

STRUCTURED REPORTING IN RADIOLOGY. ARE WE READY TO IMPLEMENT IT?

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Introduction

Information is radiology's primary business. It comprises of creation of new information by studying the image, than input of information by putting it in order and later output given in the form of report.

The radiology report is an integral part of patient management. Radiologists play a vital role by providing the interpretation of imaging studies and appropriate communication of imaging findings to referring physicians. Although some referring clinicians may interpret imaging studies by themselves, radiologists reports have been shown to be more accurate and comprehensive, resulting in improved patient care. Describing and interpreting the imaging findings and providing the probability-based differential diagnosis are the radiologist's main responsibilities in this context. To improve patient care, it is mandatory for the reports to be timely and to answer the clinical questions accurately. The presentation and clarity of a radiology report do not always meet the expectations of referring physicians. Meanwhile an intense and controversial debate is taking place in the radiology community about the future of radiological reporting.¹

Traditionally, the free-text, narrative form of radiology reports are created. There is variability in the length, language, style and vocabulary resulting in significant differences in the description and radiological findings. Free-text reporting may also result in incomplete and difficult information required for the patient management. The referring clinician finds it difficult to identify the important information needed. Such incomplete information has to be discussed in detail in multidisciplinary team meetings which is time consuming. It would be better that all relevant and required information be present in the radiology report.⁸

The primary means of interaction between radiologist and physician are the radiology reports. So they must be structured and standardized in a way to allow easy communication. The accuracy of radiology reports is vital as they are an important medico-legal documents. When a radiological examination is requested by a clinician, they are seeking the opinion of a radiologist and this should be clearly communicated in the report. The radiological report should be clear and non ambiguous to provide the clinical expertise and diagnostic opinion of the radiologist.⁵

Structured Reporting (SR)

Structured reporting has been advocated as a potential solution for improving the quality of radiology reports. A three tiered approach to structured reporting has been recognised. The first and basic tier includes headings, such as history, examination protocol, indication, radiological findings and impression. The next tier of SR is sometimes called itemized reporting, where the findings are further specified with sub-headings, such as organs and organ systems. The third and highest tier of the structured radiology report requires all the previous characteristics and use of standardized language based on defined terms of universally accepted standard lexicon. The academic centres are now using the templates for structured radiology reports containing predefined checklists.⁸

SR having a digital nature is helpful in the archiving, processing and sharing capabilities of networks and workstations to acquire and circulate the data. In case of radiological as well as non radiological imaging such as interventional cardiology, SR documents

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could be collected and saved in DICOM (Digital Imaging and Communications in Medicine) format with more efficient and flexible environment for the communication of information between the various medical specialties and over PACS/RIS platforms.⁷

History

Princeton M Hickey MD was the first give the concept of the standardised reporting in 1922. He explained that regarding radiological reports, the style of reports should always be individualistic and often eccentric and should avoid verbosity and encourage concision and clarity. He introduced the term interpretation which means not only to describe the findings but to give diagnosis and differential diagnosis based on what you see on images with a certain probability. Later on in 1990s, RA Gagliardi introduced Hickey's principles of structured reporting. With the advancement in technology and introduction of modern workstations, the interaction of physician-computer now dominates. There is improvement in computer hardware and software over the last few years with escalation of voice recognition systems as compared to conventional transcription method. But this all advancement is at the expense of cost, speech recognition accuracy and inefficiency of work flow. In the developed health care set ups the digital imaging has become the standard practice including electronic reporting, PACS and tele radiology. The efficiency and versatility of digital imaging is equally important in the developing countries. The non-digital imaging technology is becoming obsolete in the developed countries, therefore the repair and replacement of older equipment will become problematic in the developing countries due to non availability of the parts. Decentralisation of image interpretation with the help of tele radiology is economical as well as easily accessible to radiologists worldwide. Keeping in view these potential benefits, a growing efforts needs to be taken to implement digital imaging network in the less developed world.⁶

RSNA Initiative

The Radiological Society of North America (RSNA) took initiative to introduce the concept of structured

radiology reporting as a means of providing clear, consistent and organized report of radiologist's imaging interpretation. There is a reporting Subcommittee, which is responsible for reporting to the Radiology Informatics Committee of RSNA. It was created in 2007 with the purpose of developing and promoting the structured reporting in radiology in collaboration with other radiology organisations including ACR, Physicians and sub speciality societies. Since its creation significant progress has been made by the subcommittee towards its goal. It comprises of a chair and two members to update about the progress of initiative for RSNA's reporting as well as about the future strategies and goals. In 2009, an online library was created of radiology templates. Initially 70 reporting templates were written by the subcommittees members in collaboration with other organizations to create structured report templates commonly used in different sub speciality areas of radiology. Since the introduction of the radiology template library, the number of the radiology templates has grown significantly. These are basically the tools that can be adopted by radiologists according to their needs and requirements.¹¹

RSNA has been supporting RadLex from last 10 years. It is a unifying lexicon of radiological information and results. It is an ontological system whose main aim is to build a useful and common vocabulary for the radiologists.

The currently available report templates are already over 250 on the website of the RSNA (www.radreport.org) and the website in collaboration with the ESR (open.radreport.org), that have been downloaded over 4.5 million times.¹²

Current structured reporting systems in use

The Breast Imaging Reporting and Data System (BI-RADS) is the first standardised language and currently the best example of structured reporting. The standardized language has many benefits as it aids in the research, education and consistency in practice. It is through BI-RADS that much is learned about breast pathology and imaging. The BI-RADS mammography, ultrasound and MRI templates facilitates data analyses and better research opportunities. This research is

made possible as report impressions are consistent, standardised and clear thus helps in clinical practice and patient care.²

Other reporting systems include the Liver Imaging Reporting and Data System (LI-RADS) to standardise the reporting and data collection of CT and MR imaging for hepatocellular carcinoma (HCC), Prostate imaging Reporting and Data System (PI-RADS) for prostate cancer, Lung Imaging Reporting and Data System (Lung-RADS™) for lung cancer screening.⁹

Advantages of structured reporting

Structured reports provide many advantages for radiologists as well as referring physicians.

1. Structured reports provide relative uniformity between radiologists and thus improving report quality and clarity. With the usage of a consistent vocabulary there will be reduction in the medical errors and common use of radiology terminology across the world.

2. The use of consistent vocabulary can be well analysed by the computers thus creating better research opportunities as well as support to the clinical decision and eventually quality improvement. It will help research in radiology by facilitating data extraction.

3. Structured reports helps radiologists to give complete and useful reports consistently. Checklist style reports can reduce diagnostic errors as it would remind the radiologist to mention all pertinent findings.

4. Structured reports also helps to follow the guidelines, which is important as an effective way to reduce costs and improve quality in the the current healthcare environment. Currently the guidelines are less often followed. Structured reports could potentially help in adherence to the guidelines and improve medical practice in the long term.³

Cons of structured reporting

While the pros of structured reporting are considered, the current research also highlights the questions,

concerns and demerits with respect to implementation challenges.

1. One of the biggest challenge in implementation is resistance to change and to convince the radiologists to give up the traditional narrative reporting. Since early 1900's the prose report has been the primary product of radiology. While it can be argued that radiologists should update their reporting practices although prose reports have become ingrained in daily radiology practice. Radiologists consider prose reports unique to their profession therefore there is resistant to switch to structured reporting specially among the older radiologists. The focus for change should be the young radiologists as they can be flexible in adopting the new style of reporting.

2. Although one of the benefit of structured reporting is claimed to be better accuracy but this has been questioned by some experts. This is likely due to limitations of template contents. This can be overcome by introduction of new designs and improved technology.

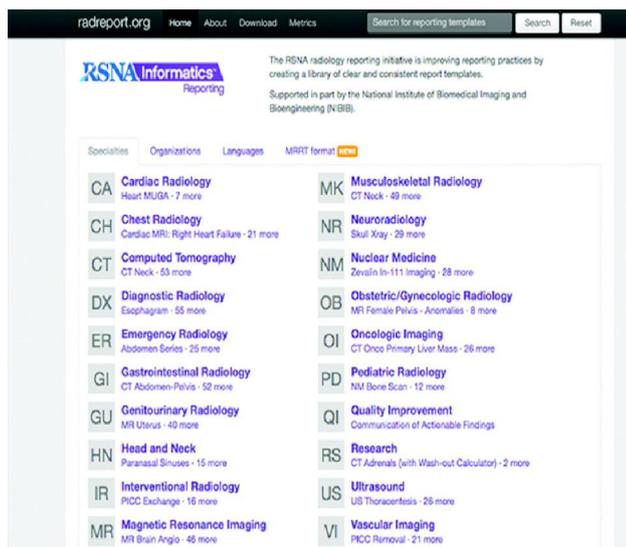
3. Adherence to the checklist type of reporting template may interfere with radiologist's reasoning and ability. There may be a negative impact on the search pattern and visual attention resulting in a phenomenon known as "eye dwell" when radiologists are more focused to keep their eyes on the report template rather than the images. This contributes to radiologist error and missed findings.

4. Concerns have also been advocated for the referring physicians similarly as for the radiologist. The same checklist style and over-structuring that may cause a radiologist to miss the important findings could have the same effect on the reader, even when reported with precision and accuracy. Although the referring clinicians claim a preference for structured reports, these limitations can be overcome by further emphasis on the need for continuing up gradation and refinement of software for the reporting and templates.³

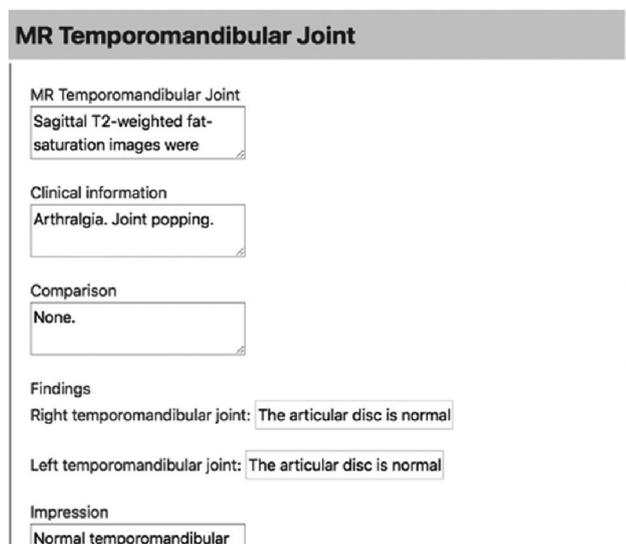
Residents Training

One of the additional possible advantage of using structured reporting templates is resident's education.

Radiology trainees are responsible for acquiring the ability to perform and integrate the radiologic procedures. By using structured reporting templates as a teaching material, the trainees can better do so in a systematic and organised manner. It can also help in accessing the progress of residents in producing better report for improved patient care. This could be done by the implementation of the reporting template as a teaching material during examination review. More over structured reporting can be used as model to improve the ability and approach of the radiology residents towards the diagnostic examination.¹⁰



- Main menu of Rad Report Template library



- MRI temporomandibular Joint template

Conclusion

Implementation of structured reporting is a challenge in the developing countries like Pakistan where software and IT infrastructure is not strong to support such advancements. In this regard the private sector can play a role by taking leading steps in introducing the new format in accordance with international standards. It is necessary to keep an eye on latest advancements in order to be in pace with the international radiology to improve patient care and safety, radiology report quality, promote productivity of radiologists and increase satisfaction of referring physicians. International and inter-society collaboration is needed to develop successful structured report templates with the help of radiology-reporting software solution providers. SR needs to be considered as the radiology work load is increasing over the years with instant demand of reports. There is increase pressure build up on the radiologist to effectively communicate the findings to the end users that can be either a - physician or patient. Finally, the national and subspecialty societies should encourage the use of structured reporting with regular feedback from the radiological as well as clinical community for the quality audit, better communication efficiency and enhanced end user satisfaction.

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Conflict of Interest: None

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