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From the Desk of Director Research

Intensity Modulated Radiotherapy (IMRT) has been a significant technological advance in the field of radiotherapy in recent years. "Special Feature" gives an overview of 'IMRT: A high Precision Radiation Technique'.

Microarray based gene expression profiling is speeding up the discovery process in cancer biology to provide better diagnostic methods and therapeutic strategies. 'Microarrays in Cancer' has been covered in "Perspective".

'Comprehensive Breast Cancer Care Centre' portrayed under "Pink Ribbon at RGCI&RC" profiles this facility dedicated for the prevention and care of breast cancer patients with an interdisciplinary approach.

A 'Uro-Oncology Workshop' was jointly organized by RGCI&RC, All India Institute of Medical Sciences, and Dr Ram Manohar Lohia Hospital & PGIMER , Delhi. Its proceedings have been highlighted in this issue.

Other regular features covered in this issue are 'Research & Development', 'New Technologies', 'Clinical Trials', 'Watch-Out' and 'Globe Scan'.

We gratefully acknowledge the contributions made by Clinicians, Scientists and DNB Students of the Institute. Views and suggestions from readers are welcome.

Happy New Year!

Dr D C Doval

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SPECIAL FEATURE

IMRT: A HIGH PRECISION RADIATION TECHNIQUE

Intensity Modulated Radiation Therapy (IMRT) is a state-of-the-art cancer treatment method that delivers high doses of radiation directly to cancer cells in a very targeted way, much more precisely than is possible with conventional radiotherapy. The intensity of the radiation in IMRT can be changed during treatment to spare more adjoining normal tissue than is possible to spare during conventional radiation therapy. Because of this, an increased dose of radiation can be delivered to the tumor using IMRT. It enables to shape the radiation beams to closely approximate the shape of the tumor.

Local or regional control of a cancerous tumor is the ultimate goal of an overall treatment strategy, for a patient. Failure to achieve tumor control can result in a greater likelihood of developing distant metastases, continued tumor growth, severe debilitation or even death of the patient. Historically, the maximum radiation dose that could be given to a tumor site has been restricted by the tolerance and sensitivity of the surrounding nearby healthy tissues. IMRT enables a more precise conformal radiation dose distribution to the target area by allowing the physician to control the intensity of the radiation beam within a given area. This means a much higher dose of radiation can be given to a tumor without an increase in radiation delivered to the normal tissue.

IMRT utilizes beams or multileaf collimators (MLCs) that can turn on or off or be blocked during treatment, thus varying the radiation beam intensity across the targeted field. The radiation beams may be moved dozens or hundreds of times and each may have a different intensity in order to protect the healthy surrounding tissue as it would be receiving a smaller dose of radiation than the tumor does. Thus there is no longer a homogeneous or even radiation dose, but a dosage that can be made higher or vary within the tumor. The end result is better tumor control, less damage to healthy tissues and structures in the treatment area and a better quality of life for the patient. Moreover, IMRT allows for the radiation dose to conform more precisely to the three-dimensional (3-D) shape of the tumor by modulating or controlling the intensity of the radiation beam in multiple small volumes.

Treatment planning for IMRT and other conformal radiation is more complex than for conventional radiation therapy, taking an average of 2–3 days for each patient. 3-D conformal radiation planning versus simple one-slice planning for conventional radiation therapy extends treatment planning time for the patient. It uses computer-generated images to plan, and then deliver tightly focused radiation beams to cancerous tumors. Radiation oncologist uses it to exquisitely "paint" the tumor with a precise radiation beam that conforms as closely as possible to the shape of the tumor. In IMRT, very small beams, or beamlets, are aimed at a tumor from many angles. A medical linear accelerator, equipped with a special device called a multileaf collimator that shapes the radiation beam, delivers the radiation in accordance with the treatment plan. During treatment, the radiation intensity of each beamlet is controlled, and the beam shape changes hundreds of times during each treatment.

IMRT is most conformal and most efficient if all target volumes (gross disease, subclinical extensions, and electively treated nodes) are treated simultaneously, using different fraction sizes. Such a treatment strategy is called the simultaneous integrated boost (SIB). This is in contrast to conventional radiotherapy in which the same fraction size (typically 1.8 or 2 Gy) is used for all target volumes with successive reductions in field sizes to protect critical normal structures and to limit the dose to electively treated and subclinical disease regions.

Techniques

Introduction of IMRT into clinical use, has generated widespread interest as an emerging radiotherapeutic modality. Since its invention, it has undergone many changes and modifications and now, several techniques are being used to deliver the IMRT. It is being delivered using linear accelerators with static MLC (step and shoot), or dynamic MLCs, or tomotherapy machines, or Volumetric Arc Modulated Therapy (VMAT). The SIB-IMRT allows for the varying doses to be delivered to the various target volumes in a single phase and obviates the need for field matching and the use of electrons, thus minimizing the dosimetric uncertainties.

Advantages

IMRT has a number of advantages:

1. It allows for greater sparing of normal structures such as salivary glands, esophagus, optic nerves, brain stem and most importantly, spinal cord.

2. It allows treatment to be delivered in a single treatment phase without the requirement for matching additional fields to provide tumor boosts, and eliminates the need for electron fields to the posterior neck nodes.
3. It offers the possibility of simultaneously delivering higher radiation doses to the region of gross disease and lower doses to areas of microscopic disease, the so called SIB-IMRT.

Indications

According to a coding guide from the American Society for Therapeutic Radiation and Oncology (ASTRO, 2007), IMRT is clinically indicated when highly conformal dose planning is required. IMRT planning may be clinically indicated when one or more of the following conditions are present:

1. An immediately adjacent area has been previously irradiated and abutting portals must be established with high precision.
2. Dose escalation is planned to deliver radiation doses in excess of those commonly utilized for similar tumors with conventional treatment.
3. The target volume is concave or convex, and the critical normal tissues are within or around that convexity or concavity.
4. The target volume is in close proximity to critical structures that must be protected.
5. The volume of interest must be covered with narrow margins to adequately protect immediately adjacent structures.

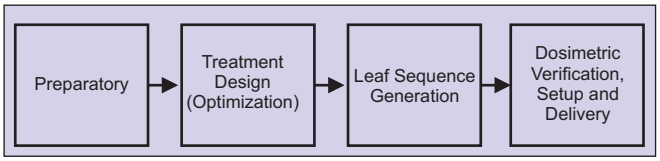
According to the ASTRO, the most common sites that currently support the use of IMRT include:

1. Carcinoma of the prostate
2. Primary, metastatic or benign tumors of the central nervous system (CNS), including the brain, brain stem, and spinal cord.
3. Primary, metastatic tumors of the spine where spinal cord tolerance may be exceeded by conventional treatment.
4. Primary, metastatic or benign lesions of the head and neck area (because of low risk of osteoradionecrosis, dysphagia and better parotid sparing along with escalated doses to tumor volume), including: (a) Aero-digestive tract, (b) Orbits, (c) Salivary glands, (d) Sinuses, (e) Skull base.
5. Re-irradiation that meets the requirements for medical necessity (as noted above).
6. Selected cases (ie, not routine) of breast cancers with close proximity to critical structures.
7. Selected cases of thoracic and abdominal malignancies
8. Other pelvic and retroperitoneal tumors that meet requirements for medical necessity.

Planning & Treatment Delivery

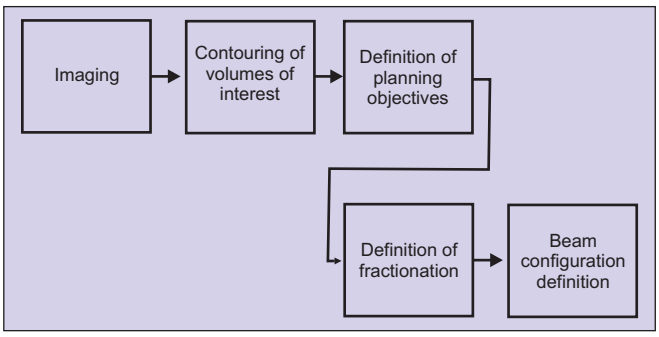
It consists of 4-phase steps:

1. Preparatory phase
2. Treatment design (optimization)
3. Leaf sequence generation
4. Dosimetric verification, setup and delivery



Overview of a typical IMRT planning and delivery process (4 steps)

Prior to IMRT treatment planning, the patient undergoes simulation, which is a process that physically aligns the patient for treatment, therapeutic radiology simulation-aided field setting. In almost all cases of IMRT, a custom immobilization device is constructed for the patient to ensure that the daily setup of the patient is precisely reproducible each day of treatment. Thereafter, 3-D image acquisition (CT, MRI, PET) of the target region and surrounding areas occurs. Either CT alone or multiple fused image sets are utilized for the planning set.



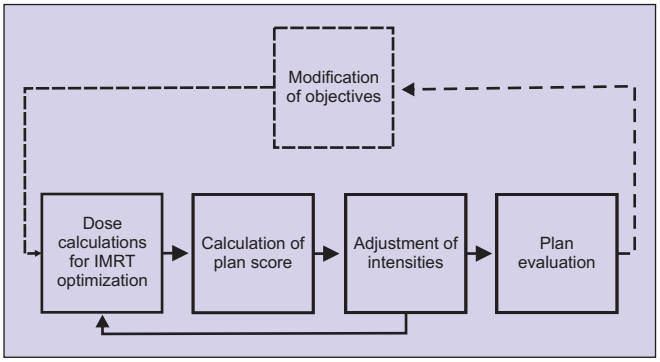
Preparatory phase of IMRT (first step in IMRT)

The physician then contours the visible abnormality or target area seen on each slice of the image set. The 3-D summation of these contours defines gross tumor volume (GTV). A margin is drawn around the GTV by the physician to include the volume of tissue at risk for microscopic spread of disease (ie, to include disease that is not visible on imaging studies). This larger volume is called the clinical target volume (CTV). Still another margin is added by the physician beyond the CTV to create the planning target volume (PTV). This additional

volume is to account for potential patient movement and random setup error. Nearby normal structures that could possibly be damaged by radiation, called organs at risk (OAR), are also individually contoured by the physician.

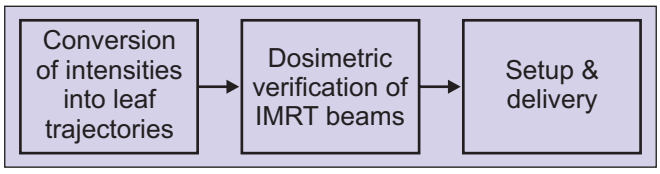
In the second step, the physician assigns specific dose requirements for the PTV, ie, minimum dose and dose homogeneity and dose constraints for the OAR, ie, maximum allowable dose to these critical structures. A treatment plan that satisfies these requirements and constraints should maximize the potential for disease control as well as minimize the risk of radiation injury to normal tissue.

Finally, the radiation physicist (or a dosimetrist under the supervision of the physicist) uses a treatment planning computer to calculate a complex multibeam treatment plan that will deliver the prescription dose to the PTV and satisfy the normal tissue dose constraints prescribed by the physician.



Optimization process (second step in IMRT)

After the plan is complete, in a separate process the physicist must perform and the physician must evaluate basic dose calculations on each of the modulated beams.



Dosimetric verifications and setup followed by delivery

Documentation of IMRT plans has to be established. This may include printouts of various plan parameters, isodose distributions in three orthogonal planes, dose volume histograms (DVHs), digital reconstructed radiograph (DRRs), and/or simulation films for each field and possibly independent monitor units (MU) calculations. The dose constraints should be visible in the prescription sheet.

Quality Control

Quality control is perhaps the biggest issue in IMRT, because there are very tight margins around the tumors. Each department has to know its own setup errors and uncertainties and follow strict protocols for quality assessment (QA). Different machines have different tools for QA, which should be exploited to the fullest. The use of electronic portal imaging device (EPID), kilo voltage imaging and cone beam CT need to be performed daily, or on alternate day basis or weekly, depending on the site being irradiated, target motion and location. However, all these facilities come at a cost and, therefore, IMRT is both labor intensive and expensive.

Future Standards

IMRT has become the standard of care for delivery of radiotherapy in head and neck carcinoma, prostate carcinoma, breast carcinoma, upper aero-digestive tract cancers and recurrent diseases. It can be further optimized, making use of advances in the imaging techniques, ie image guided IMRT. Radiation dose escalation can improve the outcome in head and neck cancers, at the same time reducing the radiation induced morbidities like xerostomia (dryness of mouth) and dysphagia. Dvelopment of the PET and PET CT image fusion has led to the biological active tumor volume mapping and hence dose escalation. Adaptive IMRT has also a role as real time adaptation to the shrinking volume during treatment period can be done.

Conclusion

IMRT is an advanced mode of high-precision radiotherapy that utilizes computer-controlled linear accelerators to deliver precise radiation doses of variable intensity and fluence to a malignant tumor or specific areas within the tumor. 3-D CRT is still used extensively for many body sites but the use of IMRT is growing in more complicated body sites, such as CNS, head and neck, prostate, breast and lung. IMRT has also shown its usefulness in cases of re-irradiation. Unfortunately, IMRT is limited by its need for additional time from experienced medical personnel. Proof of improved survival benefit from IMRT techniques over 3-D CRT and conventional radiotherapy has shown its usefulness for many tumor sites, with the ability to reduce toxicity which is generally accepted.

(Dr Abhinav Dewan, DNB Student; Dr Pardeep Garg, Sr Resident; Dr S K Sharma, Sr Consultant, Dept of Radiation Oncology)

PERSPECTIVE

MICROARRAYS IN CANCER

Definition

An array is a geometric arrangement of objects, usually in rows and columns. This arrangement when miniaturized is called a "Microarray". Arrays used in research and diagnostic are DNA (gene) expression profiling arrays, protein arrays and tissue microarray

In biological arrays, miniaturized chemical reaction areas are organized in rows and columns to test DNA, antibodies, or proteins, by using a chip (similar to computer chips) having immobilized probes and hybridizing them with sample are called "Microarrays". The color produced from the chip after hybridization is then scanned and the data is analyzed by a software to find the expression level.

Cancer & Microarrays

Cancer is a genetic disease arising from the multi-step accumulation of genetic alterations, such as amplifications, insertions, deletions and other rearrangements in the DNA which effect the expression of genes. Whilst many of these genetic lesions result in over-expression of certain oncogenes, other rearrangements cause loss of function. Identification of differences in the expression profile of tumor cell in comparison to normal counterpart in terms of transcripts or protein expression, provides information on the differential expression of genes.

Microarrays are some of the most powerful and versatile tools available, with several applications in cancer biology. Primarily there are two types of micrroarrys, ie, DNA microarray and protein microarrays.

DNA (Gene) Expression Profiling Arrays

- With only a few exceptions, every cell of the body contains a full set of chromosomes and identical genes
- Only a fraction of these genes is turned on, and it is this subset that is "expressed" and that confers unique properties to each cell type.
- Genes expressed → mRNA.
- Genes not expressed → No mRNA.
- Intermediate levels of expression and hence intermediate quantity of mRNA.
- Cancer /diseased cell /cells in different phases of growth express genes differently as compared to normal
- Within a cancer type, gene expression can be different → different outcome in a cancer type to similar interventions.
- What is being looked as predictive factors and prognostic factors → differential gene expression.

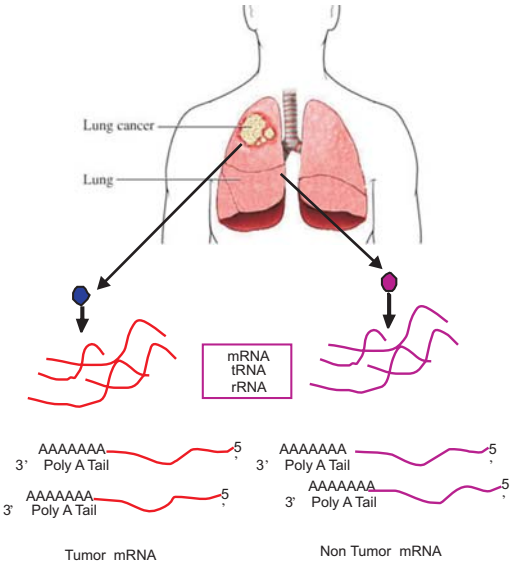
A DNA microarray (also known as gene chip, DNA chip or biochip) is a collection of microscopic DNA spots attached to a solid surface. DNA arrays allow quantitative and simultaneous measurement of mRNA expression levels of thousands of genes in biological sample. The technology is based on the hybridization of cDNA to a large set of probes arrayed on a solid support (DNA chip). The probe printing can be done in one of the three ways: photolithography, mechanical microspotting, or inkjetting. The other platform for DNA arrays are oligonucloeotide chips in which hundreds of thousands of oligonucleotides are directly synthesized in situ on glass chips by means of photochemical reaction and masking technology.

The gene sequences of array can be chosen individually from a database used to store sequenced genes and expressed sequence tags, or from commercially available cDNA clone sets. Presently, whole human genome oligonucleotide arrays are also available.

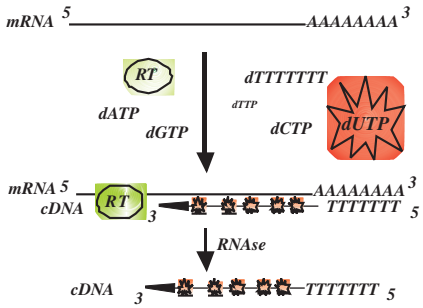
Procedures

RNA Isolation, Labeling and Hybridization: Total RNA, including mRNA, is isolated from both the tumor and normal tissues. Global mRNA conversion into cDNA is performed by PCR using primer against poly A tail. The RNA is then destroyed using RNase. The normal somatic cDNA is labeled with cyanine 3-dUTP (green fluorescent molecule) and the tumor cDNA is labeled with cyanine5-dUTP (red fluorescent molecule). The cDNA are then hybridized to probes fixed on the gene chip.

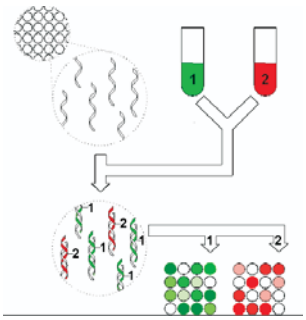
Microarray Image Analysis: Laser scanning activates the fluorescent dyes incorporated into the probe. The areas on the slide with hybridized probe will be visible on the scanned image as red, green, yellow and black spots. Gene spot with no affixed probe appear black, the red spots correspond to genes expressed in the tumor sample while green spots correspond to genes expressed in the normal tissue sample. If gene is expressed under both conditions, both the probes will be hybridized and spot will appear yellow. Figures underneath demonstrate methodology of gene expression profiling in lung cancer *vis a vis* normal lung tissue.



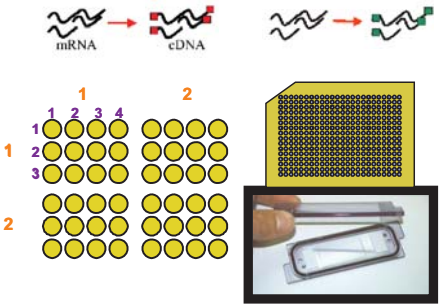
Isolation of RNA



Formation of cDNA (Red-Tumor, Green-Normal Control Tissue)



Comparative Hybridization



The Chip Used for Hybridization

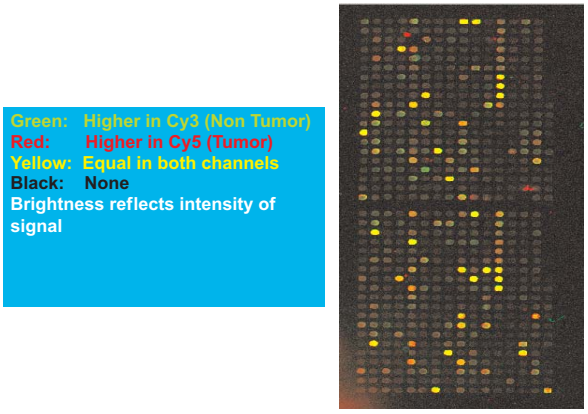


Image Analysis

Data Analysis: Image that is obtained after scanning is further processed and analyzed by using sophisticated analysis software to extract the maximum amount of information. This software attempts to identify groups of transcriptionally co-regulated genes within the tested sample, to establish groups of biological samples on the basis of similarity according to their gene expression levels, and to reveal gene clusters. One of the most frequently used tools is the hierarchical clustering algorithm, published by Eisten & colleagues.

Applications

- To study cancer types for expression of large number of genes.
- Make diagnosis based on gene expression profile.
- To distinguish similar cancer types from dissimilar types.
- Identify target (s) for modulation.
- Large scale (genome-wide) screening.
- Eliminate bias of pre-selecting candidate genes
- Test multiple hypotheses simultaneously.
- Generate new hypotheses by identifying novel genes associated with experiment.

Protein Microarrays

Proteins can be profiled effectively with protein microarrys which require only a small amount of sample material. Protein microarray technology has made enormous progress in recent year. It has been successfully applied for identification, quantification and functional analysis of proteins in basic and applied proteome research.

Protein microarrays have broad applications in discovery and quantitative analysis. This technology is also used to acquire information about the posttranslational modifications (PTM) of proteins.

Originally protein arrays were based only on the immunoassay format, but now these utilize broader range of capture and detection technologies. Currently three types of protein microarrays are used:

Standard Protein Microarrays: These consist of purified recombinant proteins. For screening these use proteins, antibodies, DNA and chemicals, and are used in functional characterization of proteins, identification of enzyme substrates and to analyze protein-DNA interactions.

Antibody Microarrays: These microarrays use antibodies as binders. Screening partner is purified proteins and complex mixtures. These are used in many fields such as antibody characterization, protein abundance quantification and commercial diagnostics. The detection of each analyte requires two specific antibodies for binding.

Reverse Protein Microarrays: These use complex non-purified fractionated protein mixtures usually derived from cell or tissue lysate, and are used for the screening of single antibodies, complex mixture. These monitor changes in PTM upon initiation of cellular processes and in serum profiling.

Procedures

Arraying and Array: Protein chips are constructed by spotting recombinant, purified protein samples to the substratum where they become covalently attached but remain appropriately folded and functional. Nitrocellulose coated glass slides are common substratum for protein arrays. A spot on array may also include an antibody, a cell or phage lysate. These high-throughput multiplexed microarrys have been used extensively to identify and quantify tumor markers from a variety of samples which include serum, plasma and other body fluids, cell culture supernatant, tissue culture lysates and tumor extracts.

Detection and Bioinformatic Analysis: Variety of protein array labels are available, such as fluorescent, radioactive, luminescent and colorimetric labels. The same instrumentation as used for scanning of DNA microarrays is applicable to protein microarrays too. Image obtained after scanning is further analyzed and data tables are generated.

Applications

- Identification of novel tumor markers.
- Study of abnormalities in signal pathways.
- Detection of new targets for cancer treatment.

Conclusion

It is clear that microarrays based technology will create profound changes in the way we look at cancers provide tools to diagnose similar cancer types from dissimilar, identify new targets for therapy and generate stronger predictive and prognostic markers. Protein chip technology is a new way to discover previously unknown multifunctional proteins. The scientific, medical and pharmaceutical potential of this exciting research field is enormous and it will transform cancer management into logical science and successful medicine.

(Dr Anurag Mehta, Chief of Laboratory Services)

21st Century Tobacco Control Challenges

Challenges to Increase

- Support for/adherence to the World Health Organization Framework Convention on Tobacco Control
- Tobacco excise taxes/unit price of tobacco
- Access to comprehensive treatment for tobacco dependence
- Media-based tobacco countermarketing campaigns
- Regulation of all tobacco products
- Health warnings on tobacco packaging
- Availability of tobacco health/economic information to the general public
- Primacy of health over commerce in trade agreements
- Basic and applied tobacco control research
- Extent and accuracy of tobacco epidemiologic data
- Litigation aimed at the tobacco industry

Challenges to Decrease

- Physician and other health care provider tobacco use
- Targeting of women for increased tobacco use
- Exposure to secondhand smoke
- Illicit trade and smuggling of tobacco
- Duty-free and reduced-cost sales of tobacco
- Tobacco advertising, promotion, and sponsorship
- Misleading tobacco product claims/descriptors
- Targeting of youth for increased tobacco use
- Subsidies for tobacco production and sales
- Youth access to tobacco

(Ca Cancer J Clin, Jan/ Feb 2010)

RESEARCH & DEVELOPMENT

Genome Sequencing in Cancer Care

Researchers at the British Columbia (BC) Cancer Agency Genome Sciences Centre have provided the first published example of genome scale RNA and DNA sequencing of a rare tumor of the tongue to aid in clinical decision making and therapeutic choice. This rare tumor had progressed to metastatic disease and the rarity of this tumor meant that no established treatment options existed. Analysis of the complete genomic sequences allowed the comprehensive discovery of the genetic changes that had accumulated within the tumor. From this information, a personalized drug regimen was initiated, which stabilized the aggressive cancer for several months. Utilizing a complete map of the molecular changes within a tumor in a clinical setting represents a world first in the application of this technology. It ushers in the era of personalized medicine in oncology, whereby therapies would be tailored precisely to the genetic make up of the tumor.

(BC Cancer Agency, Aug 12, 2010)

MicroRNA to Combat Cancer

Australian and American scientists have found a way of shrinking tumors in certain cancers- a finding that provides hope for new treatments. The revolutionary thing about this finding is that it is the first time anyone has blocked the growth of a primary tumor by the simple delivery of a microRNA inhibitor. Scientists chose to study neuroblastoma, the most common cancer in infancy and found that these cancers disabled tumor suppressor gene P53 by over- producing the microRNA 380. This results in a reduction in the amount of protection against cancerous changes in that cell, leading to the growth of tumors. When the researchers blocked the microRNA, P 53 production resumed, the cancer cells died and the tumors became much smaller. While this finding is at an early research stage, results indicate that this microRNA is a potential therapeutic target for future treatment of early childhood neuroblastoma and other micro-RNA cancers.

(Nature Medicine, Sep 28, 2010)

New Frontiers in Fighting Cancer

Near infrared light enables scientists to look deeper into the guts of cells, potentially opening up a new frontier in the fights against cancer. Current imaging probes work for only a few minutes. They cannot penetrate deep tissue, are sensitive to pH levels and have poor water solubility. A technique developed at the University of Central Florida gets around those problems by using near infrared light. After identifying the correct light frequency, researchers took images of lysosomes for hours. They used infrared light and flurorescent dye to take pictures of cells and tumors deep within the tissue. The probes specifically target lysosomes, which act as cells' thermostats and waste processors and which have been linked to a variety of diseases including cancer. The probes can be adapted to search for certain proteins found in tumors, which means that these some day may help diagnose and potentially treat tumors. Until now, there was no real way to study lysosomes because existing techniques have severe limitations. The probe developed by researchers is stable, which allows longer periods of imaging.

(University of Central Florida, Sep 3, 2010)

Preventive Strategies for Mutation Carriers

Females who carry the inherited mutations of the BRCA1 or BRCA2 genes have 56% life time risk of developing breast cancer and 84% life time risk of developing ovarian cancer. Researchers at the University fo Pannsylvania carried out a study involving 2482 women who had the BRCA1 or BRCA2 mutations to find out whether their cancer risk reduction was following a prophylactic salpingo-oophorectomy and mastectomy, incorporating mutation type (BRCA1 *vs* BRCA2) and cancer history (prior history of breast cancer *vs* none). They found that women with the inherited mutations of the BRCA1 or BRCA2 genes who had preventive mastectomy or salpingo-oophrectomy were found to have a significant lower risk of developing ovarian and breast cancers. None of the women with the mutated genes who had a preventive mastectomy developed cancer during the 3-year follow-up period. Risk-reducing salpingo-oophrectomy was associated with a decreased risk of ovarian cancer with no ovarian cancer events seen during the 6 years of prospective follow-up in BRCA2 mutation carriers without prior breast cancer who underwent the procedure. The researchers found no cases of ovarian cancer among women with the BRCA1 mutation after salpingo-oophrectomy, which was also linked to a lower risk of breast cancer in BRCA1 and BRCA 2 mutation carriers without prior diagnosis of breast cancer.

(JAMA, Sep 1, 2010)

NEW TECHNOLOGIES

DIAGNOSTICS

Cytosponge Test of Barrett's Oesophagus

Barrett's oesophagus is an alteration of the oesophageal tissue and is the main risk factor for oesophageal cancer. Researchers from the Medical Research Council of UK have developed a new test, called the "Cytosponge", which can diagnose Barrett's oesophagus. In the study, the patients were diagnosed by swallowing a capsule with a string attached and taking a drink of water. The device then dissolved in the stomach to expand into a sponge-like mesh 3 cm wide. After 5 minutes, the expanded cytosponge was removed through the mouth by pulling on the string, collecting cells for analysis en route. These cells were stained with a molecular marker or flag which allowed the researchers to identify Barrett's cells, if present, under the microscope. The cytosponge test thus provides an accurate and less uncomfortable method of diagnosis and may become the first screening option administered by nurses in a general practice clinic.

(Medical Research Council, Sep 14, 2010)

Test to Predict Chemotherapy Response

A new test on RAD51, one of the key proteins involved in DNA repair, can predict breast cancer's likely response to chemotherapy. The test developed at the Institute of Cancer Research, London, takes 24 hours, instead of the current 12 weeks to determine whether a patient has responded to chemotherapy, thus sparing the non-respoding patients nearly 3 months of wasted time and needless side effects. They have reported that anthracycline chemotherapy, a standard treatment for significant number of breast cancer patients, is much more likely to have a beneficial effect in cases where RAD51 did not work on cancer cells. A significant percentage of patients responded well, with their tumor completely disappearing from the breast. If the DNA repair process was working in the tumor, they would probably not respond to the treatment with complete response being unlikely. The test can also determine whether the women can benefit from PARP-inhibitors, a promising new type of cancer treatment currently undergoing clinical trials. This test is at an early stage of development and needs to be confirmed in larger studies.

(Clinical Cancer Research, Aug 27, 2010)

DRUGS

Cabazitaxel (Jevtana) for Prostate Cancer

The Food and Drug Administration (FDA) has recently approved a new drug called 'cabazitaxel' for men with advanced prostate cancer that is resistant to hormone therapy, and who do not respond to treatment with the chemotherapy drug docetaxel. Before the approval of cabazitaxel, docetaxel was the only FDA approved option for men with advanced, hormone-refractory disease. Cabazitaxel, manufactured by Sanofi-Aventis was fast-tracked for FDA approval. FDA was able to review and approve the application for Jevtana in 11 weeks, expediting the availability of this drug to men with prostate cancer. The FDA based its approval on results from the TROPIC study, which compared the overall survival of men who got cabazitaxel with those who got mitoxantrone. All the men had previously been treated with docetaxel. Results indicated that men who got cabazitaxel lived about 10 weeks longer on average than men who received mitoxantrone. Further research could help better define the drugs's safety profile.

(ACS News, Sep 16, 2010)

Levact® (Bendamustine)

Bendamustine, a new chemotherapy agent, has been synthetically developed to harness the natural anti-cancer properties of the mustard seed. The new agent uniquely combines the properties of two forms of chemotherapy known as alkylating agents and purine analogues. Due to its hybrid structure, it is able to attack cancer cells in a number of ways. This seems to make it much more difficult for cancer cells to build up resistance to treatment, meaning that Levact® can be effective even when other therapies have failed. Levact has been licensed in the UK for indolent non-Hodgkin's lymphoma (NHL) as monotherapy in patients who have progressed during or within 6 months following treatment with rituximab or a rituximab-containing regimen. Bendamustine has been approved for the first line treatment of chronic lymphocytic leukemia (CLL) in patients for whom fluodarabine combination chemo-therapy is not appropriate and also for front line treatment of multiple myeloma of elderly patients who suffer with neuropathy and are not suitable for transplant. Bendamustine is licensed in Germany and Switzerland. In the United States, it is indicated for the treatment of indolent B-cell NHL and also for the treatment of CLL.

(Napp Pharmaceuticals, Sep 15, 2010)

EQUIPMENTS

Electronic Brachytherapy

At the 29th annual meeting of the European Society for Therapeutic Radiology and Oncology, Xoft Inc. announced the introduction of the Axxent® Electronic Brachytherapy, eBx™ System that delivers isotope-free, 50 kV radiation therapy directly to cancer sites with minimal radiation exposure to the healthy tissue. It treats breast, endometrial and skin cancers. Several studies validate its safety and performance. The clinical benefits for single dose intraoperative radiotherapy (IORT) and accelerated brachytherapy indication continue to be substantiated by multiple publications. The Axxent system reduces recurrence of cancer and improves survival. Utilizing a proprietary miniatured Xray-source and mobile controller, treatment can be performed without the need for a shielded room, allowing radiation oncologists and medical personnel to be present during treatment which minimizes patient anxiety. Electronic brachytherapy delivers targeted treatment, which is a safe, convenient alternative to deliver IORT for breast and other cancers and is professionally validated and patient friendly.

(Xoft Inc, Sep 14, 2010)

OnControl™ Bone Marrow System

The OnControl™ bone marrow system developed by Vidacare Corporation provides the first significant advance in bone marrow biopsy and aspiration procedures in over 50 years. It combines a specially designed needle with a powered driver to obtain high quality core samples, and represents an important improvement in good patient care. In addition, the procedure takes much less time than a traditional manual procedure, making it more tolerable for the patient. Usually, the doctor gets through the bone in less than 15 seconds as opposed to 30+ minutes. The whole procedure takes less than 2 minutes with accurate reading from the laboratory. The OnControl™ system, which was commercially launched in March 2010, is now a part of standard practice procedure. In the first six months, the system hit its first significant growth milestone and is now available in 50 healthcare centres across the United States. The system offers clinicians a safe, fast and easy way to perform bone marrow aspiration and biopsy procedures, offering patients a more tolerable experience.

(Vidacare Corporation, Sep 19, 2010)

TECHNIQUES

IQQA® - Liver Technology

Primary liver cancer represents one of the most common malignancies in the world and its management presents a challenging problem. Advanced preoperative imaging assessment is paramount in determing appropriate treatment and requires the participation of multi-disciplinary team specialized in liver malignancy. IQQA®-Liver developed by EDDA Technology Inc. is a comprehensive workflow solution supporting modern multidisciplinary liver imaging evaluation and management. It allows for better understanding of surgical anatomy and surgical planning in the preoperative evaluation, and provides an innovative toolset for realtime interactive assessment and volumetric quantification of liver, liver lobes, hepatic lesions and vessels. Physicians may in realtime perform virtual simulation of resection, lobular/segmental/vascular manipulation and quantification to achieve desired planning result, typically within minutes. IQQA®-Liver has clearance by the US FDA, China SFDA, Taiwan DDH, and carries the CE mark. It is currently in use at numerous prestigious liver transplantation/ surgery/ interventional centers across the world.

(EDDA Technology, Inc, Aug 13, 2010)

Minimally Invasive Procedure for Brain Tumor

Pineal tumor, one of the most difficult to remove tumors located deep in the midbrain area, can now be safely excised with minimal invasive approach developed at the Skull Base Institute, Los Angeles. Eighty percent pineal tumors are highly malignant. The new approach involves making a dime-size opening behind the ear, inserting a small endoscope over the top of the cerebellum and through a natural pathway accessing the deep seated pineal tumor. This eliminates the need for any metal retractors or having to go through brain tissue to reach the problem area. Pineal tumor is more common in children and average age of diagnosis is 13 years. For patients suffering from significant symptoms, open brain surgery is often the first option, which leaves patients more vulnerable to brain damage and other side effects as well as long and difficult recoveries. When surgery is required, the minimally invasive approach is an excellent and safe alternative and results in much shorter surgery and hospital times and fewer complications.

(Frank Groff Inc., Sep 21, 2010)

PROSTATE CANCER

Nanoparticle Platform for Drug Therapy

Researchers at the Laboratory of Nanomedicine and Biomaterials, Brigham, have engineered a self-assembled polymeric nanoparticle (NP) platform to target and control precisely the co-delivery of cisplatin and docetaxel (Dtxl) to prostate cancer cells. A blend of polylactide-platinum(IV) prodrug in the presence or absence of Dtxl, was converted, in microfluidic channels, to NPs with a diameter of ~100 nm. This process resulted in excellent encapsulation efficiency (EE) and high loading of both hydrophilic platinum prodrug and hydrophobic Dtxl with reproducible EEs and loadings. The surface of the NPs was derivatized with the A10 aptamer, which binds to the prostate-specific membrane antigen (PSMA) on prostate cancer cells. These NPs undergo controlled release of both drugs over a period of 48-72 h. In vitro toxicities demonstrated superiority of the targeted dual-drug combination NPs over NPs with single drug or nontargeted NPs. This work reveals the potential of a single, programmable nanoparticle to blend and deliver a combination of drugs for cancer treatment.

(Proc Natl Acad Sci USA, Oct 4, 2010)

Predictors of Survival for Prostate Cancer

To evaluate the potential predictors of overall, disease-specific, and recurrence-free survival in patients with clinically localized prostate cancer, researchers constructed a tissue microarray from prostate specimens of 278 patients who underwent open radical retropubic prostatectomy. For immunohistochemical studies, antibodies were used against matrix metalloproteinase (MMP)-2, MMP-3, MMP-7, MMP-9, MMP-13, and MMP-19, as well as against vascular endothelial growth factor, hypoxia-induced factor 1á, basic fibroblast growth factor, and cluster of differentiation 31. In univariate analysis only higher expression levels of MMP-9 had a protective effect in terms of overall survival. This positive effect of high MMP-9 expression was also observed for recurrence-free and disease-specific survival. In multivariable analysis, none of these potential markers was found to be an independent prognostic factor of survival. Thus MMP-9 expression has the potential as a prognostic marker in patients undergoing radical prostatectomy for clinically organ-confined cases of prostate cancer.

(Am J Pathol, Oct 1, 2010)

Proton-Beam Therapy

The treatment options for prostate cancer include prostatectomy, external-beam irradiation, brachytherapy, cryosurgery, focused ultrasound, hormonal therapy, watchful waiting, and various combinations of these modalities. Because prostate abuts bladder and rectum, dose distributions of external-beam irradiations and the accuracy of their placement play crucial roles in the probability of tumor cure and the incidence of post treatment complications. Principal among the newer radiation technologies is proton-beam therapy (PBT), whose dose distributions make it possible to deliver higher tumor doses and smaller doses to surrounding normal tissues than from x-ray systems. However, as the 10-year cause-specific survival for early-stage disease treated by radiation therapy now exceeds 90%, and with severe late toxicities in the range of 2% to 3%, randomized clinical trials provide the only means to demonstrate improved outcomes from PBT. The efficacy of PBT can be gleaned only from reports in the clinical literature, and, to date, these reports are equivocal. In view of the current health care scenario and the higher costs of PBT for prostate cancer, it is reasonable to assess the viability of this in-vogue but not-so-new technology.

(Cancer J, Sep-Oct 2010)

Quality-of-Life Impact on Localized Prostate Cancer Patients

In a prospective study, 435 patients were treated with radical prostatectomy, external-beam radiotherapy, or brachytherapy and QoL was assessed before and after treatment. Distribution of outcome at 3 years was examined by stratifying according to baseline status. Generalized estimation equation models were constructed to assess the effects of treatment over time . The study concluded that radical prostatectomy caused urinary incontinence and sexual dysfunction but improved pre-existing urinary irritative-obstructive symptoms. External radiotherapy and brachytherapy caused urinary irritative-obstructive adverse effects and some sexual dysfunction. External radiotherapy also caused bowel adverse effects. Relevant differences between treatment groups persisted for up to 3 years of follow-up, although the difference in sexual adverse effects between brachytherapy and prostatectomy tended to decline over long-term follow-up. These results provide valuable information for clinical decision making.

(J Clin Oncol, Oct 4, 2010)

CLINICAL TRIALS

Early-Stage Hodgkin's Lymphoma

A large multicenter study in Germany has established that patients with early-stage Hodgkin's lymphoma (HL) can safely be treated with 2 cycles of doxorubicin, bleomycin, vinblastin and dacarbazine (ABVD) followed by 20 Gy of radiation therapy (RT). Investigators randomly assigned 1370 patients with newly diagnosed early-stage HL with a favorable prognosis to one of four treatment groups: 4 cycles of ABVD followed by 30 Gy of RT (group 1), 4 cycles of ABVD followed by 20 Gy of RT (group 2), 2 cycles of ABVD followed by 30 Gy of RT (group 3), or 2 cycles of ABVD followed by 20 Gy of RT (group 4). The two chemotherapy regimens did not differ significantly with respect to freedom from treatment failure or overall survival. Adverse events and acute toxic effects of treatment were most common in the patients who received 4 cycles of ABVD and 30 Gy of RT. Researchers concluded that in patients with early-stage HL and a favorable prognosis, treatment with 2 cycles of ABVD followed by 20 Gy of involved-field RT is as effective as and less toxic than 4 cycles of ABVD followed by 30 Gy of involved-field RT.

(NEJM, Aug 12, 2010)

Pancreatic Cancer Treatment

Pancreatic cancer remains one of the hardest cancers to treat. Earlier results suggest that patients who had surgery and chemotherapy had better chance of survival than patients who only had surgery. A major international trial called 'European Study Group for Pancreatic Cancer (ESPAC)-3', the largest of its kind involving 159 centers in Europe, Australia, Japan and Canada, recruited 1088 patients who had undergone surgery for pancreatic cancer. One group had the standard chemotherapy treatment-gemcitabine and the second group had a cheaper widely available drug called 5-fluorouracil. The results are the first to directly compare these two chemotherapies and show that they both are equally effective at preventing cancer returning after surgery. It raises hopes that a new trial currently looking at giving two similar drugs together could lead to a more effective treatment for pancreatic cancer patients who are eligible for surgery.

(Cancer Research UK, Sep 8, 2010)

ThermoDox® Heat Study for HCC

Celsion's global ThermoDox phase III study for hepato cellular carcinoma (HCC) is being conducted under a special protocol assessment with the US FDA. ThermoDox® is a proprietary heat-activated liposomal encapsulation of doxorubicin, which is administered intravenously and in combination with hyperthermia has the potential to provide local tumor control and improves quality of life. Localized mild hyperthermia releases the entrapped doxorubicin from the liposome. This delivery technology enables high concentrations of doxorubicin to be deposited preferentially in a targeted tumor. It has already demonstrated remarkable evidence of clinical activity in phase I studies of primary liver cancer. The 600 patient phase III study, is designed to evaluate the efficacy of ThermoDox® in combination with radio-frequency ablation (RFA) when compared to patients who receive RFA alone as the control. The primary endpoint is progression free survival with a secondary confirmatory endpoint of overall survival. Upon completion of the trial and eventual marketing approval, ThermoDox® plus RFA would provide an additional therapeutic option for patients afflicted with HCC.

(Celsion Corporation, Aug 5, 2010)

Top - Line Brentuximab Vedotin Data

The lack of adequate therapies for the treatment of relapsed and refractory Hodgkin lymphoma represents a substantial unmet medical need worldwide with almost a third of the newly diagnosed patients relapsing or becoming refractory to front-line therapy. In a pivotal trial, brentuximab vedotin (SGN-35), an antibody- drug conjugate that targets CD30, was found to shrink tumors in 75% of 102 patients with relapsed or refractory Hodgkin lymphoma who had not responded to previous treatments. The median duration of response was greater than six months. The safety of the drug was generally about the same in this clinical trial as in previous ones. These top-line results have the potential to provide an important advance in therapy for Hodgkin lymphoma. Seattle Genetics Inc. and the Takeda Oncology Company are planning to report top-line data from their phase II trial very soon. They are now positioned for the Biologics License Application submission to the USFDA and intend to discuss these results with European regulators to support the goal of submitting a marketing authorization application to the European Medicines Agency.

(Seattle Genetics Inc., Sep 27, 2010)

WATCH-OUT

Detection of Ovarian Cancer

Baker Jeffrey P et al (US)have been assigned Patent No WO2010102167 (A1) on September 10, 2010. The patent provides compositions and methods for diagnosing ovarian cancer in a patient and for identifying patients with an increased likelihood of having ovarian cancer. The compositions include novel monoclonal antibodies, and variants and fragments thereof, that specifically bind to matrix metalloproteinase-7 (MMP-7). Monoclonal antibodies having the binding characteristics of an MMP-7 antibody of the invention and monoclonal antibodies that bind to an MMP-7 epitope of a disclosed antibody are also provided. Hybridoma cell lines that produce an MMP-7 monoclonal antibody of the invention are also disclosed. Kits comprising one or more of the disclosed MMP-7 monoclonal antibodies and for practicing the methods of the invention are further provided. Polypeptides comprising amino acid sequence for an MMP-7 epitope of a disclosed monoclonal MMP-7 antibody and methods of using these polypeptides in the production of MMP-7 antibodies are also encompassed by the invention.

(esp@cenet.com, Oct 12, 2010)

Mammostrat® Test for Breast Cancer

The United States Patent and Trademark Office and the European Patent Office have allowed patents covering the technology behind Clarient Insight® DX Mammostrat®. This test is designed to aid in the classification of the risk of recurrence of breast cancer following surgery and initial treatment. Mammostrat development was targeted to breast tumors which express estrogen receptor. The standard of care for most of these patients is surgery to remove the tumor followed by anti-hormonal therapy with tamoxifen or aromatase inhibitors. Mammostrat® test has been validated in various studies as an aid for risk-stratifying early stage hormone receptor-treated breast cancer patients. This test would help pathologists, oncologists and patients decide whether additional aggressive chemotherapy should be added to a patient's treatment regimen. Clarient, Inc. is a premier technology and services resource for pathologists, oncologists and the pharmaceutical industry. Gaining allowance of these important patents represents a milestone for Clarient.

(Clarient Inc., Aug 10, 2010)

Particle Beam Therapy System

The United States Patent and Trademark Office has assigned Patent No 7,772,577 entitled "Particle Beam Therapy System" to Hitachi Ltd (Tokyo, JP) on Aug10, 2010. The invention relates to a particle beam therapy system capable of high precision irradiation for treatment, and more particularly to a particle beam therapy system suitable for using a spot scanning irradiation method. The system includes a synchrotron, a beam transport system, an irradiation system, and a controller. A controller is configured to turn on a radio frequency electromagnetic field to be applied to an extraction system when a charged particle beam is to be supplied to the irradiation system, and turn off the radio frequency electromagnetic field to be applied to the extraction system when the supply of the charged particle beam to the irradiation system is to be blocked by means of an electromagnet provided in the beam transport system or in the synchrotron. The controller is also adapted to turn off a radio frequency acceleration voltage to be applied to an acceleration cavity in synchronization with the turning-off of the radio frequency electromagnetic field to be applied to the extraction device. The particle beam therapy system can be realized at low cost.

(USPTO, Oct 11,2010)

TM7SF3 Protein for Diagnosing Liver Cancer

The TM7SF3 protein is rarely expressed in liver tissue of a healthy person, but is specifically over-expressed in malignant hepatic tissue of liver cancer patients. Choi So Young (KR) et al have been assigned Patent No WO2010098613 (A2) on Sept 2, 2010, which relates to a composition for diagnosing liver cancer containing TM7SF3 as an active ingredient, a kit for diagnosing liver cancer with anti-TM7SF3 antibodies as reagent, and a pharmaceutical composition for preventing or treating liver cancer containing the anti-TM7SF3 antibodies as an active ingredient. As diagnosis or prognosis of liver cancer is predictable, the TM7SF protein can be used as a marker for diagnosing liver cancer. In addition, the anti-TM7SE3 antibodies of the present invention specifically bind with an extracellular domain of the TTM7SF3, and respond to this particular liver cell line. Therefore, the anti-TM7SE3 antibodies selectively induce apoptosis of only cancer cells caused by IM7SF3 over-expression, and can thus be used in preventing or treating liver cancer.

(www.patentlens.net, Oct 11, 2010)

GLOBE SCAN

Practice Changes: Ovarian Cancer

New research at Vancouver General Hospital and BC Cancer Agency has recently discovered that the majority of high grade serous tumors, the most deadly form of ovarian cancer, actually arise in the fallopian tube, not the ovary. Researchers have begun an important campaign that would reduce deaths from ovarian cancer. They are asking gynecologists to change surgical practice to fully remove the fallopian tube when performing hysterectomy or tubal ligation. Current practice leaves the fallopian tube in place for many types of hysterectomy and tubal ligation. The data demonstrated that 18% of women who had developed ovarian cancer had a prior hysterectomy. The team has found that one in five serous cancer tumors occur because of germline BRCA genetic mutation. The team is translating their findings into important changes to benefit patient care. The message is two-fold: remove the fallopian tube during surgery and refer ovarian cancer patients who have a serous tumor to the Hereditary Cancer Program. These measures can reduce deaths from high grade serous cancer by 50% over 20 years.

(Canada: BC Cancer Agency, Sep 14, 2010)

Fight Against Cancer

Cancer has emerged as one of the biggest threats to the health of the world's most populous country, China. Over the past 30 years, the incidence of cancer in China has increase by 80% percent. Every year, 2.6 million Chinese people are diagnosed with cancer and 1.8 million Chinese die from it. Cancer in China has since 2009 become the number one reason for death among all illnesses. The most common cancers are; lung, liver, stomach, esophagus, colon and rectum. The incidence of breast cancer is also on the rise. Rates of cancer in villages and small towns have surpassed those in big cities, causing a heavy economic burden with a corresponding social impact. Approximately 40 percent of all cancers are a result of life style choices, infectious diseases and environmental or occupational hazards, meaning the disease is potentially preventable. However, urgent action is still needed by the government, the medical community and individuals to stop the rising number of deaths caused by cancer.

(China: UICC, Aug 19, 2010)

Risk of Cancer in Atomic Bomb Survivors

Until now, it has been unclear to what extent exposure to radiation increases a person's risk of developing more than one cancers. The first large study of the relationship between radiation dose and risk of multiple cancers among atomic bomb survivors in Hiroshima and Nagasaki in Japan has revealed a similar risk in the development of first and second subsequent cancers, such as solid tumors and leukemias in both men and women, regardless of age at exposure or duration between first and primary cancers. The association between radiation exposure and risk of second cancers was particularly significant for radiation sensitive cancers, such as those of the lung, colon, breast, thyroid and bladder, as well as leukemia. Findings suggest that cancer survivors with a history of radiation exposure should continue to be carefully monitored for second cancers. Moreover, research is essential for developing radiation protection limits and standards for occupational exposures as well as planning for the consequences of widespread radiation exposure in the general population in the event of a nuclear accident, nuclear war or 'dirty bomb' terrorist attack.

(Japan: Cancer Research, Sep 15, 2010)

Cancer Care in Developing Countries

A group of leading cancer and public health experts are calling for a global movement on cancer care and prevention in low and middle income countries (LMIC) similar to the HIV/AIDS movement. It can be done using generic, off patent drugs, education of populations and better training of doctors and community workers. Cancer is no longer primarily the burden of high income countries. Almost two-thirds of the 7.6 million annual cancer deaths worldwide occur in LMIC, making it a leading cause of mortality. The inequity of cancer care is further demonstrated by the case fatality from cancer, which is 75% in low-income countries and 46% in high income countries. The gaps between low income and high income countries in access to cancer care and control are one of the greatest challenges in global health in the world. The extension of integrated cancer prevention, diagnosis and treatment of millions of people at risk of or living with cancer is an urgent health and ethical priority. The gaps can be reduced through a bold research, financing and implementation agenda that combines global and local efforts.

(US: The Lancet, Aug 18, 2010)

PINK RIBBON AT RGCI&RC

COMPREHENSIVE BREAST CANCER CARE CENTRE

Introduction

The incidence of breast cancer in the west has attained massive proportions, with 1 in every 8 women in the US and I in every 9 women in UK likely to suffer from the disease. India is also fast catching up because of rapid growth in industrialization and urbanization, resulting in change in life style factors. It is the most common cancer among women in many regions and has overtaken cervical cancer, which was the most frequent cancer a decade ago.

It is important to care for breast cancer patients at a comprehensive facility to improve patient care, enhance workflow and efficiency; to maximize competitive advantage by providing innovative, integrated, high quality and cost-effective care; to form an inter-disciplinary approach to achieve excellence in care and management of breast cancer; to navigate a patient from point of screening through the completion of breast cancer treatment; to recruit and enroll patients in clinical trials and regular follow-up of breast cancer survivors.

Criteria for Breast Cancer Strategy

In most cancer programs, breast cancer is the largest driver of patient volume and as such, the first tumor site selected for site-specific program development. For developing breast cancer centre, technologies and best care must provide high quality, and stream lined patient centered care. Salient features for a future breast cancer strategy include: evaluating new screening, diagnostic and therapeutic technologies; perfecting patient flow from diagnosis through treatment; evaluating quality through coordinated multidisciplinary patient care; understanding key trends in breast cancer care; developing and implementing a breast cancer-specific strategic plan relevant to their organization; and identifying elements of a best-in-class breast centre.

Breast Cancer Care at RGCI&RC

Rajiv Gandhi Cancer Institute and Research Centre (RGCI&RC) is a comprehensive cancer care setup with all type of facilities for diagnosis and treatment. From 1996 to 2007, breast cancer (30.85%) was the leading cancer site in females, followed by cervix (11.38%). The Mission of the RGCI & RC Comprehensive Breast Cancer Care Centre is to contribute to the prevention and cure of cancer by addressing the needs of the breast cancer patients through scientific research and clinical trials with an interdisciplinary approach.

An overview of the types of patients seen at RGCI&RC includes women who: discover a lump, have an abnormal mammogram or biopsy, have recently been diagnosed with breast cancer, want a pathology (second opinion) consultation, need breast cancer treatment, are considering breast reconstruction, are concerned about their breast cancer risk, want to learn about breast self examination, want genetic counseling for themselves or a family member, need lymphedema prevention and/or management or want a breast specialist to routinely perform their clinical breast examination.

The centre's state-of-the- art technologies and highly skilled medical professionals are internationally recognized. Patients have access to the most advanced tests and therapies and are provided consultation involving services including: specialized diagnostic evaluation and testing, consultation and treatment by breast cancer specialists, second opinion for newly diagnosed and recurrent breast cancer patients, access to clinical trials, psychological counseling and support, physical and occupational therapy, and preventive services.

The treatment of breast cancer requires an individualized approach in several steps because the disease consists of many types of breast cancers. Patients have the right to make treatment decision and have access to the most advanced tests and therapies available. These services include radiological evaluaton and biopsies, focused expertise in breast cancer surgery, drug therapy including hormonal therapy, chemotherapy or targeted therapy and radiation therapy. Counseling is available for individual and family psychotherapy, and physical and occupational therapy. Breast cancer patients benefit from a wide range of preventive services including: an assessment of breast cancer risk based on family history and other factors; instructions in breast self-examination; recommendations for mammography and other types of screening; risk reduction techniques achieved through lifestyle changes. Multidisciplinary Breast Cancer Tumor Board meets weekly and discusses cases of interest that are more complex than average cases and that require joint discussion and the participation of the entire team. Educational programs are also conducted at tumor board meeting.

Addressing the needs of the underserved is a challenge for any breast centre. A team of workers including doctors, nurses and health educators from RGCI&RC reach out to the local community to educate and induce women to come to RGCI & RC for clinical breast examination and regular screening for common cancers in women.

If at any time during treatment the patient manifests emotional concerns, she is referred for psycho-therapy. Her family is also offered this service. Patients with a significant history of breast cancer will be referred for genetic counseling and testing. Patients experiencing lymphedema are referred to physiotherapist for lymphedema management. Patients with other co-morbid conditions that have not been properly evaluated are referred to an internal medicine specialist for assessment and treatment as appropriate.

Every patient has the right to directly participate in decision-making about her care and treatment. The centre thus provides patients relevant information and educates them in order that they actively participate in their breast health care processes. Patients are able to express their opinions openly, freely and are heard. If they have concerns about their care or wish to make suggestions to the staff for improving care or services, their opinions are taken seriously into account. Patients have the right to talk with patients previously diagnosed and treated in the Breast Centre to obtain answers to candid questions and to receive ongoing emotional support.

Patients can expect effective continuity of care, including timely communication between the Breast Centre physicians and the patients' referring physicians and other health care providers. Patients can expect urgent care needs to be effectively addressed. Health care professionals are available 24 hours a day, 7 days a week to accomplish this. Patients can rest assured that their emotional needs and that of their families personally and individually would be duly assessed and supported through interventions by the physicians, nurses, social workers and counselors. Patients should hope to be offered resource to help with image recovery, targeted at improving and rebuilding self-image and self-esteem which may change as a result of breast cancer treatment. The goal is to restore the patients' health status, including their emotional well being.

Main Thrust Areas

Comprehensive Breast Cancer Care Centre provides complete breast health sevices, including breast health education, screening, diagnostic and treatment planning. This is done by the follwoing important approaches:

Pre-operative Counseling: Pre-operative counseling is done for all patients. It helps to assist the patient in physical and emotional rehabilitation, to alleviate needless anxiety before surgery and arrange visits by patient who has had a mastectomy and has made a satisfactory adjustment.

***Post-operative Visit by Physiotherapist and Dietician*:** Physiotherapist explains the importance of exercises and encourages the patients to carry these out regularly. They are advised about regular follow-up to prevent any complications, like lymphedema etc. Dietican also visits the patients to give dietary advice for speedy recovery.

Proper Advice of Breast Prosthesis: A breast-prosthesis is an artificial breast that is used after a surgery in which the breast has been altered or removed. Whether the loss of the breast is permanent or temporary, a breast shape can be worn to simulate the natural breast and body-shape. Many types of prosthesis are available in comprehensive breast cancer care (usually silicone, foam, etc). Advice is also given to the patients about wearing the breast prosthesis.

Get-together of Breast Cancer Survivors: The basic idea of get-together of breast cancer survivors is to provide a platform where the survivors can express their feelings freely regarding themselves and meet other women who have survived breast cancer, so that they may benefit from such interactions. These get-togethers are held regularly twice a year.

Conclusion

Comprehensive breast cancer care program of RGCI & RC addresses the needs of women with breast cancer, which is imperative for a successful women's health program. Primary concern of treating breast cancer patients is to: limit the trauma of diagnosis and treatment of this very serious illness, render services with compassion and professional skill, allow nothing to interfere with what is in the patient's best interest, and be patient's advocate in interaction with the health care system.

(Reviewed by Dr Rajni Mutneja, Head, Dept of Preventive Oncology; Dr Veda Padma Priya, DNB Student; Dr Kapil Kumar, Senior Consultant, Dept of Surgical Oncology)

URO-ONCOLOGY WORKSHOP

Organization

Science has constantly been evolving over the years, especially in the medical field. But never has been the pace of developments so rapid as during the last decade. In the field of uro-oncology, the surgical procedures have progressed from open surgery to laparoscopic surgery to robotic surgery. Such advancements pose new challenges in the field which already require special skills, focus and dedication. To provide an overview of these complex procedures, a live operative workshop was conceptualized, and jointly implemented by Rajiv Gandhi Cancer Institute & Research Centre (RGCI&RC), All India Institute of Medical Sciences (AIIMS) and Dr. Ram Manohar Lohia Hospital (Dr RML) & PGIMER, under the aegis of Genito Urinary Cancer Society of India (GUCSI). The workshop was conducted from 1st to 3rd October 2010.

Dr Sudhir Rawal, Senior Consultant, Dept of Genito-Uro Oncology, RGCI&RC and Organizing Chairman; Dr Rajeev Sood, Head Dept of Urology, Dr RML Hospital & PGIMER, and Organizing Co-Chairman; and Dr Samir Khanna, Additional Consultant, Dept of Genito-Uro Oncology, RGCI&RC & Organizing Secretary, organized this event with the help of Dr PN Dogra, Head, Dept of Urology, and Dr Amlesh Seth, Professor, Dept of Urology, AIIMS. In a first of its kind venture, simultaneous surgeries were performed at RGCI&RC and AIIMS, and transmitted to the Auditorium at Dr RML Hospital &PGIMER. In spite of the hussle and bussle in Delhi just before the start of the Commonwealth Games, the workshop was attended by more than 200 delegates from India and abroad.

Faculty

The international faculty comprised of Dr Urs E Studer, Senior Consultant, University Hospital, Berne, Switzerland, who is credited with original research on Ileal Neobladder Techniques for which he is renowned worldwide; Dr Eric Le Blanc, Lille, France, famous for Laparoscopic Gynecological Surgery and Retroperitoneal Lymphnode Dissection (RPLND) in testicular tumors; Dr John Davis, Assistant Professor, MD Anderson Cancer Centre, USA, who is proficient in all robotic procedures; and Dr Ashok Hemal, Director of Robotic and Minimal Invasive Surgery, Wake Forest University, School of Medicine, USA, who has developed robotic surgery at this centre.

Proceedings

The proceedings started at 8.30AM on 1st October with the lighting of lamp at Dr RML Hospital by Dr T S Sidhu, Medical Superintendent and Dr N K Chaturvedi, Director. It was followed by welcome remarks by Dr Rajeev Sood. This was followed by lectures on 'Radical Treatment of Organ Confined Carcinoma Prostate' by Dr John Davis and 'Laparoscopic RPLND in testicular tumor' by Dr Eric Le Blanc. Dr Anant Kumar, Head of Urology, Fortis Hospital, Delhi gave a talk on 'Laparoscopic Nephroureterctomy in TCC Ureter' and Dr PN Dogra a video presentation on ''Prepubic Extra Peritoneal Robotic Radical Prostatectomy'. This was followed by simultaneous live operative sessions from RGCI&RC and AIIMS. 'Open Radical Cystoprostatectomy with Pitcher Pot Ileal Neobladder' for carcinoma bladder by Dr Sudhir Rawal and 'Video Endoscopic Inguinal Lymphadenectomy' for carcinoma penis by Dr Raghunath from Bangalore Institute of Oncology were done at RGCI&RC, and 'Robotic Cystoprostatectomy with Ileal Conduit' for carcinoma bladder by Dr John Davis and 'Continent Urinary Diversion' for exstrophy bladder by Dr Amlesh Seth were done at AIIMS. All these surgeries were well appreciated by the audience. This was followed by a video presentation on 'Carcinoma Penis' by Dr Hemant Tongaonkar from Tata Memorial Hospital (TMH), Mumbai, and a lecture on 'Role of PET in Uro-Oncology' by Dr PS Choudhury, Head, Dept of Nuclear Medicine, RGCI&RC. A panel discussion on 'Carcinoma Prostate' concluded the session in which Dr J N Kulkarni, from Mumbai presented some interesting cases. The eminent panel consisted of Urologists, Radiation and Medical Oncologists.

The workshop was formally inaugurated at a function held at Stein Auditorium at India Habitat Centre at 7.30PM on 1st October. Prof Deepak Pental, Vice-Chancellor, University of Delhi was the Chief Guest. Mr D S Negi, CEO, RGCI&RC, gave the welcome speech and Dr KV Swaminathan, Chairman, RGCI&RC addressed the gathering. Other speakers included Dr PN Dogra and Dr Rajeev Sood; Dr Sudhir Rawal read the vote of thanks. This was followed by a light musical programme and dinner.

The proceedings on 2nd October commenced at 8.30AM with Dr Janak Desai, Samved Hospital from

Inauguration at Stein Auditorium
Left to Right: Dr Sudhir Rawal, Dr T S Sidhu, Dr K V Swaminathan, Prof Deepak Paintal, Dr P N Dogra, Dr Rajeev Sood, Mr D S Negi

Ahmedabad presenting an 'Overview of Carcinoma Prostate'. Dr Hemant Tongaonkar shared TMH experiences on 'NSS in RCC', Dr Ashok Hemal presented 'Laparosopic and Robotic Partial Nephrectomy' and Dr Yuvraja from Mumbai presented his experience with Video Endoscopic Inguinal Lymphadenectomy. Simultaneous live operative sessions were performed on, 'Laparoscopic RPLND' for testicular tumor by Dr Eric Le Blanc, and on 'Laparosopic Partial Nephrectomy' for renal tumor by Dr Ashok Hemal at RGCI&RC; whereas 'Robotic Radical Prostatectomy' for carcinoma prostate by Dr John Davis, 'Radical Cystoprostatectomy with Sigmoid Neobladder' for carcinoma bladder by Dr Amlesh Seth and 'Robotic Adrenalectomy' for pheochromocytoma by Dr PN Dogra were performed at AIIMS. The audience interacted with the surgeons during these procedures and were enlightened about various points. Thereafter, Dr Nikhil Khattar, Assistant Professor, Dr RML Hospital gave a video presentation on 'Perineal Radical Prostatectomy' by Dr Studer enlightened the audience on 'Patient Selection and Postoperative Management after Ileal Orthotopic Bladder Substitution'. A panel discussion on 'Carcinoma Urinary Bladder' was conducted at the end of the day by Dr Anil Mandhani, from Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow in which he posed some challenging cases to the panelists.

Left to Right: Dr S N Wadhwa, Dr Sudhir Rawal, Dr Urs E Studer, Dr Bejoy Abraham & Dr Rajeev Sood

As usual, the workshop proceedings started at 8:30AM even on Sunday, the 3rd of October, with lectures on 'Hormone Resistant Prostate Cancer' by Dr P K Das, Medical Oncologist, Apollo Hospital, Delhi and on 'Metastatic RCC' by Dr Ranga Rao, Medical Oncologist from Artemis Hospital, Delhi, that covered the newer modalities. Dr Ashok Hemal presented his experiences on 'Laparoscopic and Robotic Radical Cystoprostatectomy'. Thereafter, a live demonstration of 'Radical Cystoprostatectomy with Ileal Neobladder' was given by Dr Urs E Studer, known for 'Studer Neobladder' named after him. He went about his surgery like a true master, demonstrating and explaining every aspect of the procedure. The audience was so captivated by the demonstration that they had to be coaxed to get up for lunch, and the huge applause at the end of surgery confirmed their appreciation. Finally, Dr Sudhir Rawal demonstrated 'High Intensity Focused Ultrasound', a new technique of prostate ablation for carcinoma prostate. This brought the curtains down on this academic extravaganza.

(Dr Sudhir Rawal, Senior Consultant and Dr Samir Khanna, Additional Consultant, Dept of Uro-Genital Oncology)

HELP FIGHT CANCER

WARNING SIGNALS OF CANCER

1. Change in bowel or bladder habits
2. A sore that doesn't heal
3. Indigestion or difficulty in swallowing
4. Obvious change in wart or mole
5. Nagging cough or hoarseness
6. Unusual bleeding or discharge
7. Thickening or lump in breast or elsewhere

Please **Mark** your dates!

RGCON 2011

10th Annual International Conference

Organized by

Rajiv Gandhi Cancer Institute & Research Centre

4th - 6th February 2011

Venue: **India Habitat Centre, New Delhi**

Conference Theme

"MALIGNANCIES IN CHILDHOOD"

Highlights

- All you need to know about Pediatric Cancers
- Troubleshooting: Everyday problems in your practice
- Latest updates from National & International Experts: ALL, AML, Lymphomas, solid tumors
- Radiotherapy and surgery in skeletally immature children
- Immunophenotyping and MRD by Flowcytometry
- Pathology predictive markers in pediatric solid tumors
- Vaccination: when and what
- Workshops: Immunophenotyping & MRD by flowcytometry, Pediatric surgical oncology, Line care & chemotherapy, Survivors

Who should attend: Pediatricians, pediatric surgeons, orthopedic surgeons; Oncologists- pediatric, medical, radiation and surgical oncologists; hematologists, pathologists, nurses

Deadlines:

Abstract submission: December 15, 2010

Registration open, For details visit: www.rgci.org/rgcon2011

Confirmed International Faculty

Dr Raul Ribeiro (St Jude Children's Research Hospital, Memphis, USA)
Dr Rob Pieters (ErasmusMC Sophia Childrens Hospital, Netherlands)
Dr Alfred Reiter (BFM, Justus-Liebig-University, Germany)
Dr Dario Camaana (St Jude Children's Research Hospital, Memphis, USA)
Dr Elaine Coustan-Smith (St Jude Children's Research Hospital, Memphis, USA)
Dr Bhaskar Rao (St Jude Children's Research Hospital, Memphis, USA)
Dr Y Ravindranath (Wayne State University, Detroit, USA)
Dr Raj Warrier (Ochsner Hospital New Orleans, USA)

Organizing Secretary, RGCON-2011:
Dr Gauri Kapoor MD, PhD
Sr. Consultant and Head Pediatric Hematology & Oncology
Rajiv Gandhi Cancer Institute & Research Centre,
Sector 5, Rohini, Delhi-110 085
Telefax: +91-11-47022621; Fax: +91-11-27051037; e-mail: rgcon2011@gmail.com
www.rgci.org/rgcon2011