HealthManagement
Promoting Management and Leadership

Volume 14 - Issue 1, 2014 - Cardio Spotlight

Cardiovascular Imaging

Interviewee

Dr. **Eugenio Picano,** *FESC*

Director General

Echocardiographic Laboratory

Institute of Clinical Physiology, CNR

Pisa, Italy

Interviewed by

Claire Pillar

Managing Editor

HealthManagement

What prompted the European Society of Cardiology to produce this position paper on the appropriate and justified use of medical radiation in cardiovascular imaging?

The European Society of Cardiology (ESC) wants to make cardiology wards and laboratories safer places for patients and doctors. The benefits of cardiac imaging are immense and often life-saving, and we can maximise them and minimise risks by simply acting on the radiation awareness of doctors and patients. The position paper tries to improve the culture of safety and radiological responsibility in the cardiology community. Appropriateness ("the right exam in the right patient") and justification ("at the right dose") are indicators (and certainly not the least important) of good clinical practice in contemporary cardiology practice.

Is the risk of radiation exposure due to cardiac imaging growing?

Medical imaging is one of the main causes of environmental cancer listed in 2010 by President Obama's Cancer Panel, and is a growing problem, with radiation exposure from medical imaging showing a sixfold increase over the last 20 years, and now totalling the radiologic dose equivalent of 150 chest x-rays per person per year in the USA. Small individual risks of a single exam multiplied by billions of examinations become a significant population risk. For the individual patient, radiation risk is a cumulative one: exam added to exam, dose to dose, and risk to risk, often creates - in cardiology patients - a non-negligible cumulative cancer risk. Increased dose means increased risk of cancer, years down the line.

How does the growing challenge of obesity affect cardiac imaging?

Obesity can lead to higher patient exposure in three ways. First, the obese patient is more vulnerable to cardiovascular disease, requiring diagnostic and therapeutic radiation. Second, for any given examination, radiation exposure is higher in the obese than in the lean patient, due to thicker interposed tissue between the target organ and the radiation source and the more pronounced attenuation phenomena. Third, in obese patients non-ionising techniques (such as ultrasound and magnetic resonance) lose accuracy and feasibility, and this leads to preferential use of ionising techniques.

What is the ESC doing to encourage cardiologists to minimise inappropriate cardiac imaging?

In theory, formal training in radioprotection is a part of the interventional cardiology curriculum and even required by law in many European countries as a prerequisite for entering the cardiac catheterisation laboratory. In practice, at least one-fifth of interventional cardiologists did not receive any formal training in radioprotection and - with or without training – their radiation awareness is disappointingly low. In its document released in 2011 and dedicated to “Patient and Staff Radiological Protection in Cardiology”, the International Commission on Radiological Protection recommends that “since the amount of radiation employed by interventional cardiologists both per patient and annually is no less than that used by an interventional radiologist, the training standards of radiation physics and radiological protection should be the same as for other interventionalists”.

Is there a role for a Dose Index Registry for cardiac imaging exams?

Absolutely yes. The paper recommends that patients should be given the estimated dose before a procedure, and the actual dose in writing afterwards if they request it. This could become a legal requirement through the European Directive Euratom Law 97/43, but application of the law is being delayed by technical and practical difficulties. The dose of each exam should be digitally stored in patients’ records.

In the position statement, you say that radiation risk is not the most important risk to be considered when weighing up the risk-benefit of an imaging test for a patient, but the one that is the least well-known and the least considered. What is the most important risk to be considered?

All risks should be included on the risk side of the risk-benefit assessment quintessential to the appropriateness of every examination. Risks include acute risks occurring during examination (for instance, cardiac death during a coronary interventional procedure, ventricular fibrillation during dobutamine stress, cardiac asystole during dipyridamole stress or myocardial infarction during exercise stress), subacute risks (for instance, contrast-induced nephropathy with invasive coronary angiography occurring days after the examination), and longterm risks (such as cancer occurring decades after the ionising test). The most important risk depends on the type of exam and the type of patient. In a child with Kawasaki disease or a young woman with chest pain, candidates for myocardial scintigraphy or coronary CT, the most important risk is probably a long-term one; in an elderly patient with acute coronary syndrome who undergoes percutaneous coronary intervention, the dominant risk to consider is the acute one.

You observe that companies are fighting the ‘dose war.’ In your opinion, can industry do more to improve the dose minimisation/ image quality balance?

Companies who develop better ways of reducing doses will win in future global competition. Radiological sustainability is becoming a competitive marketing advantage. The best way is not only to develop better ways of achieving the same information with a lower dose (for instance with low-dose coronary CT) or no dose (for instance with near-zero fluoroscopy techniques in electrophysiology), but also to have standardised open systems using a common standard to display the dose and archive it in digital patient records. The field suffers enormously from lack of standardisation and difficult communication, not only among physicians, but also between the physician and the machine, and different machines of different vendors. Things are improving, but perhaps too slowly.

You say that “Cardiologists are the true contemporary radiologists”. Please explain this comment.

Cardiology accounts for 40% of patient radiology exposure. Nuclear cardiology accounts for > 80 % of cumulative exposure from nuclear medicine. Even from a professional exposure standpoint, interventional cardiologists and electrophysiologists are three times more exposed than diagnostic radiologists. Unfortunately, radiation risks are not widely known to all cardiologists and patients, and this creates a potential for unwanted and avoidable damage that will appear as cancer decades down the line. For interventional cardiologists and electrophysiologists, adequate training in radioprotection and diligent use of protection can reduce the received dose tenfold and even more. We need the entire cardiology community to be proactive in minimising radiological friendly fire in our imaging labs.

Can you comment on the importance of multidisciplinary collaboration between radiologists and cardiologists?

Radioprotection is best achieved through close interaction and communication between cardiologists, radiologists, health physicists, radiology technicians, industry and patients. The best shield against useless radiation exposure is radiation awareness, and this can be obtained only through better communication and understanding of the basic principles of radioprotection. This is much easier if specialists talk to each other, possibly in a common language.

Published on : Sat, 8 Mar 2014