

The Crisis After the Crisis: The Time Is Now to Prepare Your Radiology Department

Q4 *Thomas C. Kwee, MD, PhD, Jan P. Pennings, MD, Rudi A. J. O. Dierckx, MD, PhD, MBA, Derya Yakar, MD, PhD*

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic poses a major challenge to health systems and hospitals worldwide [1]. Radiology departments prepare for the surge of COVID-19 patients by employing policies and procedures to ensure sufficient capacity for continued operation, to support the care of COVID-19 patients, and to maintain radiologic services for the entirety of the hospital and health system [2]. Although there is literature on how to prepare a radiology department for operation during the COVID-19 crisis, the postcrisis situation has not yet been addressed. The aim of this communication is to increase awareness about the projected aftermath and consequences of the COVID-19 crisis on a radiology department and to present possible solutions.

THE RESERVOIR

In response to the ongoing COVID-19 crisis, health care providers outside the radiology department are suspending most nonurgent elective care. This policy aims to prevent high-risk patients from being infected with COVID-19, to minimize the risk of COVID-19 spreading in hospitals

to other patients and health care workers, and to secure bed and intensive care capacity for both patients with respiratory distress due to COVID-19 and patients with other life-threatening medical conditions. Examples of elective care that have been postponed in our tertiary care center are the treatment of most patients with benign pathology and patients with malignant tumors in whom the health risk of delaying treatment outweighs that of incurring a COVID-19 infection. The majority of solid organ and hematopoietic stem cell transplantation programs and most outpatient visits have also been canceled. Because imaging plays a crucial role in many of these elective care processes, many radiologic procedures are also postponed. Another important issue is that most hospitals aim to strictly isolate patients with COVID-19 from patients and health care workers without COVID-19. In addition, many people with COVID-19 show no symptoms but are still able to infect others [3]. Therefore, there is reluctance to continue providing nonurgent elective radiologic services to asymptomatic individuals. In fact, doing so would contradict a hospital's strategy to minimize the risk of COVID-19 spreading in hospitals

to other patients and health care workers. Consequently, it is inevitable that a large reservoir of radiologic procedures will accumulate.

RE-INITIATION OF ELECTIVE CARE PROCESSES

After hospitals have overcome the peak load of COVID-19 patients and hospital capacities start to normalize, elective care processes will eventually be reinitiated. Elective care that has been postponed will most likely be caught up at a rapid pace after the ban has been lifted due to pent-up demand and clinical need. For example, further delaying some types of elective care may cause harm in cancer patients in whom chemotherapy or elective surgery have been postponed [4] and disease progression with prognostic and treatment consequences may occur. Therefore, the anticipated wave of radiologic procedures may overwhelm the normal capacity of a radiology department. A radiology department will need to process this backlog of radiologic procedures in a timely manner, because further treatment delays may be detrimental.

THE CURRENT STATE OF THE RADIOLOGY DEPARTMENT

Our tertiary care center is located in Western Europe and provides health

care services to more than two million people. Because of the COVID-19 crisis, the number of radiologic procedures in our institution has decreased by a factor of at least three to four, and this situation may continue for several weeks to months, which may lead to increased need for imaging capacity in postcrisis period. Due to pre-existing budget cuts and lost income during the COVID-19 crisis, it is not a viable option to hire more staff to process the backlog of radiologic procedures. Shortage of staff capacity relative to the workload may contribute to radiologist burnout [5] in the post COVID-19 period. Therefore, creative solutions with existing resources have to be realized. Advantages of the current COVID-19 crisis for a radiology department, at least ours, are the availability of time to implement solutions and a potentially increased willingness of the entire radiology team to comply with proposed measures compared with measures taken during a noncrisis setting [6].

POTENTIAL SOLUTIONS

Based on the aforementioned underpinnings, several measures will be implemented in our department after the COVID-19 crisis. First, MRI represents a large proportion of the total volume of procedures in our department and is relatively time-consuming both in terms of image acquisition and interpretation. Therefore, current MRI protocols will be replaced with abbreviated MRI protocols when possible. The diagnostic noninferiority of abbreviated MRI protocols compared with more extensive MRI protocols has already been shown in several clinical settings and body regions [7,8].

Second, at present the majority of radiologists in our department exclusively works in one area of subspecialization (eg, neuroradiology, chest radiology, abdominal radiology, musculoskeletal radiology). However, this type of work distribution is rather inefficient when some sections will experience higher peak workloads than others in the aftermath of the COVID-19 crisis. Based on the registration of radiologic procedures that have been canceled since the COVID-19 outbreak and available staff, subspecialty sections have been identified that are vulnerable to work overloads. Subsequently, radiologists with other subspecializations have been distributed among these vulnerable sections on a voluntary basis and given the task to refresh their knowledge to be able to independently perform basic or common procedures in these sections. Examples of basic or common procedures are conventional radiography and acute CT (eg, pulmonary embolism) in chest radiology, and abdominal ultrasonography and oncologic CT in abdominal radiology. Given the decreased workload during the ongoing COVID-19 crisis, these crossover radiologists will have time to refresh their knowledge by performing procedures under the supervision of subspecialty radiologists from each section. The duration of these in-house “mini-fellowship” constructions will depend on the duration of the COVID-19 crisis. If the COVID-19 crisis continues for a longer period, both the reservoir of radiologic procedures and the operational capability of the crossover radiologists will increase. Therefore, we believe these in-house mini-fellowships to be beneficial regardless of the duration of the COVID-19 crisis. Third, our department provides a 1-week radiology internship that is compulsory to medical students in our university.

Under normal circumstances, medical students are involved in radiologic procedures, such as supervised plain film reading and attending ultrasonographic examinations. This requires valuable time of radiologists and radiology residents that will become even scarcer after the COVID-19 crisis. Therefore, staff radiologists, fellows, and residents will prepare self-educational material that can be used by medical students until workload normalizes to a level comparable to that before the COVID-19 outbreak.

SUMMARY

This communication addressed the projected aftermath and consequences of the COVID-19 crisis on a radiology department. It was demonstrated how our tertiary care radiology department prepares to process the large reservoir of radiologic procedures after the COVID-19 crisis in a timely manner. Although some of these solutions may not be applicable to other institutions, some of them may, and it is hoped that this communication will create awareness and stimulate discussions on how to prepare a radiology department for the crisis after the currently ongoing COVID-19 crisis.

REFERENCES

1. Bedford J, Enria D, Giesecke J, et al. WHO Strategic and Technical Advisory Group for Infectious Hazards. COVID-19: towards controlling of a pandemic. *Lancet* 2020. [https://doi.org/10.1016/S0140-6736\(20\)30673-5](https://doi.org/10.1016/S0140-6736(20)30673-5).
2. Mossa-Basha M, Meltzer CC, Kim DC, Tuite MJ, Kolli KP, Tan BS. Radiology department preparedness for COVID-19: Radiology Scientific Expert Panel. *Radiology* 2020. <https://doi.org/10.1148/radiol.2020200988>.
3. Day M. Covid-19: identifying and isolating asymptomatic people helped eliminate virus in Italian village. *BMJ* 2020. <https://doi.org/10.1136/bmj.m1165>.
4. Liang W, Guan W, Chen R, et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. *Lancet Oncol* 2020;21:335-7.

- 211 5. Harolds JA, Parikh JR, Bluth EI, Dutton SC, 6. Stachowski AA, Kaplan SA, Waller MJ. The neurological complaint. PLoS One 2014;9: 263
 212 Recht MP. Burnout of radiologists: fre- benefits of flexible team interaction during e110803. 264
 213 quency, risk factors, and remedies: a report of crises. J Appl Psychol 2009;94:1536-43. 8. Canellas R, Rosenkrantz AB, Taouli B, et al. 265
 214 the ACR Commission on Human Resources. 7. Mehan WA Jr, González RG, Buchbinder BR, Abbreviated MRI protocols for the abdomen. 266
 215 J Am Coll Radiol 2016;13:411-6. et al. Optimal brain MRI protocol for new Radiographics 2019;39:744-58. 267

216
 217 Thomas C. Kwee, MD, PhD, Jan P. Pennings, MD, Rudi A.J.O. Dierckx MD, PhD, MBA, and Derya Yakar MD, PhD are from the Medical Imaging
 218 Center, Department of Radiology, Nuclear Medicine and Molecular Imaging, University of Groningen, University Medical Center Groningen, the
 219 Netherlands.

220 **Q2** The authors state that they have no conflict of interest related to the material discussed in this article.

221 Dr Thomas C. Kwee: University of Groningen, University Medical Center Groningen, Department of Radiology, Nuclear Medicine and Molecular Im-
 222 aging, Hanzplein 1, PO Box 30.001, 9700 RB Groningen, The Netherlands; e-mail: thomaskwee@gmail.com