by Dr. Menon. Instead of the cytologist checking the abnormal areas of cells identified, the machine does it.

"The machine can do four cytologists' work, so that makes a big difference and it won't get tired," said Dr. Menon, explaining that the process' main benefit is in speeding up analysis and, thus, diagnosis. Channels of communication are facilitated too, which means that a second opinion can be obtained with ease and considerable rapidity.

"The system is much faster than the traditional one. At least 100 reports can be saved onto one CD and you can send it physically or by e-mail as a digital image to a pathologist in Timbuktu!"

"The most important thing to stress is the accuracy," Dr. Menon told TDJ. Human error is one of the old system's problems, and when cytologists get tired under a heavy workload, a margin of error comes into play.

The use of computerized analysis techniques guarantees a level of accuracy which humans simply cannot provide.

Further information regarding the swab is also taken into account by the computer and considered when the outcome is decided.

Additionally, if there is any doubt regarding the results given by the computer, there is always the possibility of going back to the original sample.

Testing Protocol

Discussing the Canadian system of pap testing, Dr. Menon pointed out some setbacks in current methodology. "Our approach to cytology is not correct. There is no organized program for screening and problems are often only recognized because people are tested when they become pregnant."

"In Canada there are 32 million people, and every year 1,450 new cases of cervical cancer emerge. Of those cases 420 of those die and it should not be like that. If you have no screening at all, 5% of the women will get uterine cancer. And with screening, just over 1% of women will get it." The time and the way that the swab is taken, both present a margin of possible error which is hard to control. Dr. Menon explained that the swab must be taken from the full 360° of the entrance to the cervix, but it is not always possible to cover the entire area. Similarly, the patient's menstrual cycle is also crucial.

The optimal moment for screening is before the middle of the cycle, when there is no blood present and chances of obscuring test results are minimized. Many pap tests fail precisely because blood is present on the sample.

Implementation costs

Current costs for setting up the system come to approximately U.S.\$40,000. This price covers the hardware component of a microscope, which has a special motorized element where you can put four slides at a time.

It also includes the auto-focus camera and computer. Dr. Menon assured TDJ that the system is viable for countries with less financial resources as the screening can be centralized via a workstation that keeps costs down, but productivity high. One machine will screen about 80,000 smears a year, so labor costs can be cut by employing a single person to change the trays of samples.

The software is bought separately and its price is negotiable. The technology is available now for purchase and pilot programs are being set up in three European countries to spread the word about the product.

Chief Cytologist at the Universidad Central, Dr. Ayala, is currently being trained to use the technology and Dr. Menon plans to establish a demo system in Venezuela so that other South American countries can access the equipment and test run it for themselves.

"The machine can do four cytologists' work, so that makes a big difference and it won't get tired."

"The storage of results is easy. Now it can be done by computer so the records are conserved."

Facts and Figures at a glance

Matthew Philips | Newsweek

CERVICAL CANCER – INCIDENCE

Without cervical screening – 5% will develop cancer
Opportunistic screening – 1% will develop cancer
For full benefit – Organized regular screening

COMPARATIVE INCIDENCE RATES

(2001) Pan American Organization
North America South America
Incidence rate 7.88 pct. 30.97 pct.
Mortality rate 3.23 pct. 11.97 pct.

CERVICAL CANCER - FACTS

Human Papilloma Virus (HPV)
Many subtypes - Unpredictable outcome
Vaccine - Probably of limited value
Increased incidence with presence of HIV

CERVICAL SMEAR SCREENING

Screening is not a diagnostic test
Identifies higher and lower probabilities of precancerous lesions
These lesions may progress or regress
Regular monitoring in an organized format is the most cost-effective and efficient screening method
Not for detection of invasive cancer

SCREENING LIMITATIONS

Never 100% effective
Low sensitivity is around 51% (30-87%)

Specificity is around 95% (85-100%)

False negative is 10-20%

Fatigue

Inconsistent results

CURRENT METHOD

Manual screening of a conventionally prepared smear

is the most commonly employed method

It is the least expensive, but labour intensive and inaccurate
with error rates over 20%

CYTOPATH™ BENEFITS

Minimizes anxiety and waiting time by reducing turn
around time

The logistical flow of current cytology service is not altered

Eliminates operator fatigue

Provides a quality control program.

AUTOMATED SCREENING

Reproducibility

Reduce fatigue

Reduce turnaround time

Digital images (storage & retrieval)

CYTOPATH™ ADVANTAGES

Attractive long term cost savings

No extra smear preparation

Conforms to international medical standards

Data security

User friendly with minimal training

Digital data records

Comments on findings

PREVENTION IS THE CURE

Preventive medicine is the basis of healthcare Search for precursor lesions of any type of disease is an important facet of preventive medicine Cervical screening is only one small part of preventive medicine, yet if it is well organized, as many as 5% of women could be saved

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