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EDITORIAL

PET SCAN IN ONCOLOGY - DO'S AND DON'TS

Many of the exciting advances in medicine have occurred in imaging predominantly bio-imaging. Unfortunately, many of the newer technologies like PET scan are at times being over utilized for reasons best known to the prescribers. A patient should only be imaged if it helps in his management. We don't have any national guidelines for PET scan in oncology. Clinical judgement should remain paramount, however, and variance from these guidelines may be appropriate and warranted for unusual situations. A recent careful history, physical examination and lab tests should be performed prior to considering such imaging. I believe "a Hand scan is superior to CAT scan/PET scan". Once malignancy is suspected, biopsy should be done first. In certain clinical situations, biopsy is the procedure of last resort, only considered after all imaging and lab tests have been performed.

You can always find an indication to do a PET scan during the course of a patient's journey through the treatment and surveillance protocols. Most of these can also be justified by the clinician ordering the test. However, sometimes a randomly done scan can confuse issues. As it is always easy to find an indication we should concentrate on some relevant areas where PET scan is not indicated. It is generally not recommended during surveillance without any pretext probability of disease. The yield increases exponentially with positive clinical and bio chemical findings. The positive yield is also questionable without a HP diagnosis of malignancy. Initial staging of an early stage cancer is also not an indication. We should ask ourselves whether PET will provide any 'incremental information' over & above the conventional methods.

FDG PET should not be ordered in some types of malignancies like differentiated thyroid cancer and signet ring carcinomas, mucin secreting adeno

carcinoma of GIT, well differentiated carcinomas of Prostate & low grade lymphomas. However, if there is suspicion of transformation of grade, PET becomes the first line of investigation. PET is well indicated during 'ongoing risk stratification' in such malignancies. Timing of PET scan is crucial. As a rule of thumb four weeks post surgery; 6 weeks post definitive chemotherapy and 12 weeks post radical radiotherapy is the ideal time with exception in case where a pertinent answer is desired.

A patient who refuses standard cancer treatment in lieu of alternative therapies should not be frequently imaged. But it is seen that patient who is on unconventional cancer treatment is scanned more frequently than who is on standard treatment. Such patients may have restaging studies once they consent to standard therapy. Any smoker who presents with hoarseness of voice, dysphagia, unexplained ear pain or lymphadenopathy should be evaluated with x-ray chest, thorough head & neck examination and biopsy of suspicious lesions. PET scan should not be used in initial evaluation of such patients.

PET is not indicated for patients being managed with best supportive care. PET is not indicated in routine work up of patients with PUO and unexplained loss of weight.

PET scan is very helpful to confirm that an isolated known metastatic lesion is truly single and amenable to surgical resection. There is no evidence to prove the role of PET in screening and should not be done. PET is a high end technology but should be used judiciously. Patients will always demand the latest and we need to provide the optimum and the best.

Dr. Dewan A K
Medical Director

ROBOTIC SURGERY : A PERSPECTIVE

*Diseases that harm require treatments that harm less –
William Osler*

Introduction

Robotic surgery is an emerging new and exciting technology that has taken the surgical profession by storm. "Robot" derived from the Czech 'Robota', meaning forced labor, is a machine that resembles a human and does mechanical tasks on command.

History and Development of Surgical Robots

From their inception, surgical robots have been envisioned to extend the capabilities of surgeons beyond the limits of conventional surgery. In the late 1980s researchers at the National Aeronautic and Space Administration (NASA), Ames Research Center and Stanford Research Institute (SRI) became interested in virtual reality and robotic technologies. Their joint efforts culminated in the development of a telepresence surgical system to improve dexterity in microscopic hand surgery. The original idea soon evolved from microscopic to macroscopic surgery. The definitive event was the development of surgical laparoscopy which was ideal for the development of this new technology. Envisioned by the US Department of Defence to facilitate remotely performed surgery in battlefield and other remote environments, it turned out to be more useful for minimally invasive on-site surgery.

In 1985, a robot, the PUMA 560, was used to place a needle for a brain biopsy using CT guidance. In 1988, the PROBOT was used to perform transurethral resection of the prostate. The ROBODOC was introduced in 1992 to mill out precise fittings in the femur for hip replacement.

Later the AESOP (Automated Endoscopic System for Optimal Positioning) was successfully applied to hold the endoscopic instruments during laparoscopy. Further development of robotic systems was carried out by Intuitive Surgical with the introduction of the da Vinci Surgical System and Computer Motion with the ZEUS Robotic Surgical System.

Types of Robotic Systems

There are three different classes of robotic systems.

1. Precise path systems
2. Intern replacement surgical robots
3. The master-slave device

Master-slave device, the currently popular system in use is the least automatic of all systems as the robotic device never moves independently without guidance from the surgeon. The arms mimic the surgeon's movements at the console within the patient's body. Devices that meet these characteristics include the da Vinci Surgical System and the Zeus Robotic Surgical System.

The da Vinci Surgical System is a comprehensive master-slave robot with multiple arms operated remotely from a console with video assisted visualization and computer enhancement. There are essentially 3 components: a surgeon's console, a patient side robotic cart with 4 arms manipulated by the surgeon (one to control the camera and three to manipulate instruments), and a high definition 3D vision system. Articulating surgical instruments are mounted on the robotic arms which are introduced into the body through cannulas.

The camera arm contains dual cameras (a combination of two 5-mm optical channels one for each eye) and the image generated is 3-dimensional providing depth perception. The master console consists of an image processing computer that generates a true 3-dimensional image, the view port where the surgeon views the image, tool pedals to control electrocautery, camera arm/instrument clutches and master control grips that drive the servant robotic arms at the patients' side. The robotic instruments have articulated tips, which permit 7 degrees of freedom. The movements of the robotic system are intuitive i.e. a movement of the master control to the right causes the instrument to move to the right. The robotic systems provide increased precision by filtering hand tremors, providing magnification and providing scaling for surgeon's movements.

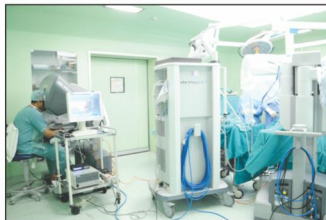


Fig1: The da Vinci robotic surgical system consol



Fig2: The da Vinci robotic surgical system

Advantages of Robotic System

The motivation to develop surgical robots rooted from the desire to overcome the limitations of current laparoscopic technologies and to expand the benefits of minimally invasive surgery. It offers all the advantages of minimally invasive surgery like less pain and use of narcotics, less blood loss and transfusion rate, shorter hospital stay, smaller incision and earlier return to normal activity. It shortens the learning curve facilitating and hastening mastery of the procedure. It increases dexterity, restores proper hand-eye coordination and an ergonomic position. It provides better 3D visualization and a ten times image magnification. It offers the possibility for the surgeon to operate while sitting and eliminates the surgeon tremors. In addition, this system makes surgeries that were technically difficult easy to perform.

Disadvantages of Robotic System

The main disadvantage of this system is the cost, both for initial set up and maintenance. Its size is large requiring bigger operation theatres and requires specialized instruments and trained staff. Another disadvantage is its absolute lack of sensitivity making it impossible to interpret force or any tactile feedback.

Spectrum of Robotic Surgeries

Urology : A wide spectrum of urologic surgeries has been found to be suitable for robotic surgical intervention including radical prostatectomy, radical cystectomy with urinary diversion, radical/ partial nephrectomy, adrenalectomy, pyeloplasty and ureteric reimplantation.

Gynecology : Robotic surgery in gynecology is one of the fastest growing fields of robotic surgery. Robotic myomectomy, radical Hysterectomies and surgery for pelvic prolapse can virtually obviate morbidity associated with open procedures.

Gastrointestinal Surgery : Whipple's procedure, liver resections, liver harvest for transplantation, oesophagectomy, fundoplication and Bariatric surgery have been performed with similar outcomes to the open procedure with significantly less morbidity.

Cardiothoracic Surgery : Robot assisted MIDCAB and Endoscopic Coronary Artery Bypass (TECAB) operations are being performed with the da Vinci system. Mitral valve repairs and replacements and ASD repairs have been performed. Hybrid CABG is being evolved and will soon be perfected. Lung resections and tumor resections have also been performed.

Neurosurgery : Neuroarm, the first MRI compatible stereotactic robotic system can perform complex brain tumor resection within a precision of 1mm.

Orthopedics : Total hip replacements, knee replacement and complex reconstruction of anterior cruciate ligament injuries have been found beneficial with the use of robotics.

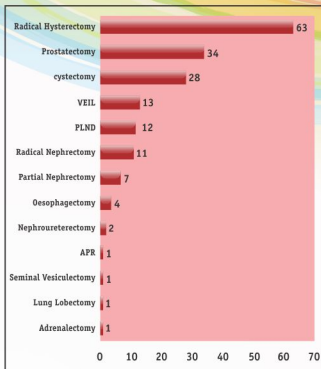


Fig 3: Robotic surgeries performed at RGCI&RC

Pediatrics : Surgical robots have been used in many pediatric surgical procedures, including tracheoesophageal fistula repair, portoenterostomy, congenital diaphragmatic hernia repair and others.

Head and Neck Surgery : Difficult to access areas like base of tongue and laryngeal resections are being done using the surgical robots.

Robotic Surgery at RGCI&RC

Rajiv Gandhi Cancer Institute & Research Center (RGCI&RC) acquired the da Vinci Surgical System in February 2011. So far, about 178 surgeries have been performed with this technique.

Future of Robotic Surgery

Many of the current advantages in robot assisted surgery ensure its continued development and expansion. Robotic surgery can be extended into the realm of advanced diagnostic testing with the development and use of ultrasonography and near infrared. One possibility is expanding the use of preoperative and intraoperative video image fusion to guide the surgeon better in dissection and identifying pathology. Some laboratories are working on systems to relay touch sensation from robotic instruments back to the surgeon. The possibility of automating some tasks is both exciting and controversial. Future systems might include the ability for a surgeon to program the surgery and merely supervise as the robot performs most of the tasks. The possibilities for improvement and advancement are only limited by imagination and cost.

**Dr Srivatsa N, Dr. Samir Khanna,
Dr Sudhir Rawal**

Chief Genito-Uro Surgical Oncology

RGCON -2012, 11th International Conference

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RGCON -2012, 11th International Conference of Rajiv Gandhi Cancer Institute & Research Centre, was organised from 6th to 8th April, 2012. The theme of the conference was "Prostate Cancer". The aim of this conference was to provide the latest updates on various aspects of prostate cancer-

from screening and treatment options in early prostate cancer to newer advances in metastatic and hormone refractory prostate cancer. The conference was inaugurated by Hon. Shri Hamid Ansari, the Vice President of India. The proceedings started with traditional welcome of all delegates by Mr D.S Negi, CEO, RGCI, Dr. A K Dewan, Medical Director, RGCI and Mr Rakesh Chopra, Chairman, RGCI gave an insight about the future plans of RGCI. RGCON Souvenir was released by the chief guest followed by his inaugural address. He lauded RGCI for its efforts in diagnosing and treating cancer patients with empathy.

On 6th April, there was live demonstration of Robotic Radical Prostatectomy from Rajiv Gandhi Cancer Institute to the Auditorium Dr.RML Hospital. The audience enjoyed the surgical feast with "Single Port Robotic Radical prostatectomy" performed by Dr. Robert Stein, which was done for the first time in India. Dr. Andrew Vickers from Memorial Sloan-Kettering Cancer Centre delivered a guest lecture on 'How surgeon characteristics such as clinical experience affect the outcome of Radical Prostatectomy'.

Dr. David McLeod's key note address on 'Hypes and Hopes In Carcinoma Prostate', addressing the various trends of treatment presently followed in USA, was well applauded. Dr. Pramod Sogani from MSKCC discussed the 'Role of Surveillance in Treatment of Low Risk Prostate Cancer.' Some of the aspects regarding 'Role of PCA 3, MRI Histioscanning and PSA isoforms in prostate biopsy', were touched upon by Dr. John Davis from M.D. Anderson Cancer Center.

It was an extremely gratifying experience for the delegates as well as organizers. Everybody found the meeting useful and was able to take away new ideas and pearls of wisdom which will help them to improve care of prostate cancer patients.

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