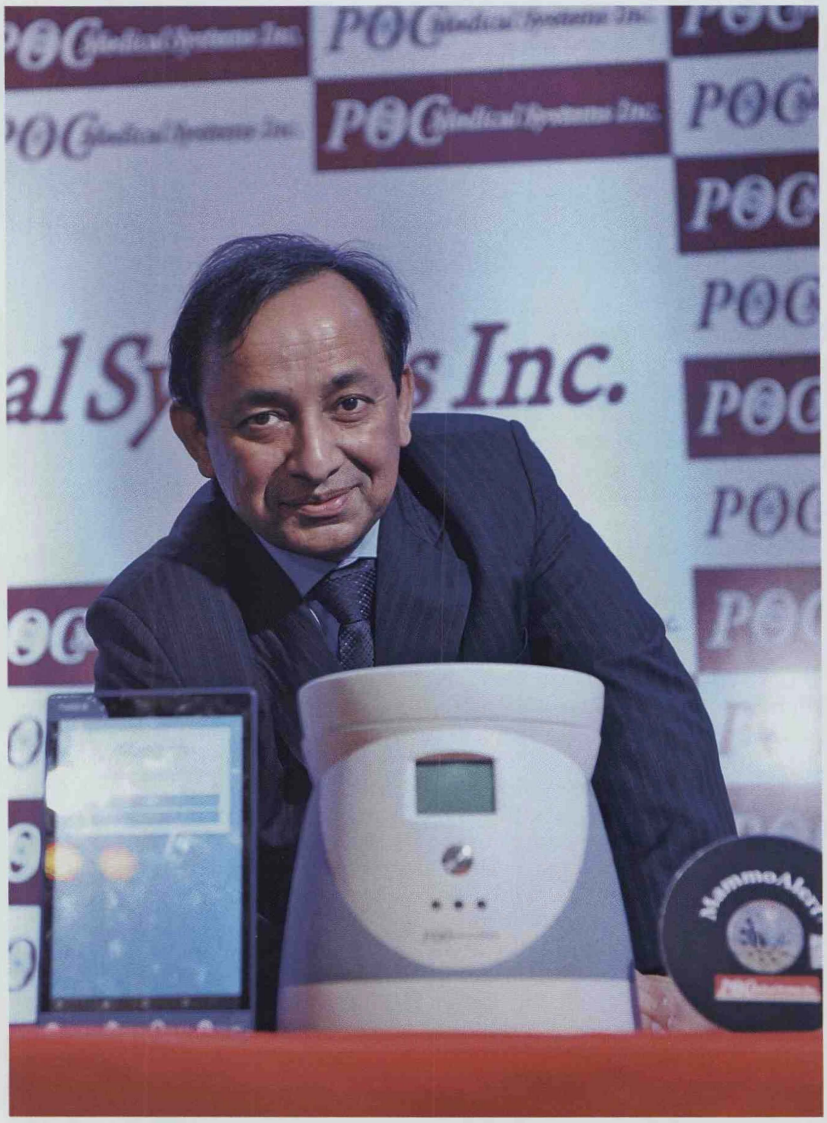

War against cancer

Blood tests offer hope in detecting the dreaded disease

Most discussions about cancer in the Indian media and elsewhere begin with the numbers: 1.7 million new cases diagnosed each year, almost 880,000 deaths in different parts of the country. This also means that slightly under half of all Indians diagnosed with cancer every year, do live beyond five years after the diagnosis. But mere numbers do not convey the real triumph in the multifaceted battle against cancer. The truly remarkable achievement is reflected not just in the growing number of survivors that we see around us in offices, clubs and our own neighbourhoods; but also in the candour with which they accept they have survived a bout of cancer.

But the triumph is far from complete. Far too many people still succumb to cancer, often in the peak of their lives, leaving behind young children and even elderly parents. The main reason for their lives coming to a premature end is invariably that the cancer is often detected when it has already invaded many surrounding tissues, and is therefore that much harder to treat.

The main challenge before physicians responsible for cancer care is to spot the early signs and take pre-emptive action. Symptoms of most forms of cancer often overlap with those of many other diseases. Jaundice, for example, might point at something as benign as a liver infection (hepatitis) or as dangerous as pancreatic cancer (in which less than 20 per cent survive beyond 12 months). Likewise, a persistent cough could be on account of a chronic infection or perhaps lung cancer!

The several types of blood tests that have been developed in recent months and can serve as screening tools for cancer offer hope of rapid gains in the war against cancer. These could be particularly useful for people believed to be facing a higher than normal risk (such as offspring of those who have succumbed to cancer, or those living close to a nuclear power station).

Among the most recent is Mammo Alert, which was developed by the Laurence Livermore National Laboratory in the US and will be marketed in India by POC Medical Systems, an Indo-US company. The blood test measures the levels of a set of four proteins in the test sample to detect very early signs of breast cancer, long before the signs and symptoms of the disease are visible to conventional diagnostic techniques. "These proteins are natural substances already present in the human body, but if they are present in concentrations beyond a certain level, they can be taken to point towards incipient forms of breast cancer," explains Sanjeev Saxena, CEO, POC Medical Systems. This is no different from the way blood tests can reveal the presence of diabetes, or infectious hepatitis or even kidney failure.

Until now doctors depended on a special form of x-ray, known as a mammogram, for the diagnosis of breast cancer. Recent studies have revealed that mammograms have an accuracy of just 75-80 per cent (that is, at least 20 per cent of cases could be missed at the first examination). Besides, the mammography images are often unclear, forcing the doctors to call the patient for a repeat examination, often at great expense as well as inconvenience. The average cost of a mammography in India is t4,000-5,000 per patient, and the necessary equipment is available only in the cities.

By comparison, the Mammo Alert can be conducted at the patient's home with the help of a device known as the Pandora CDx, and the result can be obtained in just about 15 minutes. Besides, the test result can be transmitted through an attached device to a medical specialist, located far away. The Pandora CDx has a sensitivity of 0.97 and specificity of 1 which implies an accuracy of over 95 per cent. This will have a huge social impact enabling thousands of women in India to detect breast cancer in its early stage due to the products efficient, simple, accurate and significant affordability. It is expected to be offered at about one-fifth the price of a standard mammography. "Till now women had to go through the humiliation of exposing themselves to get tested for breast cancer, which was one of the biggest deterrents in India, apart from high cost. With 'Mammo Alert', women can now get screened with the help of a simple blood test," said Amruta Fadnavis, wife of Maharashtra Chief Minister Devendra Fadnavis, at the launch of the new test method in Mumbai recently. This is particularly significant in rural areas, where women are reluctant to expose themselves even to a lady physician.

Maharashtra *Health* Minister Deepak Sawant suggested that his department could use the Pandora CDx for a pilot project in breast cancer screening in rural Maharashtra after the product becomes available in the country in July this year. "In India, as per the current statistics, over 1.5 lakh women are diagnosed with breast cancer and almost *half* i.e. 70,000 deaths are reported every year. A woman succumbs to breast cancer every seven minutes in this country," he said.

Another scientific method is the Oncotrack launched in India by MedGenome, a company focussing on genetics research and diagnosis. This technique, known in scientific parlance as 'liquid biopsy', analyses bits of DNA (the basic genetic raw material of human life) circulating in the blood to detect cancer and other diseases. The screening process identifies specific genetic changes that are linked with melanoma, lung and colon cancers.

Liquid biopsies

Oncotrack enables laboratory scientists to detect gene mutations where a biopsy is difficult to perform or has not been performed properly. This offers oncologists the power to look for actionable alterations in a patient's treatment, management, without having to do an invasive biopsy or where biopsy is not an option. "The management of cancer will undergo a massive transformation in India with liquid biopsies. We are constantly striving to get the most advanced genetic testing technology/technique at affordable prices to the patients and Oncotrack is one such offering," says Sam Santhosh, chairman, MedGenome.

The MedGenome offering is superior to Pandora CDx in some ways because the latter has been tested and validated only in breast cancer, while Oncotrack can be used for screening patients for cancer affecting more than one organ. The POC Medical Systems product could be extended to cancers involving other parts of the body at a later stage, says Saxena, but at present it is limited to breast cancer. Also Mammo Alert has not yet been applied in estimating the progress of breast cancer in a patient after the initial diagnosis, the response to treatment and even the likely duration of survival. This is particularly important in Indian patients of breast cancer, because one third of them suffer from a variety of the disease much more aggressive than observed in western patients.

Researchers at Peter McCallum University in Melbourne, Australia, also announced earlier this month the results of new findings in the field of liquid biopsies. According to Sarah-Jane Dawson, a scientist with the Australian university, liquid biopsies had two obvious advantages over a surgical biopsy: one, it can be repeated as many times as necessary at various stages of the disease (in a particular patient) and two, it can deliver the results in a much shorter time than the traditional biopsy.

While these initiatives are being announced in quick succession, early efforts to develop a screening tool for cancer through blood tests began bearing fruit as far back as 2012. At that time, a team of scientists from SRL, the well-known chain of pathology laboratories, headed by Dr B.R. Das, had come out with a product named Onko-Sure, which was supposed to work on similar lines.

The SRL technique uses the fact that the presence of cancer cells in various organs of the body results in local injury and bleeding, in response to which the natural mechanisms for clotting of blood (inside the affected organs) become overactive. This causes certain biochemical substances, collectively known as Fibrinogen Degradation Products (FDPs), to show up in much higher quantities than normal. The test uses a panel of biochemical reagents to spot the precise tissue where the FDPs are being generated and this gives physicians a powerful hint as to where the cancer is likely to show up. The results of Onko-Sure can then be used to plan a surgical biopsy and form a proper diagnosis of cancer.

Though these are very early findings, the direction in which medical scientists are moving offers hope that the biggest problem in cancer - the disease being diagnosed too late for effective treatment - could soon be a thing of the past. With it, the spectre of cancer being a death sentence could recede into history forever.

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