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## Editorial

### ‘Radiopath’- an assimilation of radiology and pathology: a need of the day

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Agnostic Pathology is a new term trying to emerge to mean a merger of radiology, pathology and molecular diagnostic information. Radiology imaging and histopathology are two different investigatory modalities in clinical diagnosis. They appear totally disconnected and isolated without any link as their departments, organization, function and their *modus operandi* are totally different. Both stand firmly on their own podium to exercise their sincere efforts to analyze their investigations; their results are very much mandatory in ‘accurate final diagnosis and proper management plan’ of all patients. Even though currently both have segregated functioning, yet there is widely growing opinion that this sort of isolation of radiology and pathology should end and a unique assimilation is greatly required to make an accurate diagnosis which helps infinitely in the betterment of human care. Thereby the quality and outcomes of patient management will improve markedly.

#### DECADES AGO

During the early 1950s, due to lack of modern facilities, diagnostic decisions were taken by the treating doctor on the merit of his own intelligence. Some experienced clinicians having an extensive updated knowledge in the field could make vital split-second decisions basing only on clinical features and plan their treatment. A patient with acute abdomen with rigidity and rebound tenderness would be taken straight to the operation theater; biopsies were done from any suspected organ by the treating doctor from the site which he felt the lesion was. This was an acceptable practice at that time. This subconscious decision-making process when used every day for complex problems carried high possibility of fatal errors in many patients.

Radiology was encompassing only a few modalities; basically plain x-rays and contrast studies such as IVU and Barium studies; venography, lymphangiography and angiography

were infrequently performed. Cross-sectional imaging (Ultrasound, CT and MRI) was not available. Therefore pathological changes within the organs were scarcely made obvious. Assessment of anatomical planes was not certain. Things have undergone enormous changes later. Scientific approach and evidence based medicine became a necessity. Recent molecular diagnostic techniques, cross-sectional 3-4 D digital imaging, quantitative image analysis, fMRI and PET scans help to improve early detection and characterization of diseases, and predictive, diagnostic and prognostic performance across a spectrum of diseases. We can exactly identify the plane of a pathological lesion. We can reach a correct diagnosis akin to that of histopathology examination (HPE).

#### DYSHARMONY

Currently it is apparent in many institutions that radiology and pathology often operate in isolation. This isolation increases the risk of radiologic-pathologist discordance, i.e., histological findings that do not match or are not in harmony with imaging findings. Even though there is nothing equal to HPE in experts’ hands in arriving at accurate diagnosis, it is not all the time we get accurate diagnosis. There are many incidences where the results from one histopathologist differ totally from another HPE expert; it may also be at variance with a radiologist’s opinion. Many times in instances of ample discrepancy between imaging and pathologic findings, the histopathologists have been requested by the referring specialists to have a ‘second look’ into the slides and /or prompted to repeat biopsy to have a reviewed opinion as the radiologist’s opinion of MRI/CT differ widely. It has happened that the HPE expert changed his version of the result after meticulous search of all the slides of the block specimen. Such a divergence or uncertainty of opinions/results is detrimental to the management of the patient. Aside from this, if

HPE and imaging results are different from the clinical diagnosis, the treating doctor is in a fix.

A treating doctor is left to himself to correlate, integrate and interpret the two separate reports got from the radiologist and the pathologist to reach his own diagnosis. On medico-legal grounds, the treating team becomes liable for prosecution when things go wrong at the outcome/prognosis of the patient (e.g. death). The doctor has to defend himself solely with clinical findings of the patient. It is difficult to draw conclusions because of the lack of material evidence (pathology lab or imaging) that lead to the diagnosis. It is difficult to say with scientific accuracy whether the clinician is correct or not in the eyes of the law. By the same token, it is scientifically and legally difficult to gauge the competency and accuracy of the clinician in his diagnosis and treatment when he chooses only one report (either HPE or radiology when they differ wildly) as the basis for his diagnosis and treatment, especially when that patient has a poor outcome or dies after treatment.

### **ASSIMILATION**

It is not a game. In real situations, it is wiser in the current scenario, for even experienced and skillful histopathologists to have imaging results beforehand for correlation to arrive at a safe diagnosis. Moreover 'an era of court disputes' now warrants such a safe approach! Legally, medically, ethically and practically it sounds very strong and meaningful to have an integrated report of (pathology and radiology) diagnosis as a basis for all treatments given to any patient. Here comes the invitation to see a scene of coordination between these two departments. Almost all major clinical entities now require clinico-patho-radiological correlation for an effective diagnosis and wholesome management of the patient. It is notably so in the field of oncology. Definitive diagnosis followed by interventions is greatly responsible for success of cancer treatment. There are instances when a radiologist issues a report stating a high degree of suspicion for malignancy; but, through sample or processing error, the material reviewed by a pathologist is not representative of the suspicious area detected in radiology. As a result, a false negative report for malignancy is issued. These discordances have serious consequences if left unresolved. There is a need for close communication, correlation and resolution of discordant findings between radiology and pathology to reduce diagnostic errors. One pilot study estimated that in the US, approximately 10,000 breast cancer cases may be under-diagnosed per year due to failure to resolve discordant radiology and pathology findings. It is obvious that any improvements in the process of communication of findings between radiology and pathology to

ensure timely exchange of clinical information could reduce these false negative reports. In order to avoid such false negative cancer diagnoses, it is imperative that both radiologists and pathologists communicate and correlate their findings in a way that ensures the proper diagnosis and prompt treatment for a patient.

### **UNIVERSAL ADOPTION**

Pathology-radiology integration such as a unified single result with correlation of clinical features, laboratory, HPE and imaging is to be advocated for improved management of specific diseases and many more potential benefits. Moreover, when integrated, both radiology and pathology technologies have immense potential to improve the planning and assessment of treatment and tracking of disease progression or response. To achieve this, standardized terminologies and reporting protocols, accessible reports from all clinical circles via PACS, development of registry and standard hospital medical information system with rich databases for all diseases with integrated radiology-pathology reports enabling users to retrieve cases in several ways by search engines using flexible queries such as patient history, symptoms and signs, physical findings, imaging features, laboratory data, HPE results, final diagnosis etc. are vital factors.

### **PROPOSED SOLUTIONS**

Basic problems must be solved before implementing an integrated pathology-radiology workflow. To resolve discordant findings between radiology and pathology, development of quality assurance programs, best practice guidelines, expedited flow of clinical information between radiology and pathology, standardization of the terminology of the reports to reduce misinterpretations and development of standardized messaging formats between information systems are proposed. Both pathology and radiology organizations must recognize the gaps in workflows that might hinder optimal communication of patient data, and progress should be made to resolve these critical issues and concerns. Both disciplines may use different information systems of their own to track subjects/patients/specimens/images and produce reports; but must also have another integrated system to view and store pathology-radiology images and reports. Moreover, the radiology and pathology systems must communicate not only with one another, but also with the hospital information system, the laboratory information system and medical records. Many of these issues can be resolved by system vendors, of course, at expensive cost. Vendors will have to develop

comprehensive management systems that consider clinical workflow and support the integration of texts, HPE and radiology images and other relevant data of both disciplines. Implementing such assimilation of radiology and pathology should be introduced to both specialties during medical training and as continuing-education opportunities would likely foster radiology-pathology integration on a wider scale. Academicians find that the

opportunity for pathology-radiology integration to improve patient care is great and, more importantly, the tools to achieve this end are not far away.

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