Radiographic Scoring in Rheumatoid Arthritis

Electromagnetic Navigation Bronchoscopy  P 17

a new approach to the diagnosis of peripheral pulmonary lesions.

Late adverse reactions to iodine-based contrast media  P 14

Updated ESUR guidelines on LARs

The Asha Jyoti Program  P 21

Women’s outreach program in India

Imaging News  P 06-08

Tech update  P 23
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Radiographic scoring methods in Rheumatoid Arthritis

Despite the advent of MRI and MSK ultrasound, plain radiographs of the hands and feet remain the mainstay in rheumatoid arthritis. This mini-review article describes the most common methods used in scoring radiographs in RA,

By Dr Vinod Ravindran

IMAGING NEWS

A cardiovascular death in China every 10 seconds. 

Strong growth projected in Indian color ultrasound market. 

Study shows bicarb hydration therapy better than saline for CI-AKI. 

Tablet computers OK for on-call radiology but software needs improvement. 

CT useful to discriminate life-threatening stercoral colitis. 

China’s health-care reforms: work in progress. 

Spectral CT shows potential in liver cirrhosis.

TECHNOLOGY UPDATE

Organic-LED Monitor. 

G-Arm system launched in China. 

New color Doppler Ultrasound system.
FROM THE EDITOR

China: meeting the health care challenges

On a date deliberately chosen to commemorate the day in 1895 when Wilhelm Conrad Röntgen discovered X-rays, November 8th was proclaimed as the first International Day of Radiology (IDoR), with its purpose openly described by the organisers, (ECR, RSNA and ACR), as being "to alert the world to the stunning medical, scientific and even artistic possibilities of imaging, the essential role of the radiologist as a part of the healthcare team in countless medical scenarios, and the high educational and professional standards required of all staff working in medical imaging". No fewer than 66 medical societies in 38 countries throughout the world participated in one way or another in the initiative. In the Asia-Pacific area these included the national radiological societies of China, Japan, India, Korea and Sri Lanka. In Oceania, the Australian and New Zealand Radiological societies also endorsed the IDoR. While making radiology more visible to, and appreciated by, the public is a worthy aim common to every country, the almost total world-wide support of the International Day of Radiology by the appropriate professional does not of course mean that the challenges facing the radiology profession are identical from country to country. In fact there are huge differences between countries in the current status and likely future development of all medical disciplines, not just radiology. Differences from Western style healthcare systems are particularly striking in countries like India and China as they adapt their medical structures to the increasing expectations of their populations in the light of their current explosive economic growth. In China especially the need for reform in all aspects of medicine is urgent. A significant landmark was passed this year in China, when the country, with its long history and culture based in rural agriculture actually became a primarily urban society. The Chinese urban population of 680 million in 2012 exceeded the number of rural residents for the first time. Such a demographic transformation can have both advantages and disadvantages form the point of view of public health. On the one hand, access to health care and infrastructure can be improved by population concentration but urbanisation brings with it its own challenges such as increased likelihood of pollution and detrimental changes in lifestyle and diet. Traditionally oriented toward the treatment of acute conditions, Chinese medicine is having to face a huge growth in non-communicable diseases. Conditions such as chronic kidney disease, diabetes and cardiovascular disease are now the country's number one health threat.

The question is how is the country's health system adapting to these seismic scaled shifts?

The good news is that the government recognised the challenges and, more than three years ago now unveiled an ambitious health-care reform plan which allocated an expenditure of 850 billion Yuan (approximately 125 billion US dollars) with the aim of the provision of affordable and equitable basic health care for all by 2020. Given the traditional description of Chinese medical services as being too difficult to access, too expensive and too variable in quality, such a goal is not just ambitious but highly commendable. A recent report from a group of public health specialists from Harvard, USA, York & Oxford, UK, and Shanghai, China examined the progress that China has made three years into this eleven year program (Yip WCM, Hsiao WC, Chen W, Hu S, Ma J and Maynard A. Early appraisal of China’s huge and complex health-care reform, Lancet, 2012; 379: 833). In this period the country has achieved nearly universal health insurance coverage, which in such a short time is a remarkable achievement. Insurance coverage in 2003 was only 95.7 %. However as Yip and colleagues point out the transformation of money and insurance coverage into cost-effective services is difficult when the delivery of health care is hindered by waste, inefficiencies, poor quality of services and scarcity and poor distribution of the qualified workforce. So, progress so far is encouraging but the challenges remaining to be overcome are daunting.
In first pass dynamic CT imaging, at equal flow rate and total iodine dose, iomeprol 400 mgI/mL, can provide better contrast enhancement and image quality than contrast solutions at lower iodine strength.

When Highest Iodine Concentration Matters

In a study comparing various contrast agents, iomeprol 400 mgI/mL was found to provide the highest iodine concentration, resulting in superior image quality compared to lower iodine strength solutions.

References:

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Iomeron 300 intravenous urography (in adults and paediatrics), peripheral phlebography, CT (brain and body), crenoscopy, intravenous DSA, conventional angiography, intrarterial DSA, angioarcadiography (in adults and paediatrics), conventional selective coronary arteriography, interventional coronary arteriography, ERC, angiography, hysterosalpingography, fistulography, disography, galactography, choioangiography, dacryocystography, sialography, retrograde pyelo-ureterography/myelography. Iomeron 350 intravenous urography (in adults and paediatrics), CT (brain and body), conventional DSA, conventional angiography, intrarterial DSA, angioarcadiography (in adults and paediatrics), conventional selective coronary arteriography, interventional coronary arteriography,ERC, angiography, hysterosalpingography, fistulography, galactography, choioangiography, dacryocystography, sialography. Contraindications: Hypersensitivity to the active principle and to any of its ingredients. Investigations of the female genitalia are contraindicated in suspected or confirmed pregnancy and in cases of acute inflammation. Intrathecal administration. Coadministration of iomeprol with corticosteroids is contraindicated. Due to overdosage considerations, immediate repeat myelography in the event of technical failure is contraindicated. Special warnings and special precaution for use. Consideration of possible serious side effects, the use of saline contrast media should be limited to cases for which there is a pressing need for a contrast examination. This is especially true in patients: Neonates: infants; children. Young infants (age < 1 year) especially neonates, are particularly susceptible to electrolyte imbalances and haemodynamic alterations. Care should be taken regarding the dosage to be used, the details of the procedure and the patient’s status. Elderly: The elderly are at special risk of reactions due to CM high dosage. The frequency encountered combination of neurological disturbances and severe vascular complications constitutes a serious complication. Hypersensitivity: a previous history of a reaction to contrasted agents. Intraarterial media also increases the risk of recurrent of a severe reaction with non ionic media. Women of child-bearing potential, appropriate investigations and measures should be taken when exposing women of child-bearing potential to any X-ray examination, whether with or without contrast medium. Caution should be used (in patients) to patients with allergic disposition, hyperventilation, fever, and blood dyscrasia, asthmatic patients; hypothyroidism, nodular goitre, renal impairment, diabetes mellitus, multiple myeloma, paraproteinemia (Waldenstrom’s par-proteinemia), myelomatosis or paraproteinaemias, myasthenia gravis, jaw and liver and renal dysfunction; severe cardiovascular disease, severe chronic hypertension, acute arterial inflammation, acute intracellular haemorrhage, and conditions involving blood-brain-barrier. BBB damage, brain oedema and acute demyelination, presence of intracranial tumors or metastases and a history of epilepsy, neurological symptoms due to degenerative, inflammatory or neoplastic cerebrovascular pathologies, cerebrovascular diseases, recent stroke or frequent TIA (transient ischaemic attacks), alcoholism. Undesirable effects: general. The use of iodinated contrast media may cause unwanted side effects. They are usually mild to moderate. However, more serious reactions, due to anaphylactic shock, with possible total outcome, may occur. In most cases reactions occur within minutes of dosing. However, reactions may manifest also later on up to 24 hours from the injection, depending on the administration route. Anaphylaxis (anaphylactic-hypersensitivity reactions) may manifest with various symptoms, and rarely does any one patient develop all the symptoms. Typically, in 1 to 15 min but rarely after as long as 2 h, the patient complains of feeling abnormal, agitation, flushing, feeling hot, sweating increased, increased, dizziness, lassitude increased, rashes, palpitations, paroxysms, pruritus, urticaria, angioedema, arthralgia, bromidea, low blood pressure, tachycardia, tachypnoea, tachycardia, cyanosis, nausea, vomiting, abdominal pain, and diarrhoea are less common. Severe anaphylactic reactions involving the cardiovascular system, such as vasodilatation, with pronounced hypotension, reflex tachycardia, dyspnoea, anaphylaxis, and various cases of cardiovascular collapse, can result in death. These events can occur rapidly and require full and aggressive cardio-pulmonary resuscitation. Primary circulatory collapse, can occur as pronounced hypotension, reflex tachycardia, dyspnoea, agitation, cyanosis and other signs or symptoms outlined above. Overdose may lead to life-threatening adverse effects mainly through effects on the pulmonary and cardiovascular system. Instruction for use/handling. Vial or bottles containing contrast media solution are not intended for the withdrawal of multiple doses. Bottles of 500 ml should be used in conjunction with an injector system. After each patient examination, the connecting tubes to the patient and relevant disposable parts should be changed. Marketing Authorisation Information. The Marketing Authorisation Holder, number, and date of approval may be different in different countries. Volumes, presentations, and indications may also differ. Refer to the local Summary of Product Characteristics. Please contact Bracco Imaging Spa – Via Egidio Fall, 50 20134 Milano – Italy for further information. Date of Preparation of this Document: October 2012
A cardiovascular death in China every 10 seconds

At the recent 23rd Great Wall International Congress of Cardiology held in Beijing the extent of the impact of cardiovascular disease in China was highlighted. “Every year three million Chinese people die from cardiovascular disease and every 10 seconds there is one death from CVD in China,” said Professor Dayi Hu, chief of the Heart Centre at the People's Hospital, Peking University and president of the Chinese Society of Cardiology (CSC). He adds: “Prevention has not been a priority in China because for the last 20 to 30 years the medical system has mainly been treating the late stages of heart disease. The number of patients treated with stents has increased dramatically.” Cardiovascular disease is the top cause of death in China and causes more than 40% of all deaths.

Smoking is a massive problem in Chinese men – 54% of men smoke. “What's worse is that half of male physicians are smokers and one-third of Chinese male cardiologists are smokers, so it's a real problem,” said Professor Hu. There is an increasing epidemic of hypertension in China. Some 200 million Chinese people have hypertension and the rate of hypertension is rising in all age groups. But awareness, treatment and control of hypertension are low. Just 30% of patients with hypertension in China are aware they have it, compared to 80% awareness in the US. Only 24% of Chinese patients with hypertension receive treatment (vs 73% in the US) and only 6% of patients have their blood pressure under control (vs 50% in the US).

Prof Hu said “I think a healthy China has to be started from the healthy physician,” said Professor Hu. “Physicians and cardiologists need to quit smoking, eat healthily, exercise and control their body weight so that they can be a good example for patients and the public, and effectively promote CVD prevention measures with the government, pharmaceutical companies and food manufacturers. I believe that if there is no healthy physician there will be no healthy China.”

http://tinyurl.com/int-congr-cardiology

Strong growth projected in Indian color ultrasound market

The growing middle-class population in India is increasing demand for higher quality healthcare services and treatment, according to a new report by the independent market research group InMedica. Increasing awareness of the latest medical advances is driving demand for higher specification ultrasound equipment that can be used for specialist diagnosis and procedures. Consequently, strong growth is projected in the color ultrasound market over the next five years, with revenues forecast to increase by 49 percent over this time. Due to the rising demand for improved healthcare services there is a growing trend in India for hospitals and clinics to replace black and white ultrasound systems with color systems that offer better image quality. The increasing functionality and technology found in low-end and mid-range ultrasound systems is driving strong growth in these markets, as many first generation users upgrade to higher specification equipment. As a result, color ultrasound equipment is forecast to account for 87 percent of unit shipments by 2016, compared to 73 percent in 2011.

As healthcare services continue to expand, the clinical expertise of physicians will diversify. This will increase demand for equipment with advanced imaging features that are commonly used in mature markets, such as 3D/4D imaging, elastography and fusion imaging. There is a growing number of Chinese manufacturers entering the Indian market. Low-cost black-and-white ultrasound systems will still be necessary to improve access to basic diagnostic imaging services in many rural regions of India. However, as color equipment is becoming more affordable for smaller-sized hospitals and demand in large and medium-sized hospitals is increasing for advanced ultrasound technology, color ultrasound systems will continue to dominate the Indian ultrasound market.

http://tinyurl.com/inmedica-report

Study shows bicarb hydration therapy better than saline for CI-AKI

A recently published paper from a Korean group of clinicians (Jang et al. Circ J. 2012; 76: 2255) presents a meta-analysis of the literature describing randomized controlled trials comparing sodium bicarbonate with sodium chloride for the prevention of contrast-induced acute kidney injury (CI-AKI). Defined as an increase in serum creatinine level of 25%, CI-AKI is associated with a significantly increased risk of...
A recent paper (Yip et al Lancet 2012; 379: 833) has attempted an early appraisal of the results so far of China’s huge health care reform program, launched in 2009 as an ambitious US$125 billion programme to ensure universal health coverage. The reform was well overdue, says Winnie Chi-Man Yip at the University of Oxford, UK. “Before the health-care reform, the Chinese Government was faced with widespread public discontent stemming from unaffordable access to health care, major financial risks associated with out-of-pocket medical expenses, and growing inequalities in access to health care and health status across regions and populations of different socioeconomic status and between urban and rural areas.”

The authors say that, “despite its size and varied socioeconomic local conditions, China has made big strides towards providing its population with affordable and equitable access to basic health care in the past few years. It has overtaken many developing nations and achieved nearly universal insurance coverage in less than a decade and has begun to establish some necessary foundations for primary health care and public health provision.”

There is more to be done. “China can expand its redistribution of resources by adopting funding formulas that adjust for heterogeneous needs (such as demographic, health, and socioeconomic indicators) at sub-provincial or municipality level. China can also show its serious commitment to health by increasing taxes on tobacco. The medical education system has to be reformed to produce well-trained primary health-care providers, but China’s needs are vast and it will take a long time to train enough family doctors”, say the authors.

Finally, the authors say that pumping money into the healthcare system is necessary but needs to be carefully managed to allow development of absorptive capacity of service providers. Independent, outcome-based monitoring and evaluation are essential for mid-course correction and to make officials and providers accountable.

China plans to rebuild its health care system by 2020. Its health reform will fuel investment in hospital expansion and medical equipment.

What a team from the Department of Radiology at Changi General Hospital, in Singapore set out to do (John S et al. J Digit Imaging 2012; 25: 628). They transferred to three iPAD tablet systems a total of 79 CT and MRI images taken in a range of common on-call conditions and which had been reported on using a full-featured diagnostic PACS workstation. The iPad ran Osirix HD DICOM software. Images were analyzed by three reviewing radiologists. All three radiologist reported a favorable user experience but noted issues with software stability and some limitations of image manipulations tools. The conclusions of the Change group are that emergency conditions that are commonly met on CT and MRI can be diagnosed using tablet computers and there is a good agreement with dedicated PACS systems. The full potential of iPADs will however only be realized in such applications if the shortcomings in software are resolved.


**CT useful to discriminate life-threatening stercoral colitis**

Stercoral colitis is the focal inflammatory condition of the colon related with increased intraluminal pressure resulting from impacted and dehydrated fecal material. Fecal impaction leading to colonic obstruction is seen primarily in the elderly who are neurologically impaired. Fecal impaction usually results from chronic constipation.

Fecaloma impaction associated stercoral colitis (SC) can result in catastrophic complications such as perforation and fecal peritonitis that may become life threatening with a mortality rate of 32-57%

Several reports on the usefulness of CT in stercoral colitis have already been published but so far no study has yet compared the CT findings in fatal SC to those of non-fatal SC. A retrospective study was carried out by a team from Chang Gung, Taiwan to evaluate the diagnostic value of CT and its ability to discriminate findings of fatal SC from those of non-fatal SC (Wu et al. Korean J Radiol 2012; 13: 283) For this study, Wu and colleagues defined fatal SC as one that may cause sepsis-related death in a patient who otherwise has no other discernible infection foci during the course of hospitalization. Their study was retrospective and a total of 23 patients continued on page 08
morbidity, including prolonged hospitalization, need for dialysis and mortality and is a leading cause of hospital-acquired acute renal failure. CI-AKI occurs more frequently in high-risk patients than in low-risk patients with several predisposing factors being well recognized, such as diabetes mellitus, chronic kidney disease, nephrotoxic drugs and various other comorbidities. Although CI-AKI is generally regarded as a transient decline in renal function after contrast procedures, it cannot be regarded as a benign complication.

Jang and his colleagues reviewed a total of 416 articles and 56 studies were selected for inclusion and further evaluated. Subsequently, 19 papers were included in the final analysis. They found that the use of bicarbonate-based hydration in comparison to normal saline significantly reduces the incidence of CI-AKI. The beneficial effect of sodium bicarbonate was consistent across trials that included patients who had renal dysfunction at baseline and underwent elective or emergency angiographic procedures with contrast medium. A more pronounced effect of sodium bicarbonate was found in trials using low-osmolar contrast medium compared with those using the iso-osmolar agents. The authors recommend that physicians should ensure that CI-AKI is avoided by conducting a preoperative evaluation of vascular disease with a small amount or no contrast media in patients with preexisting renal insufficiency.

Spectral CT shows potential in liver cirrhosis

Dual-energy computed tomography (DECT) has been around for several decades but the method has not previously achieved widespread clinical use because of deficiencies inherent in the immature technology. These deficiencies include motion-related misregistration, marked image noise, relatively low spatial resolution, and excessive radiation exposure. The recently introduced Spectral CT, a single-detector and single-source DECT system with a capability for rapid alternation between two peak voltage settings (i.e., “fast switching”), has led to renewed interest in clinical application and further investigation of DECT. The high- and low-energy datasets (140 kVp and 80 kVp) the datasets obtained using Spectral CT can be utilized to reconstruct material-decomposition images (e.g., water and iodine-based images).

CT with energy information, especially spectral CT, is thus an imaging method that extends the capabilities of conventional CT. Spectral CT not only enables the estimation of full linear attenuation, as a function of X-ray photon energy of the imaged subject at each voxel in the CT volume, but the method also generates material decomposition images so that the composition of the imaged subject can be represented as an equivalent mixture of two basis materials. A team from Shanghai, China has studied the applicability of the new technique to investigate liver cirrhosis, i.e. the late stage of hepatic fibrosis which results in widespread distortion of normal hepatic architecture (Lv P et al Korean J Radiol 2012; 13: 434). Cirrhosis is characterized by regenerative nodules surrounded by dense fibrotic tissue. There are different uptakes of iodine contrast agents in the healthy liver and three stages of liver cirrhosis during the arterial phase (AP) and portal venous phase (PVP).

The Shanghai team found that the combination of quantitative Spectral CT imaging parameters- provided high sensitivity and specificity for differentiating healthy liver from cirrhotic liver.
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** Warnings and precautions:** 

- Hypersensitivity reactions are not predictable, however in patients with an allergic disposition, carefully evaluate risk/benefit ratio. In rare cases, delayed anaphylactoid reactions (after hours to days) have been observed. 

- Prior to administration, it is recommended to screen all patients for renal dysfunction by laboratory testing. Nephrogenic Systemic Fibrosis (NSF) has been reported with gadobutrol. Gadolinium-containing contrast agents in patients with acute or chronic severe renal impairment (GFR < 30 ml/min/1.73 m²). 

- Patients undergoing liver transplantation are at particular risk due to high incidence of renal failure. Only use in patients with severe renal impairment and those in the perioperative liver transplantation period after careful risk/benefit assessment and if diagnostic information is essential and not available with non-contrast enhanced MRI. 

- Haemodialysis shortly after Gadovist administration may be useful in removing Gadovist from the body. There is no evidence to support the initiation of haemodialysis for prevention or treatment of NSF in patients not already undergoing haemodialysis. As renal clearance may be impaired in the elderly, it is particularly important to screen patients aged 65 years or more for renal function. Use with caution in patients with a low seizure threshold. 

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** Incompatibilities:** Do not mix Gadovist with other medicinal products. Legal category: POX Basic. 

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** References **


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Radiographic scoring methods in Rheumatoid Arthritis

Despite the advent of magnetic resonance imaging and musculoskeletal ultrasound, plain radiographs of the hands and feet remain an important tool in rheumatoid arthritis (RA) both in routine clinical and research settings. This mini-review focuses describes the most common methods used in scoring radiographs in RA, and discusses pertinent issues in such scoring.

Radiographs of the hands and feet are used to evaluate the disease course of rheumatoid arthritis (RA) both in the clinical practice and research settings. Radiographic scores have been associated with other measures of disease activity, such as laboratory parameters, clinical features, and functional class, all of which are commonly used end points in clinical trials. The true efficacy of disease-modifying anti-rheumatic drugs traditionally has been viewed as their capacity to slow down radiographic damage. Assessment of radiographic damage could also give valuable insight into the RA disease course in different ethnicities [1]. For these reasons, the current “gold standard” for radiological evaluation of disease progression in RA is by plain radiographs. It has been recommended that each clinical trial exceeding 1 year should assess radiographic damage. Magnetic resonance imaging (MRI) and ultrasound assist with the diagnostic work-up in suspected, but not definite, inflammatory joint disease and early, unclassified inflammatory joint disease (by detection of presence/absence of synovitis, enthesitis, bone erosions, etc.). MRI and ultrasound are more sensitive than radiographs in detecting early structural changes in joints and surrounding structures however, the availability, costs and training related issues limit the use of these technologies in daily clinical practice [2].

TECHNICAL ASPECTS IN SCORING RADIOGRAPHS
Radiographic lesions in RA include soft tissue swelling, juxta-articular osteopenia, bone erosions, joint space narrowing indicative of loss of cartilage, cysts, joint subluxations, mal-alignment, and ankylosis. All radiographic scoring methods assess erosions and joint space narrowing, whereas other features are not always used. Standardized patient positioning and radiographic techniques, as well as the use of fine detail screen film combinations, are important to improve the sensitivity and reproducibility of radiographic scoring.

The scoring systems that have been designed to evaluate radiographic changes in RA can be divided into two main groups: global and detailed. Global scoring systems assign one score to the entire joint, taking into account all the abnormalities seen, whereas detailed systems assign scores on at least two separate variables for each joint evaluated. The Sharp [3, 4] and Larsen methods [5] have been developed to assess radiographs more quantitatively and they and their modifications are the two most widely used methods of scoring radiographic damage.

«... The gold standard for radiological evaluation of RA disease progression is by plain radiographs...»

THE SHARP METHOD
The original Sharp method [3] included radiographs of the hands and wrists and scored features such as periosteal reaction, cortical thinning, osteoporosis, sclerosis, osteophyte formation, defects, cystic changes, surface erosions, joint space narrowing, and ankylosis. Limitations of several of these features led to their omission from the final score which includes two scores, one for erosions and the other for joint space narrowing (JSN) [4]. For erosions, 17 areas are considered and 18 areas for joint space narrowing. An erosion score of 0 to 5 is given to each joint that is analyzed, according to the number of erosions; “5” representing the total destruction. Similarly JSN can be scored from 1 (focal JSN) to 4 (ankylosis). Subluxation is not scored. The final score for erosions and JSN ranges from 0 to 170 and 0 to 144 respectively.
THE SHARP/VAN DER HEIJDE METHOD

By including feet for both erosions and JSN and by omitting some areas of the hand for JSN the van der Heijde modification [6] of the Sharp method overcame major limitations of the modified version of Sharp score [4].

The Larsen method [5] includes both erosions and JSN in each joint as a single score according to reference radiographs. In this method, six stages reflecting gradual, progressive deterioration have been recognized. As a supplement to the standard reference films, descriptions of these stages were also given to aid the scoring. The score ranges from 0 to 250. A modification of its original method to evaluate radiographs in long-term studies was proposed later by Larsen et al. [7].

Numerous modifications of the above methods have been developed and sought to overcome some specific limitations in a given method [8]. Overall, the Larsen method is more easily scored and less time consuming than Sharp method. As the Sharp and Sharp/van der Heijde methods utilize a higher degree of detail, they can be time consuming and that is the major drawback when compared to the Larsen method and its modifications.

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MERITS AND LIMITATIONS

Radiographs are reproducible, allow measurement of severity, and can identify single point damage and progression with fairly high precision and accuracy. Characteristic X-ray findings aid in the diagnosis of RA. X-ray can be helpful in the differentiation of RA from other joint conditions including osteoarthritis, psoriatic arthritis, and neoplasms. Early bone erosions are correlated with poor long-term radiographic and functional outcome, and early progression in X-ray erosions is related to future impairment in physical function. Other important advantages of X-ray are the possibility of standardization and blinded centralized reading and existence of validated assessment methods.

Although radiographs provide optimal documentation of joint destruction, several important limitations are seen in the application of radiographs as a measure of clinical status in patients with RA. “Floor” and “ceiling” effects related to detection and scoring of RA-induced disease seen on conventional radiographs have been well recognized. The floor effect stems from the fact that the hallmark radiographic findings of bony erosions and joint space narrowing may occur late in the pathophysiology of the disease whereas the ceiling effect refers to the fact that radiographic progression of the disease can continue even after the highest damage score has been assigned. Radiographs change slowly in most people with RA. Modern treatment of RA requires that many patients be treated prior to any evidence of radiographic damage. Other disadvantages of X-ray include projectional superimposition due to

FIGURE 1. Radiographs of hands of a patient with rheumatoid arthritis showing extensive erosive destruction of carpal bones, joints space narrowing of proximal inter-phangeal (PIP) joints, varying degree of sub-luxation of metacarpo-phalangeal (MCP) joints, discreet erosions (right 4th and 5th metacarpal heads).
RHUMATOID ARTHRITIS

FIGURE 2. Radiographs of feet of a patient with rheumatoid arthritis showing erosions (bilateral 1st meta-tarsal heads, right second proximal phalange base), big erosion at right second metatarsal head and subcortical cysts (bilateral 1st inter-phalangeal joints).

the two dimensional representation of three-dimensional pathology, use of ionizing radiation, relative insensitivity to early bone damage, and total insufficiency for assessment of soft tissue changes including synovitis.

REPORTING OF RADIOGRAPHIC DATA

There is wide variability in the methods used to report radiographic data, which hampers comparisons between trials. Adopting specific standards for reporting radiographic data may help overcome this. The current key recommendations regarding the scoring itself, are (1) radiographs of the hands and feet should be included, (2) the smallest detectable difference (SDD) should be used as quality control (SDD is the smallest change that can be reliably discriminated from the measurement error of the scoring method, which for example is 5.0 for the Sharp/van der Heijde method); (3) there should be preferably two or more observers; (4) kappa and/or intra-class correlation coefficient and SDD for inter-observer agreement should be used and (5) the average score of observers should be used [9]. The key recommendations in relation to reporting the data are (1) absolute numbers should be reported for radiographic change along with the maximum score possible; (2) primary analysis should be done at group level reporting mean change in values together with the standard error or standard deviation; and (3) secondary analysis done at the patient level should give the percentage of patients with disease progression [9].

FUTURE DIRECTIONS

Digital imaging techniques and the development of a number of picture archiving and communication systems have been reported to increase clinical efficiency. Use of such techniques as well as appraisal of their performance compared to MRI in both clinical and research setting could enhance the value of conventional radiography. Teaching and training of the radiographic scoring methods is important for the ongoing development of this important field.

REFERENCES


Book review

Anatomy in Diagnostic Imaging, 3rd Edition

This book is a basic atlas of anatomy applied to diagnostic imaging. It covers the entire human body employing all the imaging modalities used in clinical practice; x-ray, CT, MR, ultrasound and scintigraphy. It includes over 800 carefully selected images, which are very east to read due to their high quality and the comprehensive anatomical interpretation that is that is drawn and labelled directly on a contact print alongside every image.

The third edition will contain extended coverage of MR scanning given the great strides that have been made in this area recently. It will also cover PET scanning for the first time in recognition of the fact that this modality has become a great deal more common.

Both for medical students and doctors the book will serve as the all-round reference collection linking anatomy and modern diagnostic imaging.

The technique chapter has been updated with relevant technical developments. Among others MR and PET have been elaborated more and several new figures added.

The 46 images (‘twin images’, i.e. plain and interpreted) are replaced/supplemented with 86 new twins, which means a net increase of 40 images. The number of pages will be increased by 26 compared to the previous edition.
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Late adverse reactions to intravascular iodine-based contrast media

Iodinated X-ray contrast media are one of the most common administered pharmaceutical products and with the steady increase of CT and X-ray examinations there is a growth in the use of such media. Generally mild and self-limiting, late adverse reactions (LARs) to contrast media have long been recognized. In 2003, the Contrast Medium Safety Committee (CMSC) of the European Society of Urogenital Radiology (ESUR) issued guidelines regarding LARs. However since that date, there have been many new studies published on the incidence, symptomatology and pathophysiology of LARS, as well as prospective comparative studies and reviews.

The Contrast Medium Safety Committee (CMSC) of the European Society of Urogenital Radiology (ESUR) is composed of 13 radiologists (12 active members and one honorary member) from various European countries and is chaired by Dr HS Thomsen from Denmark. In addition to this panel of clinicians, there are four consultants to the committee, representing some of the major manufacturers of contrast media products.

The committee recently reviewed the development of the situation with regard to late adverse reactions (LARs) to the administration of iodine-based contrast media since the previous publication in 2003 of ESUR’s guidelines on the subject. The methodology used was a detailed review of the relevant literature, using two literature databases, PubMed and Web of Science, which were interrogated using appropriate search terms.

The results of the review were published in Eur Radiol [1].

SYMPTOMS OF LATE REACTIONS

LARs are defined as reactions occurring between 1h and 1 week after the administration of intravascular iodinated contrast medium. This broad period of time in which LARs may occur complicate detailed analysis of the nature and frequency of LARs, since it is sometimes not clear whether the contrast medium is in fact the true cause of the many symptoms that have been associated with LAR. In addition, the collection of reliable and accurate data from patients who have been administered contrast media in the previous week is not easy and may not be totally rigorous.

This difficult situation has been greatly clarified by several studies which have compared the symptoms observed after enhanced and unenhanced CT. These studies have shown clearly that the most frequent symptoms seen in patients who had received contrast medium for enhanced scans were skin rashes.

“...The use of non-ionic dimers is associated with a three- to four-fold increase in the frequency of LARs compared to non-ionic monomers...”

FREQUENCY OF LARS AFTER DIFFERENT CONTRAST MEDIA

The frequency of LARs varies with the nature of the chemical structure of the contrast agent used.

The use of non-ionic dimers is associated with a three- to four-fold increase in the frequency of LARs compared to non-ionic monomers. Thus, late skin reactions occur three-four times more often with the nonionic dimer ioxilanox than with nonionic monomers such as iopamidol and iomepril. There seems to be no significant difference in the occurrence of LARs between the use of different non-ionic monomers. Likewise, the rate of LARs seems to be the same whether the agent is an ionic or a non-ionic monomer. The frequency of LARs with the ionic dimer ioxalate is similar to those with non-ionic monomers.
In quantitative terms, when only skin reactions to nonionic monomers are considered, the frequency of LARs is lower than 4% of all cases, although this value is significantly increased if other, non-skin, symptoms are considered as LARs.

“...Most late skin reactions are mild, are usually self-limiting and resolve within 7 days...”

**PATHOPHYSIOLOGY OF LARS**

Much information on the nature of the pathophysiology involved in LARs has been generated from studies involving skin tests using diluted iodinated contrast medium. These tests are carried out on patients who have reacted to contrast media, i.e so-called “reactors”. Such skin tests include skin prick and delayed reading intradermal tests which can identify both IgE- and T-Cell-mediated mechanisms, as well as patch tests which only identify T-cell mediated reactions.

These studies have shown that the skin reaction seen after the administration of iodinated contrast media is very similar to that seen with many other drugs, where the reaction has been shown to be mediated by T-cells.

In patients who have demonstrated LARs with non-ionic contrast agents, the skin test studies have shown that there is a significant cross-reactivity with other non-ionic agents, but that there is no reaction with inorganic iodine. This suggests that the whole molecule of the contrast agent plays an immunogenic role but free iodine does not.

The observations that peripheral blood lymphocytes taken from patients who have demonstrated LARs with non-ionic contrast agents, the skin test studies have shown that there is a significant cross-reactivity with other non-ionic agents, but that there is no reaction with inorganic iodine. This suggests that the whole molecule of the contrast agent plays an immunogenic role but free iodine does not.

**Definition**

A late adverse reaction to intravascular iodine-based contrast medium is defined as a reaction which occurs 1h to 1week after contrast medium injection.

**Reactions**

Skin reactions similar in type to other drug-induced eruptions. Maculopapular rashes, erythema, swelling and pruritus are most common. Most skin reactions are mild to moderate and self-limiting. A variety of late symptoms (e.g. nausea, vomiting headache, musculoskeletal pains, fever) have been described following contrast medium, but many are not related to contrast medium.

**Risk factors for skin reactions**

- Previous late contrast medium reaction
- Interleukin-2 treatment
- Use of non-ionic dimers

**Management**

Symptomatic and similar to the management of other drug-induced skin reactions, e.g. antihistamines, topical steroids and emollients

**Recommendations**

Patients who have had a previous contrast medium reaction, or who are on IL-2 treatment should be advised that a LAR is possible and they should be advised to contact a doctor if they have a problem. Patch and delayed-reading intradermal tests may be useful to confirm a late skin reaction to contrast medium and to study cross-reactivity patterns with other agents Agents which have shown cross-reactivity on skin testing should be avoided Drug prophylaxis is generally not recommended

**TABLE 1.** The Contrast Media Safety Committee guidelines for late adverse reactions.
confirmed LAR to a contrast medium needs further administration of contrast medium, skin testing could be useful for choosing an alternative contrast agent.

“... A history of allergy appears to double the likelihood of a late reaction, with drug or contact allergies appearing to be particularly important...”

CLINICAL FEATURES
OF LATE SKIN REACTIONS
Most late skin reactions occur within three days of the administration of contrast medium. Maculopapular rashes are common, often with erythema, swelling and pruritus although other reactions include urticaria, angiodema and scaling eruptions.

Most late skin reactions are mild, are usually self-limiting and resolve within seven days, with up to 75% of cases resolving within three days.

However, occasionally there are severe reactions leading to severe morbidity, hospital admission and even death. In some reported cases of severe adverse reactions the patients had severe underlying medical conditions.

MANAGEMENT OF LATE SKIN REACTIONS
The recommended management of late skin reactions is symptomatic. Topical steroids and emollients have been used for late reactions; oral antihistamines have also been used for acute reactions.

PREDISPOSITION TO LARS
Women appear more susceptible to late reactions to contrast media than men.

There have been reports that the incidence of late reactions varies in a seasonal manner, with proportionally more cases being notified in spring and early summer. This has given rise to the suggestion that contrast media may cause photosensitization or that pollen may increase the predisposition to the development of late adverse reactions.

A history of allergy appears to double the likelihood of a late reaction, with drug or contact allergies appearing to be particularly important.

“... it is considered not appropriate to give any special warnings about LARs unless the patients have special risk factors...”

The risk of late reaction is increased in patients who have had a previous late reaction to contrast media, but there appears to be no higher risk than normal of late reactions in patients who have had immediate reactions to contrast media.

Several underlying medical conditions have been reported to predispose to late reactions. These include renal impairment, cardiac, liver disease and diabetes mellitus.

Severe late reactions have been reported in patients with systemic lupus erythematosus.

There appears to be a two- to four-fold increase in the incidence of late reactions in patients who are receiving immunomodulatory treatment with interleukin-2 (IL-2). It has also been noted that the appearance of skin rash, pruritus and flu-like syndromes after administration of contrast media are more frequent in patients who had received IL-2. In the light of the proposed mechanism involving T-cells activation in the pathophysiology of LARS as described above, it is interesting to note that both IL-2 and the stimulation of the immune system that occurs in SLE are known to reduce the threshold for T-cell activation by enhanced cytokine secretion or monocyte activation.

PROPHYLAXIS
Given the relatively low rate of occurrence of late adverse reactions and the fact that they are usually mild and self-limiting, it is considered not appropriate to give any special warnings about LARs unless the patients have special risk factors.

On the other hand patients with increased risk, such as those undergoing IL-2 immunotherapy or who have a strong allergic history should be warned about the possibility and nature of late reactions and should be advised to contact medical help if a problem is encountered.

The value of the prophylactic use of steroid is unclear.

FURTHER READING
This article is a short summary of the recent paper [1] which provides detailed references to the large body of published material dealing with late adverse reactions. A full bibliography is available in the reference below [1] or from the author.

REFERENCES
Peripheral pulmonary lesions (PPLs) are increasingly being detected, as a result of the increasing use of computed tomography scanning and will become even more prevalent if widespread CT screening is adopted for lung cancer. Current diagnostic techniques for PPLs are imperfect: radiographic surveillance is unable to provide a histological diagnosis; CT-guided transthoracic needle aspiration has a reasonable diagnostic sensitivity but suffers from high complication rates; bronchoscopy with fluoroscopic guidance is a safer approach, but has poor sensitivity particularly for nodules ≤ 2 cm; endobronchial ultrasound (EBUS) radial probe provides accurate confirmation of target localization, but offers no assistance in steering the probe through the branching bronchial tree in order to reach the target. Electromagnetic navigation bronchoscopy (ENB) is a new bronchoscopic technique that enables GPS-like navigation through the lungs, promising accurate lesion localization. This review article explores this new technology and reviews the available published literature.

Detection of peripheral pulmonary lesions (PPLs) is increasingly common because of the widespread availability and use of computed tomography (CT) scans in lung cancer screening research [1,2]. It has been reported that 5-18% of CT coronary angiogram and CT pulmonary angiogram scans demonstrate incidental pulmonary nodules [3,4]. The National Lung Cancer Screening Trial (NLST) demonstrated a 20% reduction in lung cancer mortality when CT screening was used compared to CXR screening. However during the screening phase of the study more than 39% of participants were shown to have one or more non-calcified pulmonary nodules ≥4 mm, the majority of which were ultimately found to be benign [5].

Several techniques have been used in the diagnosis of PPLs. CT transthoracic needle aspiration (CT TTNA) is a frequently used diagnostic technique for PPLs and has a high overall sensitivity for malignancy (0.90) [6] that decreases for lesions <2 cm (0.77) [7]. A negative result usually leads to additional procedures in view of the high false negative rate of 20-30% for malignancy [8]. CT TTNA complication rates include pneumothorax in 5-41% and parenchymal hemorrhage rates approach 2% [6]. Transbronchial biopsy is a safer approach however sensitivity for malignancy is considerably lower when guided by fluoroscopy alone, particularly for nodules ≤2 cm [6]. Endobronchial ultrasound radial probe (EBUS RP), a newer technique with real time confirmation of target localization, increases diagnostic sensitivity to approximately 70% but is dependent on operator and lesion size, and does not allow direction of biopsy instruments [9].

**ENB - DESCRIPTION OF TECHNOLOGY**

Electromagnetic navigation bronchoscopy (ENB) is a relatively new technique aimed to localise PPLs through GPS-like tracking. The first human trials of ENB took place in 2005 and over 20 000 ENB procedures have since been performed [10].

In practice, the procedure consists involves three stages [11] These are:

1. **CT SCAN**
   To reconstruct multiplanar format CT data necessary for planning, proprietary iLogic software requires DICOM data with specific slice thickness, overlap and convolution kernel.
2. PLANNING
The target lesion is outlined on axial, sagittal and coronal CT views and a pathway is mapped from the trachea to the target lesion by placing “waypoints” along the relevant bronchi. Several pathways can be planned for each target and previewed through virtual bronchoscopy animation. The pathways are exported to a removable flash drive for transfer to the procedural computer.

3. PROCEDURE
The patient lies on a location board that produces an electromagnetic field (EMF) encompassing the patient’s thorax. A miniaturized sensor in the locatable guide (LG), situated at the distal end of an eight way steerable catheter, delivers position (in x,y and z planes) and movement (roll, pitch, yaw) information to the procedural computer three times/second, allowing precise tracking through the EMF. [Figures 1, Left and Right panels]

Once the bronchoscope is wedged into the appropriate subsegment, the locatable guide together with an extended working channel (EWC) is passed through the bronchoscopic working channel into the lung periphery. The operator selects a waypoint, placed during the planning stage, and the computer provides instructions on how to steer the LG to reach that particular waypoint [Figure 3]. Once a waypoint is reached, the next waypoint is selected and the process is repeated. When the LG is in close proximity to and correctly aligned with the target lesion, the extended working channel is locked onto the bronchoscope, the LG is removed, and biopsy tools are inserted through the anchored EWC to sample the lesion.

![Figure 1. Catheter handle and locatable guide. A miniaturized sensor in the locatable guide (LG), situated at the distal end of an eight way steerable catheter, delivers regular position and movement information to the computer, allowing precise tracking through the electromagnetic field. The locatable guide is shown in the neutral position (Left Panel) and with the neck flexed (Right Panel).](image)

ENB LITERATURE
Most case series of the use of ENB for the diagnosis of PPLs report diagnostic yields ranging between 59-74% [10, 12-22]. Only one randomized controlled trial has been published comparing ENB to other diagnostic techniques. In this study, 118 consecutive patients with PPLs ranging between 13-58 mm were randomly assigned to endobronchial ultrasound radial probe EBUS RP (n=39), ENB (n=39) or a combined approach using ENB to navigate and EBUS RP to confirm lesion localization (n =40). Both techniques had similar diagnostic yield (68% vs. 59%) despite the mean lesion size being largest in the ENB group compared to the EBUS and combined groups (28+/−8 mm vs. 25+/−5 mm vs. 24 +/−5 mm). In contrast, the yield in the combined group was significantly higher (88%, p=0.02) approaching that of CT TTNA. Forceps biopsy was the only sampling modality used with a range of 2–5 biopsies taken per lesion [13].

Several studies have investigated predictors of ENB success. As in EBUS RP, Seijo et al found the presence of a bronchus sign was associated with significantly higher success rate (79% vs. 31%) [20], Eberhardt et al found ENB yield was dependent on lesion location (upper lobes vs. lower lobes = 29% vs. 89%, p=0.01) possibly because of excessive respiratory motion in lesions close to the diaphragm [23]. This is however not a universal finding [16,21]. Individual studies have not shown lesion size to be a predictor of success but this is likely due to small numbers.

ENB is a safer procedure compared to CT TTNA. Published pneumothorax rates range between 1 - 7.5%. No major bleeding has been reported.

Most procedures involve the operators climbing a learning curve. However the data regarding the learning curve of the ENB procedure vary. Makris et al even suggested that there was no need for a learning curve as evidenced by two operators achieving the same diagnostic yields in their first/last 13 sessions (76.9% vs. 69.2%) and first/last 7 sessions (42.8% vs. 42.8%) respectively [24]. Lamprecht et al found an increased diagnostic yield for the first 30/last 30 procedures (n=112, 80% vs. 87.5% respectively, p=0.724) in parallel with a reduction in mean lesion size from 30.4 mm to 25.3 mm [21].

More recently a meta-analysis of guided bronchoscopic techniques which included EBUS RP, ultrathin bronchoscopy, virtual bronchoscopy (VB), guide sheath and ENB, found that ENB alone had the lowest inverse weighted diagnostic yield of all modalities (67% vs. 70% for all modalities) [9]. Interestingly, VB had a higher diagnostic yield than ENB (72% vs. 67%) despite VB being part of the ENB procedure.

Cost remains the most significant barrier to widespread ENB implementation. Capital costs and consumables per case are considerably higher than CT TTNA and EBUS RP. Consumers are single use. A recent modelling study comparing cost-effectiveness of CT TTNA to ENB, followed by video-assisted thoracoscopic surgery (VATS) if non-diagnostic, found that CT TTNA cost $US 2913 compared to $US 6633 for ENB for the diagnosis of a solitary pulmonary lesion. However CT TTNA had an increased pneumothorax rate (CT TTNA 15% vs. ENB 1.6%) [25]. The most cost effective strategy was sequential biopsy by CT TTNA followed by ENB and VATS ($US 1934); the cost of ENB followed by CT TTNA and VATS was $US 2406. The former sequential strategy still resulted in higher pneumothorax rates than the latter strategy (6.7% vs. 2.7%).

ENB is a resource-intensive procedure, potentially requiring an anesthetist, radiographer (for fluoroscopy), cytology technician (rapid on-site evaluation), and bronchoscopy nursing staff. ENB
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is more time-consuming than EBUS RP with reported duration times reported as being between 25.7–60 mins [17-20,26-28]. There are no direct comparative data between general anesthesia (GA) and conscious sedation so optimal anesthetic strategy is uncertain. A subgroup analysis of 92 patients undergoing ENB showed diagnostic yield was not affected by anesthetic choice (GA vs. sedation, p=0.57) [23].

Similarly, the need for fluoroscopy during ENB is debatable. The author uses fluoroscopy to confirm biopsy forceps opening and as an additional confirmation of target alignment. EBUS RP is commonly used as a further confirmatory technique but may increase the chance of EWC dislodgement from the leading bronchus.

FUTURE DIRECTIONS
While most publications on ENB have addressed the diagnostic sensitivity for PPLs, its true value may lie in therapeutic applications. Case series have demonstrated the utility of ENB for fiducial marker placement to facilitate stereotactic radiotherapy [29,30]. Furthermore, the placement of pulmonary brachytherapy catheters with ENB in medically inoperable lung cancer has been shown to be feasible [31]. Pleural dye marking for resection of PPLs can also be achieved through ENB.

Diagnosis of PPLs remains a common yet challenging problem for clinicians. While CT TTNA is a reasonably accurate way of diagnosing PPLs its major disadvantage is its high complication. Although ENB is a safer alternative with diagnostic yields that approach CT TTNA the further spread of the technique requires the production of favorable comparative evidence against CT TTNA and improved cost-effectiveness data.

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Women’s outreach program in India: the Asha Jyoti program

At a keynote presentation during the recent RAD-AID conference on International Radiology for Developing Countries at the Johns Hopkins Hospital in Baltimore, Maryland, the results of a six-month pilot phase of the Asha Jyoti program were presented (Asha Jyoti means “Light of Hope” in Hindi and Punjabi). The program, which was developed to address several unmet healthcare needs in India, has already successfully achieved its goal to provide breast cancer, cervical cancer, and osteoporosis screening to more than 500 women in its initial pilot phase. Nearly 50% of the women seen were from the poorest socio-economic groups in India, i.e. those living in households that earn less than $1/day. The mobile unit provided an opportunity for free health screening on their doorstep.

Asha Jyoti is a Women’s Healthcare Outreach Mobile program which was launched on 22 April 2012 at the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh. It is a population-based screening program of women aged between 40 and 60 years, which aims to ensure early detection of breast cancer, cervical cancer and osteoporosis, even before the individual has any signs or symptoms. It was established as a model for preventive healthcare for semi-urban and rural areas in northern India and involved the creation of a special mobile outreach van with imaging technology and clinical referral services to efficiently and effectively address multiple care needs. All women who visited the van received results from their tests within 7 to 10 days. Seven women with suspicious mammography findings and 41 women with suspicious colposcopy findings received follow-up testing and treatment, if needed, at PGIMER hospital.

“Our vision for Asha Jyoti was to develop a high quality, mobile screening facility to provide decentralized primary healthcare on people’s doorsteps, to detect three major diseases affecting women’s health earlier, and to provide diagnostic follow-up and therapy to the community,” commented Dr. N. Khandelwal, Professor and Head, Department of Radiodiagnosis, PGIMER. “A multidisciplinary team of health care specialists from our Institute, one of the premier institutions in India, formulated this program, and the teams from Philips Healthcare and RAD-AID supported the initiative to make it a reality and ensure that we reached the underserved population in the northern part of India.”

During the 6 month pilot phase, 615 women participated in the screening, and now that the program is going into full “operational phase” the aim is to screen 2,000-3,000 women every year for at least the next 4-5 years and provide a clear plan for follow-up and further routine screening. The target population is women living in semi-urban and rural areas, and Asha Jyoti has already extended beyond the original remit to reach women across the state: Screening was originally conducted in one sector of Chandigarh, but has also extended to two additional areas in Punjab.

“Together with our clinical partner PGIMER and with Philips Healthcare, we have been able to provide a solution that has delivered some really impressive results and we are extremely proud of the impact that the Asha Jyoti project is having on the lives of some of India’s poorest women,” stated Daniel Mollura, M.D., Founder, President and Chief Executive Officer, RAD-AID. “As a result of the successes to date, we are happy to say that the program will continue and we hope that it will be successful for many years to come.”

Diego Olego, Chief Strategy and Innovation Officer, Philips Healthcare added, “Asha Jyoti is an innovative way of delivering sustainable health care to the most needy women, by bringing state-of-the-art diagnostic equipment, high quality clinical care and education to rural and semi-urban areas. This initiative is one more example of how Philips creates the future of healthcare and enables clinical partners to save lives.”

In addition to being a model for integrating women’s health services, the collaboration is a unique public-private partnership between government (PGIMER) entities, non-profit non-governmental organization (RAD-AID) and the private sector (Philips Healthcare). To make the Asha Jyoti program work, PGIMER delivers the clinical services, RAD-AID is providing educational training and program planning support to health workers and staff and Philips has donated all the equipment and also donated the entire van which was designed and built in India by local suppliers.
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The world’s first medical-grade monitor, model PVM-2551MD, based on Organic Light-Emitting Diode (OLED) technology was introduced by Sony a few months ago. OLED (Organic Light-Emitting diode) is the next-generation flat-panel screen technology with exceptional image quality that outperforms liquid-crystal display (LCD). The 25-inch monitor, is now in use delivering significant benefits for a variety of surgical procedures and combining all the noted advantages of Sony’s OLED technology — true-to-life color reproduction, high resolution, virtually no motion blur and a response time more than 10 times faster than standard LCD. The PVM-2551MD model features a full HD OLED panel using Sony’s unique “Super Top Emission” structure and also comes equipped with an advanced signal processor that brings out the full performance of the OLED. The new monitor features Sony’s TRIMASTER EL technology, for a wide variety of endoscopic and surgical applications.

At RSNA 2012, Sony demonstrated its newest “works in progress” OLED display innovation, specifically targeted toward the radiology market. SONY TOKYO, JAPAN www.sony.com/medical.

G-Arm system launched in China
Whale Imaging has just launched its new G-arm in China with Europe and Scandinavia to follow shortly. The Orca MultiScan G-arm which incorporates the company’s proprietary CrossBeam technology is revolutionizing the way surgeons operate on certain orthopedic trauma and spine cases. The unique CrossBeam technology allows both apical and lateral views to be seen live and simultaneously on the twin monitors. The surgeon can thus save time, preserve the sterile field and ensure accuracy all at the same time.

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The CHISON i7 model has set the new standard for a premium cardiovascular color doppler system. The unique technologies of double phase digital beam forming has tripled the frame rate of a traditional cardiac motion image, which significantly reduces the chance of mis-diagnosis. With the elegant design of 19”LCD screen, 4 active probe connectors, ergonomic keyboard, the i7 is a top-of-the range system for cardiovascular use.

CHISON, WUXI CITY, CHINA www.chison.com.cn

LED Backlit Monitors
Eizo has just announced the launch of RadiForce GX540, a new 5 megapixel monochrome LCD monitor, as well as the RadiForce RX440, a new 4 megapixel color LCD monitor, at RSNA 2012. With the addition of these two models, EIZO’s RadiForce diagnostic monitor line up will all come with LED backlights, an industry first. LED-backlit monitors ensure stable and reliable performance needed in diagnostic monitors while increasing the service life since LEDs deteriorate far slower than traditional CCFL (cold cathode fluorescent lamp) backlights. EIZO offers a 5 year full warranty for the GX540 and 5 years or 20,000 hours when used at recommended brightness 400 cd/m² for the RX440.

With energy-efficient LED backlights, the monitors achieve a reduction in power consumption of approximately 25% (internal measurement under each monitor’s recommended brightness.) compared to the same size monitor with a conventional CCFL backlight. Both new monitors include all the features that current EIZO RadiForce diagnostic monitor have. One such feature is the unique Hybrid Gamma function which automatically distinguishes whether the displayed images are monochrome or color and displays each image in its ideal brightness and grayscale tones. This expands the usability of PACS applications by ensuring that various medical images are optimally displayed simultaneously.

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References
1. For details and full range of indications please refer to the Summary of Product Characteristics.