



RAJIV GANDHI CANCER INSTITUTE & RESEARCH CENTRE

Newsletter

Vol. XIV

No. 5

Price : 50 Paise

Issue : May 2011

SECTOR-V, ROHINI, DELHI-85 • Tel. : 47022222 (30 Lines) 27051011-1015, Fax : 91-11-27051037

EDITORIAL BOARD :

- | | | | |
|---------------------------|-----------------------|-----------------------------|-------------------------|
| ★ Mr. D. S. Negi (C.E.O.) | ★ Dr. P. S. Choudhury | ★ Dr. Rupinder Sekhon | ★ Dr. Sandeep Mehta |
| ★ Dr. A. K. Chaturvedi | ★ Dr. A. Jena | ★ Dr. (Col.) A. K. Bhargava | ★ Dr. Sheh Rawat |
| ★ Dr. D. C. Doval | ★ Dr. S. K. Rawal | ★ Dr. N. R. Dutta | ★ Dr. S. K. Sharma |
| ★ Dr. Gauri Kapoor | ★ Dr. Kapil Kumar | ★ Dr. R. S. Jaggi | ★ Dr. Amitabh Sandilium |
| ★ Dr. Anurag Mehta | ★ Dr. Sunil Kr. Gupta | ★ Dr. Pankaj Pande | |
| ★ Dr. S. A. Rao | ★ Dr. B. K. Naithani | ★ Dr. Vineet Talwar | |

Editor : Dr. A. K. Dewan

EDITORIAL

SIMULATION TRAINING

Some Professions that are typified by high-hazard, high-acquity crises, such as the aviation industry, the military, and the nuclear power industry, have long ago institutionalized simulation-based training. Medical education has been slow to embrace simulation for reasons of cost, complacency, and lack of rigorous determination of reliability and construct validity. Many articles in literature have condemned the use of animals for training in basic procedures, again highlighting the role of simulation-based training.

The first attempted surgical simulation utilizing virtual reality took place two decades ago. Since then, computer power has rapidly improved, as has the quality of procedural simulation both in terms of visual fidelity and enhancements such as haptic feedback. The digital aspects of these computer-based simulations allow robust data capture to provide immediate performance assessment and feedback. Professional organizations have begun to seriously consider the potential of these tools to revolutionize the surgical training and certification processes.

Although the advent and acceptance of laparoscopic surgery was soon followed by curricula and guidelines for training, the specific metrics of evaluation were lacking. Currently, there is no standardized threshold level that residents are expected to attain, and there is no consensus on metrics of performance, methods of evaluation, or the significance of these measurements when applied to clinical outcomes.

Currently, simulation – based training and assessment is available for such diverse procedures as

general laparoscopy, laparoscopic cholecystectomy, hysteroscopy, bronchoscopy, esophagoduodenoscopy, ERCP, endoscopic ultrasound, arthroscopy, endoscopic sinus surgery, endovascular surgery, robotics and others. For most of these applications, the procedure being simulated requires interaction with an image. It is fascinating to consider that the field is generally at the same stage of development as the first flight simulator. It took nearly 20 years for the field of flight simulation to develop into a standard part of flight training and certification, so we will in all likelihood continue to see significant advances in surgical simulation.

We should in India, create centres of Medical Simulation, which will translate into improved real world communication, collaboration and team work. Simulation programmes could cover a range of healthcare areas including anesthesia, emergency medicine, ICU care, obstetrics practice, various surgical procedures and crisis management response in many domains. We can in future generate automated performance data and issue simulation training certificates.

Trainers in medical simulation could be experts in medicine, biomedical engineering, HR and Quality Cell. They should ensure that each simulation session is customized and uniquely effective. Simulation workshops organized by such centres could simulate a patient in highly realistic clinical environment. Even the non clinicians may actually get a chance to care for a patient and experience real-time issues first hand. It could be an eye-opener!!

Dr. A. K. Dewan

Medical Director



RADIATION ISSUES IN MEDICAL PRACTICE

Radiation describes any process in which energy travels through a medium or through space. Some types of radiation have enough energy to ionize particles. Generally, this involves an electron being 'knocked out' of an atom's electron shells, which will give it a (positive) charge. This is often disruptive in biological systems, and can cause mutations and cancer.

Man-Made Radiation includes medical radiation like x-rays and diagnostic or therapeutic radiation. Radiation in medical practice largely comes from X-rays, CT scans, Mammography, Bone scans, PET CT scans and Radiotherapy.

Unfortunately, the benefit of imaging for a particular patient is often hard to predict. There have not been many trials linking imaging decisions to patient outcomes. Assessing patient's risk of cancer based on radiation exposures are linearly extrapolated from data from Japanese atomic-bomb survivors (but a linear hypothesis is controversial).

Responsible radiological imaging is the key to minimize unnecessary radiation from medical practice. At the same time it is necessary to avoid overestimating the risk from radiation.

Source of radiation

The source of radiation to mankind is natural radiation and manmade radiation.

Natural Radiation (Background radiation) :-

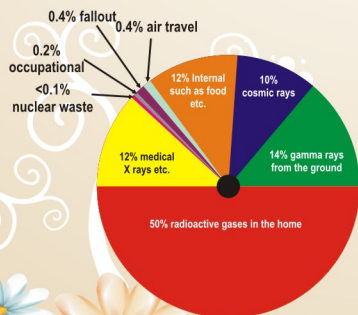
It accounts for 80 per cent of our radiation exposure and includes solar and cosmic radiation, radiation emitted from the earth's crust, radon, and internal radiation from the foods we eat and drink

Man-Made Radiation :-

The components of manmade radiation are medical (x-rays and diagnostic or therapeutic), industry, consumer products (such as smoke detectors and television sets), testing of nuclear weapons etc.

Medical sources of radiation: Benefits and risks

The diagram below shows the radiation contribution from medical x-rays, which stands at 12% of radiation from all sources.



AERB guidelines

Atomic Energy Regulatory board (AERB) of India has laid down guidelines for the maximum permissible dose for public and occupational workers.

Public

- 5 mSv in 5 years
(1 mSv per year)

Occupational workers

- 100 mSv in 5 years
(Average 20 mSv per year)
- Not >30 mSv in any single year

The estimated radiation dose from different diagnostic investigations and its comparison with equivalent background radiation is as in the chart below :

Investigation	Effective Radiation	Background Radiation
CT Abdomen	10mSv	3 yrs
CT Chest	8mSv	3 yrs
IVU	1.6mSv	6 months
CT Head	2mSv	8 months
X ray chest	0.1 mSv	10 days

Computed tomographic (CT) scans may deliver a radiation dose of upto 20 mSv. An excess of cancers has never been detected in laboratory animals or in humans for doses below 100 mSv. This model is used for analyzing data from cohorts including persons who have received doses higher than 100 mSv. This method is exposed to strong bias. Defense mechanisms against radiocarcinogenesis are much more effective at low doses, and the use of the linear no-threshold model in this dose range is highly debatable. It greatly overestimates the risk. After repeated x-ray examinations, induction of cancer has been observed only when the cumulative dose was above 500 mSv. In patients treated with radiotherapy, a threshold was reported for irradiation doses of 0.6 Sv delivered in 30 sessions. Overestimation of the risk may deprive patients of beneficial examinations.

Are there benefits of having x-rays? Yes, if they outweigh the radiation risks. A broken bone needs an X-ray to fix it. Health benefit of the extra radiation to fix a fracture can't be questioned. However every situation is not so simple to judge.

Responsible radiological imaging: Optimizing the need and radiation dose

Radiation dose is optimized when imaging is performed with the least amount of radiation required to provide adequate image quality.

However the imaging procedures need to be standardized. Radiation doses are higher than they should



be and they vary dramatically within and between facilities. No uniform standards exist for how much radiation is needed to produce a scan. Two patients may be getting vastly different amounts of radiation to get the same diagnosis.

Because the use of radiation carries an element of risk, we need to adopt a new paradigm for our approach to imaging. Instead of investing so many resources in performing so many procedures, we should step back and design and execute desperately needed large-scale, randomized trials to figure out which procedures yield net benefits. Centre for Medicare and Medicaid services in the USA has launched a \$10 million project to evaluate the efficacy of decision-support systems for ordering diagnostic imaging studies. The aim is to assess if decision-support systems can promote the ordering of diagnostic imaging procedures only when they are clinically appropriate thereby reducing unnecessary radiation exposure.

A group of workers in Boston performed diagnostic, contrast-enhanced multidetector CT scanning in 39 patients who were aged at least 65 years and who had a history of cancer. In a blinded review of image quality and anatomic details of the abdominal wall and organs, two radiologists rated randomized CT scan slices done at a standard radiation dose (240-300 mA) and at a 50% reduced dose (120-150 mA) at a constant kilovoltage of 140.

Although the image quality score was significantly higher overall ($P < .005$) on the scans obtained with standard-dose CT, there was no statistically significant difference in image quality in the half-dose and standard-dose CT scans in patients who weighed less than 180 pounds and who had a transverse abdominal diameter of less than 34.5 cm, an anteroposterior diameter of less than 28 cm, a cross-sectional circumference of less than 105 cm (42 in), and a cross-sectional area of less than 800 cm².

Abdominal CT scan quality appears to be acceptable even with a 50% reduction in radiation dose except in patients with large anthropometric measurements. A reduction in CT radiation dose is possible if the tube current is optimized for the patient's weight and abdominal dimensions.

Many doctors order tests that will not find the cause of their patients' complaints. Perhaps due to the practice of defensive medicine to avoid litigation Americans today receive seven times more radiation from diagnostic scans than in 1980. But better communication among doctors and providing physicians with decision-making technology could cut down on unnecessary tests.

In most cases, an imaging procedure enhances the accuracy of a diagnosis or guides a medical treatment and is fully justified, because it benefits the patient. But some imaging procedures are not justified, because they are

unnecessary for the patient's care. These are the uses of imaging that we, as medical physicists, radiologists, radiation oncologists and educators, should try to identify and eliminate.

Many large hospitals, like Massachusetts General in Boston, have developed decision support software that helps doctors ordering scans decide which tests would be best for their patients' complaint.

Programs like this need to be made available to more doctors to eliminate unnecessary tests. Non-radiologists need to find a better way to communicate with radiologists to see if the test they want to order is really necessary. Patients often request specific imaging tests, and doctors need to take the time to explain why ordering them is a waste of money and resources.

We should step in to protect patients from radiation from CT scanners. Doctors should stop ordering so many scans, which often find conditions that might have been better left untreated. There should be clear guidelines about how to best use advanced diagnostic tests.

The real threat from using advanced imaging technology is when doctors stumble on a potential problem and need to follow up. Doctors need to be more critical about using medical imaging, reserving it for patients who really need it. We need to convince physicians that a quest for certainty is not always possible, is costly and sometimes harmful.

Conclusion

The growth of medical imaging has yielded important and life-saving benefits for millions of people. However over utilization of medical imaging can expose patients to unnecessary radiation.

We should aim to raise awareness among providers of opportunities to eliminate unnecessary imaging exams and lower the amount of radiation used in necessary imaging exams to only that needed to capture optimal medical images. Factors that contribute to over utilization of diagnostic imaging are the fee-for-service payment system, the practice of self-referral, the practice of defensive medicine in avoiding malpractice suits, referring physician behavior, and often the wishes of patients who, armed with internet surfing, may seek specific studies.

In emergency situations, the benefits of appropriate x-ray imaging always outweigh the possible cancer risk. "Image wisely" that is doing the right examination and "Image gently" that is with the least amount of radiation to produce an optimal result, are the key words to remember.

Dr. Arvind K. Chaturvedi, MD, Director
Dr. S. A. Rao, MD, Senior Consultant
Dept. of Radiology

**ANOTHER MILESTONE IN BONE MARROW TRANSPLANT**

Dear Colleague,

It is our pleasure to share the moment of achieving another milestone.

Bone Marrow Transplant Program at Rajiv Gandhi Cancer Institute & Research Center has successfully performed 100 Hematopoietic stem cell transplants (Bone Marrow Transplant).

Rajiv Gandhi Cancer Institute & Research Center is a leading Bone Marrow Transplant centre in India since 2001. Rajiv Gandhi Cancer Institute & Research Center has a 4 bedded, HEPA filtered Bone marrow transplant unit and a dedicated team of renowned transplant specialists and hemato-oncologists.

Not only patients from various part of India but many International patients opt Bone marrow transplant at Rajiv Gandhi Cancer Institute & Research Center as their first choice.

We are regularly performing Allogenic as well as autologous transplant for various malignant diseases. Aplastic anemia and Thalassemia major are among major indications for nonmalignant diseases, while Acute myeloid leukemia (AML), Acute lymphoblastic leukemia (ALL), Multiple Myeloma (MM), Non-Hodgkin Lymphoma, Hodgkin's lymphoma, Chronic myeloid leukemia (CML) and Neuroblastoma are the malignant diseases, we have treated with transplant.

With the help of our cutting edge technology and internationally trained faculty; our results have been at par with international standards. Transplant is an expensive treatment, requires lot of resources but at RGCI&RC cost of a transplant has been very affordable as compared to other corporate private sector hospitals.

We are especially thankful to all of you, our patients and our dedicated team for achieving this memorable Milestone.

In future we are expanding our program and incorporating Cord blood transplant, Haploidentical transplant and Matched unrelated donor transplant.

We hope your constant suggestion and cooperation for your future endeavour.

BMT TEAM OF RGCI & RC

Posted at : Ashok Vihar Head Post Office, Delhi-110052
Registered with Registrar of Newspaper Under No. 68797/98
Postal Department Registration No. DL(N)06/004/2009-11
Licensed to Post without prepayment under No.:"U"(DN)-162/ 2009-11

TOTAL COMMITMENT !!**BLOOD DONATION BY RGCI & RC STAFF**

There are very few people in this world who have the ability and feelings to help the society by donating blood and save lives. These are the following true social workers from the staff of RGCI & RC who donated blood in the blood donation camp organized on 30th April 2011.

Mr. Jitender (Pathology), Pranay (Hematology), Surender (Histopathology), Amit (Histopathology) Rajesh (CSSD), Manoj (CSSD), Vijay (MRD), Hemraj (MRD), Santosh Kumar (MRD), Raju (MRD), Raju (MRD), Ms. Anju Aggarwal (Administration), Shashi (Administration), Rajni K, Sushant, Kabir, Vikas, Sanjay and Rohit Garg.



To, _____

If undelivered please return to :

**RAJIV GANDHI CANCER INSTITUTE
& RESEARCH CENTRE**

Sector-V, Rohini, Delhi-110085

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, New Delhi-110085 • Editor: Dr. A. K. DEWAN