

Is Radiology a clinical specialty?: The concept of the invisibl-e radiologist

Stavros Efremidis
Professor Emeritus of Radiology

It should be stated right from the start that Radiology is a clinical specialty and the radiologist is a clinician with special training in methods of exceptional diagnostic significance and dynamically expanding range. Our teaching was based upon this assumption with which Radiology should always comply, if its status is to be preserved. It is the status that Radiology has achieved along the years of its evolution to become the specialty we all know.

However, the recognised clinical character of Radiology is jeopardised recently due to what happens now in our field - and I am afraid it is going to progressively happen in the years to come!

To address the issue of what threatens Radiology as clinical specialty, it is important:

A. To review useful historical data regarding the evolution of our profession, obtaining some very interesting feedbacks.

B. To reaffirm some basic concepts that the term “Clinical Radiology” obviously includes.

C. To recognise current trends in Medicine in general and Radiology in particular, working insidiously against the clinical identity of our specialty.

This review wouldn't be completed without some comments and proposals aiming to possibly prevent the risk Radiology is facing right now, that is losing its clinical character! These proposals - rather general attitudes - are based on the experience of others and the over 40 years active practicing and teaching Radiology of my own.

A. Historic review

The radiologist' struggle to establish a professional status starts with the clinical application of the discovery of X-rays at the beginning of the past century. By that time the radiologists tried to secure their profession by claiming possession on the X-rays. Most of them had no formal medical diploma. Some were photographers or at the very best, experimental physicists at some University Hospitals [1] and all were considered helpers to the surgeon or the internist even after the American Roentgen Ray Society was established in 1908 [2, 3]. However, they did have an objective advantage: they were in direct contact with the patients, on which they were performing and interpreting the X-rays and sometimes, communicating directly the results to [4].

The professional status of the radiologist was enhanced when the American Registry of Radiologic Technology was created (1922) describing the qualifications and licensing requirements for radiographers. The Registry formulated a model of practice limiting the role of the technologist to performing the examinations and the radiologist in interpreting the X-rays and communicating the results to the referring physician. Although a step to the right direction, this model of practice became the first step to dissociate the radiologist from his patient [5].

This dissociation was intensified by hospital financial policies collecting the fees for professional radiological services, depriving the radiologists from their rights, as physicians, to have access to fee-for-service compensation; thus, maintaining them as salary dependent employees [6]. In addition, X-rays were handled by the file-room clerks further depriving the radiologist from any contact with the patient making him invisible.

During the 60s, starting from the United States, the situation had changed worldwide. The many new clinical applications of radiologic techniques, along with the already implemented formal training in Radiology, increased the

professional status of the radiologist. An increasing number of hospitals allowed the radiologist to bill the patient with a fee-for service, slightly restoring his prominence from the previous decade when, according to a survey in 1956, less than one out of four patients was aware of the radiologist's role to their diagnosis [5, 7].

B. Basic concepts

Basic concepts inherent to the term "Clinical Radiology" include:

- 1) direct access to and interaction with the patient, his family and his referring physician, to obtain reliable information of pertinent clinical data, laboratory findings, personal and family history etc.,
- 2) clinical interpretation of an imaging examination (currently including image analysis-radiomics),
- 3) decision making consultations to further patient's imaging diagnostic work-up,
- 4) evaluation of the extent of the disease for treatment planning or change of treatment based on imaging response on follow-up (it applies particularly to oncologic patients) and
- 5) direct access to the patient with full clinical responsibility as "primary care physician" in Interventional Radiology [8].

C. Current trends

Development of current imaging modalities, improvements in cross sectional technology, advances in digital imaging reconstructions and widespread use of high speed and resolution PACS work stations, although revolutionised medicine in the last 20 years, have also affected indirectly our practice. The radiologist's concern (and time) has now split between the clinical significance of an imaging examination and the necessary acquisition protocols, post processing reconstructions etc., making it possible to dissociate himself from the patient to be focused on the work station. Moreover, the change from film-based to digital imaging has allowed non radiologists, even medical personnel, to communicate imaging studies through the work station. This practice is limiting the radiologist' personal interaction, further displacing him from clinical foreground and isolating him, gradually and imperceptibly.

How should we negotiate the apparent dilemma "patient versus work station" or answer the question "physicians or image interpreters"? I think this "dilemma" is only a subterfuge because--- radiologists have to master them both. They have to be the first, the best and the fastest to exploit the work station potentials; they should effectively perform all necessary reconstructions, measurements and comparisons with previous studies (making use of PACS) and consider in their diagnosis all necessary data - taken from the Hospital Information System (HIS). Moreover, they should improve diagnostic and prognostic potentials of traditional medical imaging with more sophisticated technics such as those combining data mined from digital imaging analysis of standard of care images (radiomics) with biologic information coming from genomic analysis (radiogenomics) [9]. For every imaging examination, the radiologist has to be the only quick, dependable, evidence-based source of information to imaging diagnostic guidelines, collaborating with other specialists in medical consultations and acknowledging the value of the individual patient in making clinical decisions [10]. This is the way Radiology will maintain its prominence in the clinical chain: medical imaging - clinical diagnosis – treatment planning – imaging follow up. To this end the radiologist can be helped by means of emails, electronic medical record communication etc. This is particularly appealing to the younger generation of radiologists, who spend significant amount of time deftly exploiting all capabilities of work stations.

Therefore, it is necessary during the formal radiological training, appropriate time to be provided for practical issues of computer science in order to familiarise the radiologist with the work station potentials and the exploitation of its functions. The progress has to be reported during his/her training.

It has also been suggested – and it seems self-evident - that the radiologist has to invest more time in meeting with the patient after the examination and in clinical consultations with the referring physicians. To this end, some authors have provided guidance to decrease barriers to communication by improving practices for more personal and identifiable ways in the reporting system [11]. The benefit of the radiologist's personal involvement in the diagnostic process is evident in certain subspecialties, such as Paediatric Radiology, Mammography and Interventional Radiology, where the direct contact of the radiologist with the patient during the examination provides a better service to the patient and reveals the important role she/he has to play for the solution of a particular clinical problem; that, in turn, indicates which is the right way to go.

All that is mentioned so far seems not difficult to be confronted. What make me think however that the clinical character of Radiology is in stake and, if lost, endangers the future of Radiology as a discrete specialty, are mainly two relatively independent reasons:

The first is being related to the structure of our training, which is not adequately clinically oriented. Our residents are not formally trained to deal with the patient, sometimes even to confront a clinical situation related to an imaging report. Consequently, many radiologists decline (or are not allowed) to convey results to the patient even in cases when the patient is expecting them to do so. An explanation for this conduct could be the lack of preexisting relationship between the patient and the radiologist. On the other hand, this could also be related to the radiologist's inability to create such a relationship due to a limited exposure during training. Therefore, a rotating medical internship for at least one year in a certified medical training program has to be established and become an absolute prerequisite prior to initiation of radiological training. Such a program already exists in the medically developed countries, although its duration and structure is not standardised but differs among different countries [12]. Consequently, a homogenised curriculum has to be formally approved by European Association of Radiologists, matching the current clinical requirements of evidence based, individualised Medicine included in this clinical year. This year can also serve as a deterrent to different bureaucratic claims of other specialties questioning the clinical sufficiency of our training curriculum.

Training in Radiology has to be revolutionised anyway, in order to meet challenges emerging very fast in our profession. The question if Radiology training is updated enough to encompass the advances in modern imaging, correlation of image analysis with genomic heterogeneity -radiogenomics in clinical decisions [9] and the upcoming promises of nanotechnology in imaging is very timely [13]. More appropriate though for our discussion is the question: does our training invests in the "radiologist to be" with the necessary background to fully appreciate the clinical importance of the highly subspecialised studies he performs and interprets, to rightfully claim clinical authorship? If the answer to this question is not, then these highly subspecialised studies will be very easily swallowed (although not adequately digested) by our antagonists in turf battles that have always existed in Medicine.

The other reason has to do with what we use to call commoditisation, a term expressing criticism to the practice of Medicine in general but, currently, to Radiology in particular. It has a negative connotation since it implies the transformation of medical or, in our case, radiological services into commodities which is detrimental to both patient and radiologist.

To the patient, because he will receive services which are not personalised if the radiologist's main concern is to carry through the examination ignoring integrated components of his/her job such as:

- a) selection of the appropriate study based on the clinical needs of the particular patient,
- b) monitoring the selected study tailored to patient's clinical question and
- c) communication with the referring physician for a sound medical decision. The radiologist on the other hand, limited to dictating reports, is tantamount to ignoring the same -mentioned above- integrated components which, in turn, depreciates his clinical status; a situation typified in teleradiology (the ability to perform diagnostic imaging services remote from the site where the actual examinations are obtained).

Recent publications rise significant concern regarding teleradiology and its use in the future, especially based on outsourcing [14]. It might be a perfect example of selling Radiology as a commodity at a regional, national or international level by providing only interpretation services and destroying whatever important clinical elements remain in our specialty. The situation has been paralleled with surgeons limiting themselves to only performing surgery without assessing the indications for surgery or consulting with the patient pre-or post-operatively.

It is true that demands for radiological services are explosive with simultaneous drop in human resources [15]. We are pressed, if not obliged, to function an imaging department in a "24/7" environment which makes teleradiology to become a global reality in exchange to the clinical character of our specialty. That gradually pushes radiology toward commoditisation. The latter is also driven by a growing market where industry advocates purchase of imaging equipment by clinicians of other specialties leading to overutilisation of imaging examinations. A vicious circle!

In conclusion, we ought to defend our Specialty and oppose whatever depreciates its clinical status. We should be continuously trained to function as clinicians, demanding our clinical rights on multiple levels

and on a multitude of fronts. However, our awareness has to be based on a common denominator: ***The continuous effort to not only preserve but expand the essence of our specialty which remains Clinical.***

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