Japanese Journal of Radiology (2018) 36:575–578
https://doi.org/10.1007/s11604-018-0770-z

EDITORIAL

Diagnostic Radiology Service in Japan

Shinji Naganawa[1] · **Yukunori Korogi**[2]

Published online: 27 August 2018

Recently, many medical issues caused by a lack of sufficient communication between radiologists and non-radiologist physicians have been reported by the news media in Japan. This is a 'hot topic' not only in the Japanese radiology community, but also throughout the Japanese medical community. In most cases, an incidental finding reported by a radiologist was missed or ignored by non-radiologist physicians, and this incidental finding, which was most commonly a small, early-stage cancer or a finding suggestive of early cancer, subsequently progressed to advanced cancer. Most cases have been reported in the setting of large university hospitals. We, the diagnostic radiologists in Japan, should act promptly to reveal the cause of these issues and initiate processes to reduce this type of critical errors.

This issue of the *Japanese Journal of Radiology* includes a letter to the editor titled "Taking a proactive role in patient management of important incidental imaging findings: How can we increase the 'value' of diagnostic radiology service and improve quality of patient care?" by Dr. Daichi Hayashi and Dr. Ali Guermazi, who practice in the United States [1]. We appreciate this timely, constructive, warm, and a very encouraging letter, in which the authors recommend direct calls from the radiologist to the requesting physician (or their respective staff) to discuss each important incidental finding that is likely to change patient management and/or indicate a potentially life-threatening condition. The authors also suggest that diagnostic radiologists take a proactive role in patient care by direct, two-way communication ('closed-loop communication') with the requesting physician regarding any non-routine, important incidental findings that are likely to change patient management, and they suggest that diagnostic radiologists document these communications in the diagnostic report.

We are aware of the American College of Radiology (ACR) practice parameters for communication of diagnostic imaging findings [2], and we know that telephone calls are important and sometimes better than information technology (IT) solutions to ensure closed-loop communication. However, the medical environment and culture are quite different between Japan and the United States. In Japan, all people have medical insurance and have the right to freely access any medical institution they choose. Most people prefer to visit large hospitals, even for non-severe conditions such as the common cold, back pain, or mild headache. The number of computed tomography (CT) and magnetic resonance imaging (MRI) units per population in Japan is the largest in the world [3]. Thus, in most large hospitals, the number of patients per clinical physician and the number of images per single radiologist are quite large in Japan. The distribution of non-radiologist physicians and diagnostic radiologists is quite uneven in Japan, and varies greatly between hospitals [4–6]. Many hospitals are currently facing a crisis due to the lack of sufficient number of non-radiologist physicians and diagnostic radiologists; currently, these physicians have very heavy clinical burdens. Physician fees are also far lower in Japan than in the United States. Finally, while the United States is a litigious society, Japan is not.

Therefore, the establishment of uniform nationwide guidelines regarding direct telephone calls about incidental findings throughout Japan might be too aggressive, as well as impractical. In some hospitals with very small number of clinical physicians, they would have to answer an overwhelming number of calls from radiologists each day or might receive an overwhelming number of messages from their secretaries or medical clerks each evening. In such situations, some notifications might be missed or ignored. In Japan, it would be extremely difficult to obtain acknowledgment that the non-radiologist physician has received the notification from the radiologist without using IT.

✉ Shinji Naganawa
naganawa@med.nagoya-u.ac.jp

Yukunori Korogi
ykorogi@med.uoeh-u.ac.jp

[1] Department of Radiology, Nagoya University Graduate School of Medicine, Nagoya, Japan

[2] Department of Radiology, School of Medicine, University of Occupational and Environmental Health, Kitakyushu, Japan

From the radiologist's perspective, setting the threshold for when to call the requesting physician might be difficult without the knowledge of the patient's background. For example, an incidentally detected small equivocal pulmonary nodule might be of critical importance in a healthy young patient, but may not be as important in a patient with poor health due to other conditions. In Japan, order sheets often lack a sufficient description of the purpose of the imaging study. Sometimes, only a single word—'screening'—is written on the order sheet. With the development of high-performance CT and MRI, subtle but potentially critical findings are discovered quite frequently. However, determining the significance of the findings for each patient can be very time-consuming. Radiologists in Japan do not have the time to thoroughly read the electronic medical record of each patient. We must continuously remind requesting physicians that we need a summary of the clinical background of each patient to provide an adequate report.

Of course, we appreciate the authors' opinion that this might be a good way to improve the reputation of radiologists and the popularity of radiology in Japan. However, we would like to improve this situation internally, before we are forced to do so from the outside. Guidelines developed too hastily and that are too strict, might severely impact some clinical departments and radiology departments in Japan, which are already in critical condition. Further increasing the workload of radiologists and requesting physicians is not practical in some hospitals in Japan. Moreover, spending too much time in calling non-radiologist physicians or their assistants could result in a reduction in the time used to interpret images, which might cause errors that could damage radiologists much more severely than the present communication errors in Japan.

In Japan, we usually call attending physicians directly and record the details of this direct communication in cases of life-threatening emergency findings, such as skull fracture, subarachnoid hemorrhage, ruptured aortic aneurysm, and pulmonary embolism. Sharing the importance of closed-loop communication between radiologists and non-radiologist physicians for these life-threatening emergencies, therefore, seems like a good idea.

We know the detailed backgrounds of some of the recent incidents reported in the news media. Some of the unfortunate incidents which occurred, due to the incidental discovery of very small pulmonary nodules on CT, were out of focus from the requesting physicians' perspective. Those small pulmonary nodules are sometimes sufficiently equivocal that we can confidently report that 'this is a lung cancer'. Indeed, many CT scans have incidental equivocal pulmonary nodules. The critical incidents, such as those reported in the media, occur only occasionally among the many cases for which we recommend follow-up CT. To make a telephone call about such very subtle findings in all cases might be difficult and stressful for both radiologists and non-radiologist physicians. Too many telephone calls might cause other problems in Japanese hospitals, as described above. The radiology report is not the only thing that clinicians must consider—they also should evaluate pathology reports, blood test results, ECG results, etc. Alternatively, it has been recommended that we flag reports with important incidental findings to notify the requesting physicians. However, such a flagging system might be a 'double-edged sword'—for example, the requesting physicians may ignore reports without flags. Some hospitals in Japan have begun to share diagnostic report information with patients. The patient's involvement might be helpful to avoid missing important incidental findings. However, to expect this from patients might be difficult in Japan, which is the leading aging society in the world. Sharing diagnostic reports with patients would also increase the radiologists' and physicians' work, preparing additional versions of reports that can be understood by lay people. Finally, cultural differences in the patient–physician relationship exist between the United States and Japan [7, 8].

The European Society of Radiology (ESR) guidelines for the communication of urgent and unexpected findings [9] are quite reasonable to the Japanese radiological community. It is noteworthy that this guideline also states that direct telephone communication is not usually necessary and that other IT methods can be used in the case of unexpected, non-emergency findings.

The ESR guidelines divide the reasons for enhanced communication into three categories: emergency findings, unexpected findings, and incidental findings. Emergency findings include situations in which patients may experience harm, if urgent medical action is not taken. In emergency cases, little doubt usually exists where direct contact, generally by telephone, should be made, even if it is time-consuming to locate a physician who is capable of caring for the patient. An unexpected finding is defined as a significant abnormality detected on imaging, such as a mass lesion or a suspected malignancy, for which the referrer determines that appropriate action should be taken within a short-time frame. Regardless of whether the abnormality is unsuspicious or potentially suspicious to the referrer, the radiologist must rely on the available information, usually the request card or order sheet. For unexpected findings, the guideline states that "direct telephone communication is not usually necessary, and other methods can be used", as described above. Incidental findings are less significant than or equivocal to unexpected findings. For incidental findings, which currently represent a hotly debated topic, the guideline states that "urgent communication is required only where action needs to be taken in a short-time frame". When further investigation is suggested but the incidental finding is not thought likely to be of urgent significance for the patient,

the normal reporting processes will usually suffice. However, many unfortunate incidents in Japan occur in cases with incidental findings, for which further investigation is recommended; thus, we know that the normal reporting processes are not sufficient for these incidental findings. When establishing guidelines about this issue, some additional measures regarding the actions to be taken, in cases of incidental findings, should be defined.

Of course, teleradiology services outside of the hospital, which do not share the hospital information system, require timely, and direct communication such as telephone calls.

Many things can be done, by each stakeholder, to prevent these incidents. For radiologists, practical solutions that should be implemented promptly include:

- Sharing the basic rule that the requesting physician is responsible for reading the diagnostic report and properly acting to manage the patient's care.
- Notifying the requesting physicians that the information provided on the order sheet is very important for radiologists to produce an accurate diagnostic report and to conduct proper communication.
- Writing an easy-to-read report that highlights the important message from the radiologist in a timely fashion.
- Establishing a reliable method for monitoring the status of the diagnostic report (i.e., read or un-read) and the requesting physician's actions via an electronic information system or other means.

Important steps that the radiology community should take in the medium-term include:

- Controlling the number of CT and MRI exams that are conducted [10, 11].
- Improving the reading efficiency of radiologists by work-schedule modification [12].
- Ultimately, increasing the number of diagnostic radiologists.

In the medium to long term, we should develop a comprehensive solution in the radiology department and throughout the hospital with IT and artificial intelligence (AI), as follows:

- Develop an easy-to-view electronic hospital information system display with excellent perspicuity to reduce the error rate by requesting physicians; some prototype systems allow us to see the status of all of the clinical tests conducted on a single display using well-designed thumbnails and icons, to monitor the status of various reports, and to appropriately notify the attending physicians and/or medical safety department personnel so they can act promptly when necessary.
- Develop AI that aids radiologists in the image interpretation process and provides them with sufficient time to communicate with non-radiologist physicians.
- Develop AI that surveys the electronic medical record system to determine whether the appropriate action, noted in the radiologist's report, has been carried out by the requesting physician; this would be a true fail-safe mechanism, with results that cannot be achieved by conventional non-electronic and current electronic alert systems.

In conclusion, developing an appropriate method of effective, efficient, and practical communication that is suitable for individual local medical environments is critical for increasing patient safety. Attempting to establish a nationwide guideline addressing communication errors that is too strict or too uniform might be harmful in some parts of Japan. We need to develop a smart IT and/or an AI system that increases patient safety, work efficiency, and communication reliability.

Of course, even in an era of AI, humans must accept the final responsibility in medical communication.

References

1. Hayashi D, Guermazi A. Taking a proactive role in patient management of important incidental imaging findings: How can we increase the 'value' of diagnostic radiology service and improve quality of patient care? Jpn J Radiol. 2018. https://doi.org/10.1007/s11604-018-0766-8
2. ACR practice parameter for communication of diagnostic imaging findings (Revised 2014). https://www.acr.org/Clinical-Resources/Practice-Parameters-and-Technical-Standards/Practice-Parameters-for-Documentation-and-Reporting. Accessed July 9, 2018.
3. The Organisation for Economic Co-operation and Development (2014) OECD health statistics 2018. Available: http://www.oecd.org/els/health-systems/health-data.htm. Accessed July 20, 2018.
4. Kumamaru KK, Machitori A, Koba R, Ijichi S, Nakajima Y, Aoki S. Global and Japanese regional variations in radiologist potential workload for computed tomography and magnetic resonance imaging examinations. Jpn J Radiol. 2018;36(4):273–81.
5. Kumamaru KK, Machitori A, Koba R, Ijichi S, Nakajima Y, Aoki S. Correction to: Global and Japanese regional variations in radiologist potential workload for computed tomography and magnetic resonance imaging examinations. Jpn J Radiol. 2018;36(4):282–4.
6. Nishie A, Kakihara D, Nojo T, Nakamura K, Kuribayashi S, Kadoya M, Ohtomo K, Sugimura K, Honda H. Current radiologist workload and the shortages in Japan: how many full-time radiologists are required? Jpn J Radiol. 2015;33(5):266–72.
7. Berlin L. Reply to "For whom should we write a radiology report: an attending physician or a patient?". Am J Roentgenol. 2017;209(3):W200. https://doi.org/10.2214/AJR.17.18175.
8. Mugikura S, Fujimori K, Takase K. For whom should we write a radiology report, an attending physician or a patient? Am J Roentgenol. 2017;209(3):W199. https://doi.org/10.2214/AJR.17.18150.

9. European Society of Radiology (ESR). ESR guidelines for the communication of urgent and unexpected findings. Insights. Imaging. 2012;3(1):1–3.
10. Kumamaru KK, Sano Y, Kumamaru H, Hori M, Takamura T, Irie R, Suzuki M, Hagiwara A, Kamagata K, Nakanishi A, Aoki S. Radiologist involvement is associated with reduced use of MRI in the acute period of low back pain in a non-elderly population. Eur Radiol. 2018;28(4):1600–8.
11. Kumamaru KK, Murayama S, Yamashita Y, Nojo T, Watanabe Y, Goto M, Maeda E, Echigo J, Soga S, Fujii S, Tanami Y, Okabe T, Okada M, Munechika J, Ota H, Miyake M, Honda H, Aoki S. Appropriate imaging utilization in Japan: a survey of accredited radiology training hospitals. Jpn J Radiol. 2017;35(11):648–54.
12. Yokota H, Goto M, Bamba C, Kiba M, Yamada K. Reading efficiency can be improved by minor modification of assigned duties; a pilot study on a small team of general radiologists. Jpn J Radiol. 2017;35(5):262–8.