Article published online: 2025-02-17

Unindicated Acquisition of Multiple Phases in CT/CT Part of PET CT at Scan Centers and Hospitals: *Let Us Avoid It and Move toward Optimized Imaging*

Anitha Sen[1] Jiji Valsalamony[1]

[1] Department of Radiodiagnosis, Regional Cancer Centre, Thiruvananthapuram, Kerala, India

Indian J Radiol Imaging

Address for correspondence Anitha Sen, MD, DMRD, FRCR, Department of Radiodiagnosis, Regional Cancer Centre, Thiruvananthapuram 695011, Kerala, India (e-mail: anithasen@rcctvm.gov.in).

Since we work in a tertiary care hospital, we get many computed tomography (CT) and positron emission tomography CT (PET-CT) scans done in other centers for review.

Recently, we have observed an increasing trend of acquisition of multiple phases for body CT scans, for all indications (including breast carcinoma): as triple phase (arterial, portal, and venous) studies in many centers and as arterial, venous, and delayed (for liver/abdomen) phases in some centers. In a few cases, noncontrast, arterial, portal, venous, and delayed images (five-phase/quintuple studies) have been acquired. Sometimes unindicated multiphase studies are also noted in the CT part of PET-CT studies.

Acquiring unnecessary phases, may be to avoid issues like recalling patients, in case an indeterminate lesion is detected on CT (this practice may be more in centers having teleradiology practice, since radiologists may not be available to do ultrasound correlation or to report continuation study done on another day).

However, performing a multiphase study in all patients is not desirable due to the following reasons:

1. Increased radiation exposure to the patient.
2. Increased amount of intravenous contrast needed for a multiphase study (at least 10 mL or more depending on institutional practices/machines), which may (1) increase the cost of the study and (2) push patients with borderline renal function to renal impairment.
3. Decreased lifespan of CT tube due to more exposure time of tube.
4. Time wastage for radiology technicians in printing more films/writing compact disk (CD)/uploading films/CDs to Picture Archiving and Communication System (PACS, if films/CDs are used for transferring images to the next level care like hospitals/referral centers). A CD is usually sufficient to record all phases of a study, but studies with multiple phases, may take more time for writing/opening/uploading CD.
5. Time wastage for radiologists reporting/reviewing images and other clinicians viewing images (e.g., radiation oncologists seeing images for radiation therapy [RT] planning) while going through lots of unnecessary images.
6. Storage space is unnecessarily used up on cloud/onsite server if such studies are uploaded on PACS. Maintaining server farms requires a lot of electricity, with generation of more electricity potentially causing global warming.

Usually, triple-phase (arterial, portal, and venous) CT studies are done for specific indications like characterization of liver lesions (if there is a confusion on ultrasound or CT or CT part of PET-CT) and identification of hepatocellular carcinoma (HCC) in a setting of cirrhotic liver. Presurgical evaluation of tumors (pancreas, kidney, liver, adrenals, mediastinum, lung, parathyroid) and vascular lesions (in any part of the body), and postoperative/traumatic bleeding or hematoma (to look for pseudoaneurysm/source of bleed) are other indications for multiphase studies. But most CT studies do not routinely require multiphase studies.

We find this trend of acquiring multiple phases in CT study for all patients in many scan centers and also in some hospitals. We would like to raise awareness about this issue so that, unindicated acquisition of multiple phases for CT studies/CT component of the PET-CT studies can be minimized. This would be in consonance with the practice of green and sustainable radiology.[1–3]

DOI https://doi.org/10.1055/s-0044-1801835.
ISSN 0971-3026.

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

Meeting
The manuscript has not been presented as a part of at any meeting.

Funding
None.

Conflict of Interest
None declared.

Acknowledgments
The authors would like to thank Dr. Rakesh C.A., Dr. Akshay Baheti, Mr Prasad PP, Mr Anees KN, and Dr. Zunimol P.K.M.

References

1 Sumner C, Ikuta I, Garg T, Martin JG, Mansoori B, Chalian M, Englander BS, Chertoff J, Woolen S, Caplin D, Sneider MB. Approaches to greening radiology. Academic Radiology 2023 Mar 1;30(03):528–535
2 Mariampillai J, Rockall A, Manuellian C, Cartwright S, Taylor S, Deng M, Sheard S. The green and sustainable radiology department. Radiologie (Heidelb) 2023 Nov;63(suppl 2):21–26. Doi: 10.1007/s00117-023-01189-6. Epub 2023 Sep 18. PMID: 37721584; PMCID: PMC10689521
3 McKee H, Brown MJ, Kim HHR, Doo FX, Panet H, Rockall AG, Omary RA, Hanneman K. Planetary Health and Radiology: Why We Should Care and What We Can Do. Radiology 2024 Apr;311(01):e240219. Doi: 10.1148/radiol.240219. PMID: 38652030

