



Rajiv Gandhi Cancer Institute and Research Centre

A Unit of Indraprastha Cancer Society
Registered under "Societies Registration Act 1860"

Architect's Impression of RGCI & RC (post expansion)



News Letter

Vol. XVII

No. 7

Price: 50 Paisa

EDITORIAL

THE TRUTH OF TRUE BEAM

RGCI & RC commissions True Beam - the latest state-of-the-art Radiotherapy machine

The aim of radiation therapy is to cure the tumor without harming the patient. The science and technology involved in achieving this aim are multidisciplinary and multifaceted. While the aim of radiation therapy has not changed since the discovery of ionizing radiation in 1895, the focus and emphasis has changed dramatically over the years.

The evolution from the kilo voltage era to the mega voltage era resulted in significant gains but at some cost. Imaging played a major role in radiation therapy. It was realized that *"if you can't see it, you can't hit it. If you can't hit it, you can't cure it"*. The advent of X-ray and CT-scanning led the way for 3-D imaging and treatment planning.

Two basic strategies were adopted to increase the efficacy of radiation therapy. The first was to reduce the treatment volume and second was to increase the differential response between tumor and normal tissue. In recent past, it has been possible to achieve reduction in radiation volume of normal tissue by refining treatment planning & delivery of radiation.

We have seen an unprecedented adoption of a new linac platform. Large number of patients in developed countries

are being treated with high precision techniques, pushing back the boundaries of advanced radiation treatments. RGCI & RC has commissioned state-of-the-art latest radiotherapy machine **"True Beam"** and has become first in North India and only second in India to acquire this technology. With its high intensity mode, **True Beam** can deliver very high doses quickly and accurately, more than twice as fast as earlier generations of technology. **True Beam** enables better integration between imaging and treatment delivery, much faster dose output, using the flattening filter free mode, and a much shorter time is needed for pretreatment setup, due to user-friendly nature of the equipment.

True Beam is most suitable for tumors that move during treatment, as the patient breathes in and out. Designed to advance the treatment of lung, bone, prostate, head & neck and other types of cancers, **True Beam** features a multitude of innovations that dynamically synchronizes imaging, motion management and treatment delivery.

The buzz words for **True Beam** are **"Sync., Speed and Precision"**.

I am sure, **True Beam** in true sense, will prove to be truthful to our patients.

Dr. Dewan A. K.
Medical Director



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Realization of A Vision



RGCI & RC, Delhi Commissions **TRUE BEAM** A first of its kind in North India

This latest technology targets cancer cells in tumors, even in moving organs (lungs, prostate and kidney) with amazing precision while sparing the surrounding normal healthy tissues.

Our True Beam system offers high precision treatments that can be delivered in a very short time.

- Radiotherapy with hallmark precision (1 mm) and speed
- Flattening Filter Free mode gives a speed of 2400 MU / min
- Swift delivery of required doses
- Least exposure of normal tissue
- High definition micro MLC to execute Stereotactic Radiation Therapy (SRT), Stereotactic Radio Surgery (SRS), Stereotactic Body Radiation Therapy (SBRT), Intensity-Modulated Radiation Therapy (IMRT), Image Guided Radiation Therapy (IGRT)

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TRUE BEAM: A REVOLUTION IN RADIATION ONCOLOGY

Change is the essence of life. And so is true for cancer and its treatment. Innovation and intuitive thinking has brought about revolutionary changes in the field of radiotherapy. Evolution in imaging modalities, treatment planning systems, beam delivery and treatment verification has allowed radiation oncologists to widen the scope for offering curative radiation doses and reirradiating recurrent tumors while respecting normal tissue constraints. Keeping up with our motto of keeping pace with the latest and providing quality care to patients, we decided to acquire the True Beam STx in the Department of Radiation Oncology at RGCI & RC.

True Beam STx (Varian Medical Systems) offers integrated imaging, beam delivery and motion management with unmatched precision and accuracy.

High Points of True Beam

- Absence of flattening filters: as IMRT treatments require a heterogeneous dose distribution and steep dose gradients outside the target volumes, absence of flattening filters in the path of the beam can considerably reduce treatment time by achieving a maximum dose rate of 2400 MU/min
- Choice of three photon energies (6,10 and 15 MV) and four electron energies(6,9,12 and15 MeV) widens the choice for beam selection during planning
- Availability of high definition multileaf collimator (HDMLC) consisting of 120 leaves, with a leaf thickness of 25 mm each, allows improved dose conformity around the target volume and sparing of organs at risk. This will allow us to perform SRS (Stereotactic Radio Surgery), SRT (Stereotactic Radiation Therapy) and SBRT (Stereotactic Body Radiation Therapy) with excellent precision and accuracy
- Rapid Arc technology allows delivery of radiation with simultaneous movement of gantry and MLCs, thereby reducing the treatment time per patient
- Integration of Gating (synchronizing tumor motion with dosing and continuous imaging) with Rapid Arc allows better tumor motion management for SBRT, in cases of lesions situated in the lung, breast, liver and gall bladder. It also allows reduction in the volume of irradiation of normal lung when compared with large ITV (Internal Target Volume) based approaches
- Jaw tracking with Rapid Arc reduces the low dose bath to the surrounding normal tissues
- Continuous imaging (2D/3D) during treatment improves precision of delivery. Live fluoro images can be generated and images may be stored as a video
- User friendly and intelligent interface:
 - ✓ It can link upto 10 treatment fields in a given patient, so that the therapist need not wait for each field to be loaded. This allows the therapist to concentrate more on the patient

Using Smart Segmentation knowledge-based contouring, the oncologist can take advantage of built-in expert cases or create his own expert cases.

It has been integrated with the ARIA information system and ECLIPSE™ with Acuros treatment planning system to simplify planning and manage treatment workflows.

Integration with SmartAdapt deformable registration algorithms will allow the clinician to account for anatomical changes in the target volumes and organs at risk during the course of radiation.

6 Degrees of Couch Freedom is designed to advance patient positioning during radiotherapy and radiosurgery procedures by providing two additional rotational motion axes: pitch and roll, thereby enabling enhanced accurate target positioning and precise beam delivery and may reduce treatment margins in select clinical cases.

It will offer more convenience for the patient by shortening treatment periods with a dose rate of up to 2400 MU/minute with FFF (Flattening Filter Free) mode. A Standard IMRT treatment that lasts 10-15 minutes normally can be completed in a time shorter than two minutes. A complex radiosurgery operation which lasts from 40 minutes to 2 hours can be completed in 5-20 minutes.

TrueBeam device is superior to other radiotherapy devices, because it can perform radiotherapy and radiosurgery on the same platform. Since, dose rate can be increased up to 8 fold, compared to other linear accelerators, it can perform RapidArc more rapidly.

It increases the probability of hitting the target by giving less time for tumor movement during dose delivery that is performed in a very short time: sensitivity of TrueBeam system is less than 1 millimeter. This accuracy is provided by the sophisticated structure of the system which forms a new synchronization level among technologies of imaging, positioning, management of movement, shaping of irradiation and dose delivery with accuracy control every 10 milliseconds throughout treatment. As the treatment is continued, more than 1,00,000 data points are observed continuously and it is ensured that the system maintains a “right isocenter”. This increased sensitivity level enables the physician to treat a tumor inside a continuously moving organ with a high accuracy.

True Beam will allow us to treat upto 60-70 patients in a day, with 3-DCRT / IMRT / IGRT / SRS / SRT with or without gating. We have executed SRT and SBRT treatment on True Beam for our patients on 24th July, 2013.

With yet another feather in the cap of RGCI & RC, we hope to continue being one of the leading radiation oncology centres in India.

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Printed & Published by Mr. K. K. Mehta on behalf of Indraprastha Cancer Society & Research Centre and Printed at Raju Art Printers, 18-A, Old Gobind Pura Extn., Street No. 2, Parwana Road, Delhi-51, Tel. : 9871006333, Published from RGCI&RC, Sector-V, Rohini, Delhi-110085

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