

DIAGNOSTIC IMAGING WHERE DO WE STAND ?

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It is now more than 100 years that on November 8-1895 Wilhelm Conrad Roentgen of Germany discovered a new kind of ray and applied it to take an image of his wife's hand. This image showed for the first time bones of his wife's hand along with the wedding ring she was wearing on her finger. This new ray called X-Ray created excitement and found immediate medical application. X-Ray has been used since then to image the internal organs. In addition to imaging of organs X-Ray is also used for therapy. Special procedures in the form of angiograms, pneumoencephalogram, Myelogram, arthrogram, bronchogram, cholangiogram, salpingogram and varieties of other special procedures were obtained using X-Ray.

During the last 20-25 years of X-Ray has expanded with the introduction of computerized tomography (CT). During this time other newer imaging modalities such as ultrasound, magnetic Resonance imaging (MRI), Positron Emission Tomography (PET), Single Photon emission computed Tomography (SPECT) etc imaging have emerged. Historically imaging was aimed mainly at defining pathologic anatomy. With the introduction of newer modalities the trend is now towards studies of physiology and biochemistry. The ability to obtain rapid sequences of images in conjunction with various contrast media or radio pharmaceuticals has greatly facilitated studies of vascular and organ physiology. Positron emission tomography (PET) of the brain and heart allows absolute regional quantitative analysis of several metabolic variables. The increasing use of computers is an important element in quantitative image analysis and has been combined with a progressive shift from analog of film-based image recording to digital image recording and viewing of studies by computer display.

Imaging has become important not only in diagnosis but also in therapy. Imaging has long been an integral part of treatment planning for radiation therapy and has helped to guide surgery. imaging to guide interventional therapy such as angioplasty, abscess drainage, biopsy and lithotripsy is an extension of this concept that is likely to continue and become more important in future.

In the present context of imaging it would be appropriate to highlight few facts about our institution. history of radiology of Birendra hospital (then TCMH) dates back to 1967AD. During which time 100 mA, 50 mA, 15mA and MMR (mass miniature radiography) machines were installed by American Army. As expected conventional radiography was the only available means for most of the period, during which time plain x-ray and some special procedures like barium studies, IVUS, Myelography etc. were carried out.

Ultrasonography was first introduced in our Hospital during the year 1988-1989. Ultrasonography which is among the most widely used newer modality all over the world is no exception to us. This modality has undergone lot of technical advancement with addition of doppler, colour doppler, power doppler and lately introduction of ultrasound contrast media is under way which aids for vascular study. In spite of all these, real time gray scale ultrasound which is with us is well suited for most of the common problems we come across and cover most of the studies including certain interventional procedures, e.g. abscess drainage, biopsy guidance etc. Main attraction of Ultrasonography is quick for examination, non-invasiveness, relatively cheap & well acceptable to the patient.

With the introduction of magnetic resonance imaging (MRI) in Birendra Hospital during the year 1991 our faculty was upgraded to the latest technological advancement. This being the first MRI unit in the country is also providing services to the civilian population. Undoubtly this is the best imaging technique by which a lot of complicated & hidden pathology (most useful for intracranial & spinal problems) can be diagnosed & help for further management of the patients. MRI is the image forming process where there is interaction of main magnetic field (MMF) & radio frequency (RF) on the human body (H+proton) & image formed by computerized technique is displayed in the screen & studied.

MRI is advantageous because there is no radiation to the patient, it is non-invasive & resolution is very high which provide very clear image. Only disadvantage is high cost (! misutilization is not be encouraged).

Among the special X-rays we perform barium studies, IVUS, Myelography, HSG, sinogram, sialogram etc with the help of image intensifier that we have for diagnosis of varieties of problems.

Following figures outlines the number of patients examined by different means in our Hospital for the year 2054.

<u>MODALITIES</u>	<u>NUMBER OF PATIENTS</u>
1. Convventional X-Ray(Including MMR)	19,243
2. Ultasonography	2,794
3. Magnetic Resonance Imaging	1,092 (Civil 252)
4. Special procedures	506
Grand Totel	23,635

Above figures include regular Army personnel, their families, retired servicemen, their families & also few civilian patients (specially MRI).

It can be learnt from the statistics that we have many diagnostic modalities by which quite good number of patients are examined & diagnosed to aid for the management of the patients. Provided we get some additional equipments like computed Tomography (CT), scintigraphy & interventional facilities, our department with the team of three qualified Radiologists is capable of performing almost all radiological tests which can upgrade the radiological works & hence the standard of medical management in Birendra Hospital.