


Chemotherapy-Induced Toxicities and their Impact on Daily Imaging Practice: Is this the Time to Reassess Our Imaging Interpretation?

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The coronavirus disease (COVID-19) has been identified by the World Health Organization as one of the deadliest pandemics in history, causing more than 600 million cases and 6.48 million confirmed deaths, as of 28 August 2022. Its impact on life style, economy, education and so on has been tremendous. In the same way, the effects on the global health care system has been devastating. Actually, COVID-19 pandemic has caused significant delays in the delivery of any other issue requiring patient's admission, including cancer treatments.

As cancer treatment and imaging volumes are slowly returning to normal, radiologists will have to face the varied imaging appearances of chemotherapy related toxicities at higher rate compared to the past years. This is quite challenging for radiologists because it implies the knowledge of multiple classes of chemotherapy agents which have different mechanisms of action (not necessarily related to duration of treatment, although there may be a relationship with the dose), specific organ targets and imaging patterns which may overlap with the classic clinical symptoms and imaging features of concurrent diseases. Last but not least, these findings should not be confused with disease progression.

We have read with interest the article entitled "Chemotherapy-induced toxicities: an imaging primer" by Patil et al.¹ The authors provided a first class review on chemotherapy classes, mechanisms of action, specific imaging appearances of toxicities through a systematic analysis of each agent and its target organ damage, from the brain to the vascular system, from the heart to the skin, muscles and bones. The article is also well illustrated with a number of examples from each class of agents.

However, as modern approaches to treating patients may involve chemotherapeutic agents, targeted therapy, and/or immunotherapy, when complications arise, attributing toxicity to a specific drug may be very challenging. For example, in the lungs, gemcitabine and paclitaxel can result in ground glass changes and gemcitabine may be the cause of a non-cardiogenic pulmonary oedema.² Interstitial pneumonitis complications typically tend to occur approximately 5-10 days after the first or second cycle of therapy.³ Both cisplatin and gemcitabine can affect the vascular system, with the

potential for arteriothromboembolic manifestations. For this reason, imaging features are often non-specific, and sometimes the final diagnosis of the disease must be performed on the basis of the clinical ground and/or follow-up imaging or ultimately due to the analysis of tissue obtained through fine needle biopsy and/or surgical resection.

In conclusion, as the radiology workflow is returning to a normal following the COVID-19 pandemic, many patients will be diagnosed with, or begin treatment for, a number of malignancies and some of them will encounter chemotherapy-related toxicities. Therefore, it is crucial for radiologists to get awareness of the typical imaging findings related to toxicity and complications of therapy for an accurate interpretation, thus supporting healthcare providers for a tailored patient management.

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