

## **HO HUNG CHIU LECTURE**

**DELIVERED BY DR. C.H. LEONG ON 30/10/2004**

Madam President, Ladies & Gentlemen

May I begin by thanking you Madam President and your wise council for affording me the honour to deliver this very prestigious lecture – the Ho Hung Chiu Lecture. I took on the honour with trepidation. My predecessors consist of Professor Ho himself, 2 Ministers from the HKSAR Government; and the Vice Chancellor of HKU, a true scientist. I feel like David amongst many Goliaths. Worse unlike my predecessors who spoke on their pet topics, the subject that I have chosen today is “Redesigning Radiology service in the 21<sup>st</sup> Century – a non Radiologists approach”. It may appear impertinent for me to talk about radiology services amongst radiologists. No I am not bringing coal to Newcastle nor am I 班門弄斧. Yet having been at the helm of the largest health care services organization in Hong Kong the Hospital Authority; and currently as the President of the only statutory body to vet and accredit specialists, I think I am qualify to speak on the policy and the changes to cope with the advancement of radiology and the demands of the public. I am also a urologist, as such it would be pertinent for me to address how urologists and radiologists should maintain partnerships, after all not all urologists are as fortunate as I am to have a permanent radiological partner. Perhaps I am also an ordinary HK citizen and tax payer and I would like to know how any redesigned radiological service could give me the best cost effectiveness in seeking optimum health care.

Professor H.C. Ho, as we all know, is not only the doyen of radiology in Hong Kong, but also an internationally well respected figure. History will tell us that he instigated the Institute of Radiology and Oncology in Hong Kong in 1950, the launching pad of radiology service in HK. So influential was H.C. Ho even after retirement that he was affectionately known as Emperor Ho. In short H.C. Ho was the designer and determinant of Radiology Service in HK in the 20<sup>th</sup> Century.

As we move into the 21<sup>st</sup> Century, radiology as a science has extended

and enlarged by leaps and bounds. Gone are the days of fluoroscopy, which are still in use, and in its place is 3T or 4T MR. Gone are the days when X-ray films have to be developed handheld, we are in the era of filmless technology. Through the technology of PACS, captured images could be viewed and read miles away eliminating the need to transport x-ray films. Gone are the days when x-rays were at best a diagnostic tool that has to combine a hazy picture and a large amount of experience, and perhaps a small dose of imagination. Today, radiology provides not only highly accurate diagnosis of anatomic, and pathologic, anomalies, but extends into the realm in the diagnosis of physiologic and functional disturbance and even into molecular abnormalities. The scope of radiology now extends to localizing lesions for surgical approaches, interventional radiology for treatment and accurate localization of lesions for ablation with the X or Gamma Knife. All these I must say are to the detriment of the surgeons, whose work, or bread and butter, will soon be done by the radiologists.

A scan of the newer and emerging technologies in imaging showed a non-exhaustive list :-

- Positron emission tomography (P.E.T.)
- Hybrid PET – Computed tomography devices (PET-CT)
- Optical imaging
- Magneto-encephalography
- Image guided therapeutic intervention
- 3D and 4D imaging, robotics and Computed (aided) diagnosis

Experts in radiology have alluded that the next phase of development will be on Functional MR and Molecular PET.

I should hasten to apologize to our non-medical audience for not clarifying what all these are. The fact remains, I as a non-radiologist am just as ignorant. To me all these sound like tools of medical “star war”.

To cope with such rapid advances of science and technology, the service has to be redesigned. It is on this basis that I would bring you through my thoughts on the following areas.

- The new role of radiologic services
- The need to relook at the health care budget and additional manpower to match the new role
- Catering the advancement to changing patterns of disease
- The need to work in partnership with other medical disciplines
- Educating the public, and
- The way forward

Radiology service of the 20<sup>th</sup> century were basic diagnostic services, today this role is rapidly enhanced. Whilst diagnosis will be more accurate and succinct, many radiological departments are well established treatment centres – stenting of hollow or tubular organs; ablation of lesions of solid organs etc. The fact remains the boundaries between a radiologist, an interventionist and a surgeon is now blur.

The new role of radiology service, new technologies to improve diagnosis will invariably attract demand. Increase in demand is synonymous with expansion of service which could only be brought about by more manpower. Whilst new technology is invariably expensive, expansion of service and more manpower means more financial resources, the denominator is simple – a bigger budget. It may be argue that we in HK could go slow, but as the “world city of Asia” can HK remain in the “dark ages”?

Let us look at the current statistics of HK.

For the last decade, imaging service has already been increased by 8.8% and predicted to be more. Nor is the increase estimation characteristic of HK only, the need is world wide.

Perhaps many in the audiences is aware that HK spends around a modest 5% GDP on health care. Some slightly more than 50% for the public sector which caters for 98% of all in hospital services. Few would realize that of this modest percentage which amounts to below HK\$30 billion only 4.4% is spent on radiologic service. Yes, we have a fair share of “hard wares” but needless to say it is never enough. The problem of course is updating equipments when the technology of

imaging is so rapidly advancing.

Let us look at manpower. The Medical Council of HK recorded a total of 227 radiologic specialists (between diagnostic and therapeutic). Your College boast 307 Fellows and 85 trainees. By calculation we have less than 30 radiologists per million population, way below other developed countries and this has not taken into the needs for expansion in subspecialties.

Madam President, ladies & gentlemen, what I presented just now are some raw data of HK. It is very obvious that it does not compare too favourably with many in the 56 developed world. It has been said that in many respects, radiology is a victim of its own success in the development of the number and power of diagnostic technologies. The growing demand for imaging services is outstripping the resource that are available. Still less, any resource increase, if any will not be ever enough to reflect both the expanding role of radiology as well as technologic innovation within the specialty. This is certainly true for Hong Kong.

Facing with such onslaught, policy makers and the radiological profession would have to look deep into the following areas:

- A re-shift in health care budgeting for radiologic services;
- A reassessment of radiologic manpower needs especially in subspecializations;
- Training and accreditation of these specialty personnels;
- Establish guidelines on when, how and why could and should different imaging procedures be performed for proper patients' protection and cost benefit issues; and
- Enact laws and regulations to assure that new technologies and products are used with the highest safety for patients and workers alike.

Needless to say, the radiologic profession must be the driver of such changes.

The radiologic profession should realize and stress that as estimated by W.H.O. some 25-30% of all medical problems depend in

imaging to make a proper diagnosis and instill treatment. In short in a developed world proper imaging are a necessity and not a luxury.

Redesigning imaging service are very much dependent on the changing pattern of diseases. In HK, 3 areas in disease pattern will in the course of time affect the developmental direction of imaging requirements.

- Disease prevalent to us and other parts of Asia;
- Disease due to “westernization” of habits; and
- Newly emerging infectious diseases and their aftermaths.

Primary hepatoma or Hepatocellular Carcinoma (HCC) are prevalent in HK, many are the result of cirrhosis of liver following chronic Hepatitis B infection. Modern imaging is essential to initiate the diagnosis, estimate the status of the rest of the liver – in preparation for possible liver resection. Modern imaging tools are also important to guide proper tissue biopsies for diagnosis. In cases, where surgical resection is considered not possible, modern imaging may be used for embolization and intra-arterial chemotherapy. Overnight the diagnostician become the interventionist venturing into land that no man has even tread before.

Whilst atherosclerosis is considered a rarity in the past in HK and Asia, the “westernization” of habits has resulted in a marked increase in coronary heart diseases and cerebrovascular catastrophies. Data in HK showed that coronary heart disease accounts for 5.4% of all death and CVA ranks the third major cause of death. Global data have shown that urgent CT or MRI will provide a clear distinction between cerebral thrombosis and cerebral haemorrhage and thus become a good therapeutic guide. Experiences have shown unequivocal that in the case of thrombosis, thrombolytic therapy given within 3 hours of the attack do produce a high rate of reversal. There is thus a call for the setting up of Neuro International services within a Stroke Center.

SARS which could be a global problem originates from Asia, HK was hardhit. Many aspects of the disease is still very much in the unknown. At the initial phase, accurate diagnosis could be a problem

for the diagnostic PCR test are usually only positive after a few days and takes time to come out with a result. Imaging is therefore the only early tool. Plain x-ray of the chest may be elusive and only CT lung could give the clue away. Experiences have shown that some 7 days after the onset, the patient could rapidly desaturated (oxygen saturation in the blood). This occurs as a result of hyperimmune reaction of the lung tissue to the corona virus and could be preventable or minimized by massive dose of steroids. CT is invariably the significant diagnostic tool to pick up the early changes to instill rational treatment.

The highly infectious state of SARS and the high dependency on imaging for diagnosis and follow up means that not only do we need the tools, and in this case CT machine, it also means that the radiological services must be redesigned to provide a “clean service” for non SARS cases and a “dirty service” for SARS or suspected SARS cases. In the “dirty” sector there must be a proper workflow and logistic for staff, adequate portable x-ray machines and perhaps even a mobile CT scanner. Needless to say, all the staff has to undergo a rigorous training for self protection, disinfection and proper infection control. It may be said that SARS has not and might not return. Yet we have to be on the alert, other infections are always waiting to attack. Avian “flu” in an obvious example.

When modern radiologic tools can provide images that are no more a guessing game, and interventional x-rays could be such an effective curative modalities, it should come as no surprise that many doctors, be they a generalist or a specialist, will call for more of the service. Overnight the one time considered a “small specialty”, today the specialty of radiology is the envy of the whole health care profession.

The surge for imaging services could well be attributed to the following reasons.

- When diagnosis is still unsure
- To further ascertain the most likely diagnosis
- At the request of patients (having learnt from Readers’ Digest, Time Magazine, etc.

Regrettably, what are being requested could well be the wrong investigations or even unnecessary investigations.

Often times too, to minimize the possible danger of medical litigations, doctors may decide to “play safe”, do all perceivable investigations available to absolve from blame.

It is unfortunate that in the political climate of a “blame culture”, the denigration of the time honoured doctor patient relationship has led to the use of highly innovative and state of the arts technologies, not for life saving, but to act as a medical scapegoat. Such of course should never be encouraged.

It is imperative that the radiological profession should lead the rest of the health care team to maturity in the understanding of the use, the indications, the effectiveness and the side effects of all these modern technologies. In short the radiologists should educate their other medical discipline colleagues on proper imaging referrals. Furthermore as specialist in the know it is also your responsibility to veto referrals and to suggest courteously better alternations or dissuade further unnecessary investigations.

The public must be educated too. They have to realize that each new technology was developed for a specific cause and not as a “general health check screener”. Furthermore all these investigations are not without side effects. Patients subject to CT scans for example are exposed to quite a high dose of irradiations. Similarly the message must be delivered to the public that each new technology are not the be all and end all for diagnosis. Nor is there a single best investigation. New technologies do not invariably replace old ones as a diagnosis tool, instead each compliments the other and thus improve the diagnostic accuracy.

Madam President, Ladies and Gentlemen, for the last 20 minutes or so I have outline to you the trials and tribulation of how the very rapid advancing radiologic science and technology affects the health care budget, the manpower needs, the adaptation of the health care team, and the needs to educate the public. It is for us the health care professionals and in particular the radiologic specialists to take the advantage of the

new technologies and steer them to improve the care of our patients. This is particularly important in HK and the China Mainland. For as China is predicated to be the hub for fast growing economy of the 21<sup>st</sup> century, to make this into a reality and in particular to have this sustained, HK as a part of China will need to maintain a healthy population through redesigning our health care service that answer to the needs of the people, assessable to all, cost effective and provide incentive to progress through research. Radiology as a hub of health care service must do like wise.

Madam President, we should be glad and proud that much of these are happening in HK. Your College through the innovation of your forefathers, your able Council and yourself have spearheaded many of these new technology services in HK in a rational manner even in the presence of a very stringent budget; your College have done work on the manpower needs, you have developed workable guidelines for referrals on new technologies and you have coordinated with the other Colleges within the Academy for better cooperation, you have extended your College network with both national and international bodies to enhance education and communication. It will be up to the whole profession to stand behind your College to push the Government to look at a rational health care reform, to properly define the role for radiology and its service and to reshift the very much needed budget.

Madam President, Ladies, Gentlemen, I have no doubt even Emperor Ho, our mentor in radiology, a visioning radiologist, would approve.