



# Rajiv Gandhi Cancer Institute and Research Centre

A Unit of Indraprastha Cancer Society  
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Architect's Impression of RGCI & RC (post expansion)



# News Letter

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## EDITORIAL

### RGCI LAUNCHES WORLD-CLASS MOLECULAR LAB



Rajiv Gandhi Cancer Institute & Research Centre (RGCIRC) announced the launch of its state-of-the-art "Centre for Molecular Diagnostics & Cell Biology" on April 15, 2015. It will carry out high-end genetic testing like Tumor Gene Profiling (TGP) and Circulating Tumor Cell (CTC) enumeration. While TGP allows identification of the specific gene which has gone rogue in cancer and helps design targeted therapy. The lab is equipped to carry out Circulating Tumour Cell (CTC) test in patients with breast, colon and prostate cancer. CTC enumeration gives us the ability to predict and forecast the outcome in a particular individual.

As a premier cancer institute in the country, we have always been at the forefront of embracing breakthrough technology and the opening of world-class molecular lab is a step forward in that direction. Now through this high-end genetic testing, our patients shall have the option of getting focused therapies which prolong survival without causing side effects of chemotherapy. RGCIRC is also maintaining a Tumor Tissue Repository (Tumor Bank) where tumor tissue can be preserved and retrieved for research purposes.

The facility will also perform almost all oncology specific "Single Gene Assays" using PCR, RT PCR, gel electrophoresis, Pyrosequencing and Fluorescent In-situ Hybridization (FISH). The molecular diagnostic laboratory will provide colon cancer biomarker assay, ALK rearrangement by FISH, EGFR mutation analysis using

RTPCR, solid cancer specific translocation assays and all hematological evaluations of contemporary value.

We need to move beyond prognostic biomarkers and focus on development of predictive biomarkers that will enable selection of patients for a specific therapy. We also need to focus on exploiting common TSGs rather than limiting ourselves to the rare oncogenes in drug development. Moving forward, it will be necessary for clinicians to educate themselves in order to convert laboratory data into meaningful clinical information. This will require an understanding of the basic technologies used in biomarker studies, as well as their limitation and basic biology. Each biomarker needs to be critically assessed and applied to patient's care with comprehensive pretesting and post testing counseling. Unfortunately, additional limitations exist beyond science and medicine. Although the technology and science are available; the clinical research, health-care policy, insurance policy and ethical considerations have not kept pace with! implementation of emerging biomarkers. However, regardless of these seemingly impossible challenges, we are optimistic that the goal of delivering individualized cancer therapy for patients with cancer is within our reach.

**Dr. Dewan AK**  
Medical Director

## BRACHYTHERAPY IN HEAD AND NECK CANCERS

Brachytherapy is a form of Radiation Therapy, wherein radioactive sources are placed very close to or in contact with the target tissue. "Brachy" is a Greek word for "short distance".

**Brachytherapy implantation techniques** may be classified in terms of approach to the target volume;

1. Interstitial implant: when sources are placed within the tumor or tumor bed;
2. Intraluminal: when sources are placed or pass through a lumen;
3. Mold: when an applicator containing an array of radio active sources is designed to deliver a uniform dose distribution and is placed on the skin or mucosal surface immediately adjacent to the target tissue.

Commonly used radio active isotope for head and neck brachytherapy is Iridium ( $^{192}\text{Ir}$ ).

A few examples of Brachytherapy across various head and neck cancers are as follows:

**Cancer lip:** Interstitial implant of a locally advanced tumor.



Before Radiation



Interstitial Implant



After Brachytherapy



Interstitial implant in a case of Cancer floor mouth

The patient underwent Radiotherapy in form of combined Teletherapy and Brachytherapy.

**Cancer Tongue:**



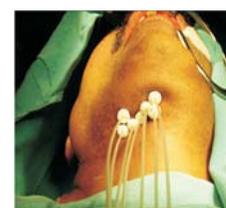
Lesion in right lateral border tongue



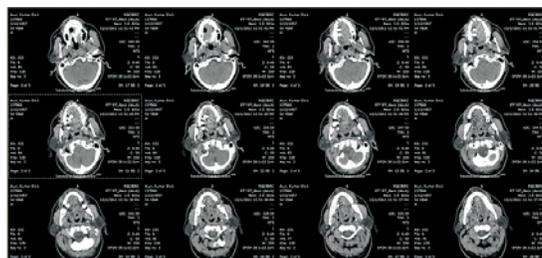
Under General anaesthesia



Brachytherapy catheters placed in Operation theatre



These catheters are placed by the Radiation Oncologists within the tumor in operation theatre under general anaesthesia. Computerised dosimetry is performed the same day. The catheters are left in place for a period ranging from 3-4 days if brachytherapy is being delivered as a boost to 7-8 days if brachytherapy is the sole radiation modality being used to treat the tumor. The brachytherapy is carried out in Brachytherapy suite twice a day at a minimum interval of six hours between two fractions. The catheters are removed after completion of treatment and patient discharged the same day.



C.T. scan for brachytherapy planning



Brachytherapy plan is generated and verified



Patient in Brachytherapy suite

The patient underwent Radiotherapy in form of combined Teletherapy and Brachytherapy.

**Cancer Buccal mucosa:**

**Cancer Palate:**



At presentation Interstitial implant Post brachytherapy

Lesion seen in Hard palate

Mold prepared with the help of Dental department

Patient with Mold applicator in place

The patient underwent Radiotherapy in form of combined Teletherapy and Brachytherapy.

The patient underwent Radiotherapy in form of combined Teletherapy and Brachytherapy. Another indication of Brachytherapy is in recurrent neck nodes with perinodal extension post chemo radiation. The patient undergoes neck dissection.



Tumor bed is identified and an intra operative Freiberg's applicator is placed.



Patient undergoes intra operative brachytherapy and the applicator is removed and surgical wound closed.



### Advantages of Brachytherapy

It enables us to deliver very high doses of radiation to the tumor or tumor bed without irradiating adjacent normal tissues. It is said to be the best form of 4 dimensional conformal radiotherapy (4-D CRT) where even tumor motion is taken care of, if any. The overall treatment duration is shortened. It preserves cosmesis of the body part under treatment, unlike many other procedures which may lead to terrible disfigurement of face and neck, thereby spoiling body image.

**Dr. Sheh Rawat**

Senior Consultant and Chief of Head and Neck Radiation Oncology Services

## PREVENTING HPV ASSOCIATED CANCERS

Cancer cells themselves are not contagious, but some contagious viruses like HBV (Hepatitis B Virus) and HPV (Human papillomavirus) are directly or indirectly responsible for about 20% of human cancers.

Human Papillomaviruses (HPVs) are a group of more than 150 related viruses. It infects the skin and the cells, lining the body cavities. Most are harmless but around 13 types of HPV can cause cancer. These are called "High-Risk or Oncogenic HPV" types. Two of these HPV types 16 and 18 are responsible for the majority of HPV caused cancers. HPV spreads through sexual activity including vaginal, oral and anal sex.

Most high-risk HPV infections occur without any symptoms, go away within 1 to 2 years and do not cause cancer. Some HPV infections however can persist for many years. Persistent infections with high-risk HPV types can lead to some serious cytological abnormalities or lesions that if left untreated may progress to cancer.

### HPV associated cancers

- Cervical Cancer:- Most common HPV associated cancer. Virtually all cervical cancers are caused by persistent HPV infection.
- Anal cancer:- More than 90% linked to HPV.
- Vulvar Cancer:- About 75% are linked to HPV.
- Penile Cancer:- Almost 65% are linked to HPV.
- Oropharyngeal Cancers- (Cancers of the back of the throat including base of the tongue and tonsils) In United States more than half of the cancers of the oropharynx are linked to HPV-16. Though in India the main culprit still remains the tobacco use.

### Other factors which increase the risk of developing cancer following a high risk HPV infection are-

- Tobacco use
- Having many children (increased risk of cervical cancer)
- Long term oral contraceptive use (increased risk of cervical cancer)
- Poor oral hygiene (increased risk of oropharyngeal cancer)
- Chronic inflammation

### Prevention of HPV infection

The most reliable way to prevent infection with HPV is to avoid any skin to skin, oral, anal or genital contact with another person. For those who are sexually active, a long term mutually monogamous relationship can reduce the risk of infection. Condoms lower the risk of infection but HPV can infect areas that are not covered by condom – so condom may not fully protect against HPV.

While cervical cancer can be detected with screening (HPV-DNA test & Pap Test) no effective screening test exists yet for the other cancers linked to HPV like Vaginal, vulvar, penile, anal and oro-pharyngeal cancers. Although HPV test might be used in research studies to look for HPV in other sites, there is no proven way to manage positive finding. Also the accuracy of the test itself may be affected by the site it is taken from and the way the sample is taken. HPV test results can change over a period of months or years as the body fights the virus.

### Vaccination against HPV

Two vaccines have been licensed in most countries for prophylactic use.

- Gardasil – Quadrivalent vaccine - contains HPV types 6, 11, 16 & 18 (U.S. FDA approved since June 2006.)
- Cervarix – Bivalent vaccine - contains HPV types 16 and 18 (U.S. FDA approved since Oct 2009)

Both vaccines protect against HPV types (16 & 18) that cause about 70% cervical cancers, 80% of anal cancers, 60% of vaginal cancers and 40% of vulvar cancers. These HPV types also cause most HPV induced oral cancers and some other rare genital cancers.

### Schedule for Gardasil

- First dose of 0.5 ml.
- Second dose of 0.5 ml two months after the first dose.
- Third dose of 0.5 ml four months after the second dose.

### Schedule for Cervarix

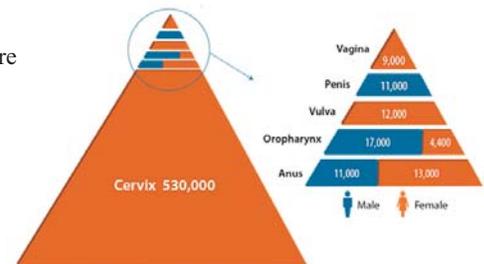
- First dose of 0.5 ml.
- Second dose of 0.5 ml, one month after the first dose.
- Third dose of 0.5 ml five months after the first dose.

Both the vaccines are given as intramuscular injections in left deltoid muscle. All the three doses of same vaccine are given

Gardasil also prevents anal and genital warts caused by HPV types 6 & 11. The vaccines can only be used to prevent HPV infection. They do not help treat an existing infection. To be most effective it should be given to sexually naïve females and males (9-26 age group).

### Reasons for vaccinating boys:

- Vaccinating males protect their unvaccinated partners.



Number of cancers caused by HPV world wide each year : photo credit courtesy National institute of health

- It increases the “herd immunity”.
- Quadrivalent vaccine-Gardasil protects against genital warts caused by HPV.
- Increasing evidence that HPV vaccination protects against oropharyngeal cancers.

In Dec. 2014 the U.S. FDA approved a nonavalent HPV vaccine Gardasil 9 to protect against nine HPV strains (16, 18, 6, 11, 31, 33, 45, 52 & 58) which are responsible for >90% of cervical cancers.

HPV vaccine has proved controversial because of rumored side effects, including blood clots, strokes and seizures. These claims commanded the attention of researchers, but studies have shown no cause-and-effect relationship between the vaccine and such side effects. More than 100 million doses have been given around the world and monitored. Such rumors only decrease the uptake of vaccine. However there is one known side effect of vaccine – fainting. The fainting itself doesn't indicate anything serious but carries the risk of falls and injury. So resting for 15 minutes after the vaccine is administered is suggested.

Improving vaccination coverage is important to reduce the burden of cancer and disease caused by HPV. Cost is a big hindrance for low resource countries. Reduction in unit price and number of doses required are the critical issues in near future.

**Dr. Jai Gopal Sharma / Dr. Indu Aggarwal**  
(Preventive Oncology Department)

### BHOOMI POOJAN

On 28th March 2015, the bhumi poojan for the New Building at RGCIRC was conducted in the presence of members of the Governing Council, doctors and members of staff, and associates & vendors. Echoes of “Om” rendered the air as a ‘Havan’ was performed. The expansion is expected to make RGCIRC care accessible to many more patients of cancer, by adding more beds as well as ample parking space.



### CME – BATHINDA



RGCIRC organized a CME on Oncology in association with IMA, Bathinda, Punjab, on Friday 10th April 2015. Dr. Vineet Talwar, Sr. Consultant – Medical Oncology delivered a talk on “Head & Neck Cancer - Recent Advances” & Dr. Sheh Rawat, Sr. Consultant – Radiation Oncology, spoke on “Recent Advances in Radiotherapy Management of Oral Cancers”. The talks were attended by more than 100 doctors.

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