

Cancer Staging in Patients with Compromised Renal Function: Is PET/CT an Alternative to Contrast CT Scan?

Sir,

Both cancer and compromised renal functions are prevalent in the old age population, and staging plays a pivotal role in cancer treatment. Imaging is a cornerstone in the clinical staging of cancer. Intravenous (IV) contrast is essential to cross-sectional imaging, as malignant tissue is identified based on contrast enhancement. Notwithstanding this vital role, IV contrast predisposes patients to adverse events ranging from a mild hypersensitivity reaction to life-threatening anaphylactic shock, which can be prevented by enquiring about the history of previous allergic reactions and prescribing pre-medication before a scan.¹

Contrast-induced nephropathy (CIN) is a serious complication of IV contrast agent administration, defined as a rise of 25% of serum creatinine level from the baseline value or >0.5 mg/dl rise of absolute serum creatinine within 48-72 hours after IV contrast injection.² It has a direct relation with serum creatinine level and an inverse relation with estimated glomerular filtration (eGFR) as an increase in creatinine level and decreased eGFR increases the risk of CIN. Patients with eGFR between 45-60 ml/min/1.73 m² will have an 8% risk of CIN which is increased to 27% in patients with eGFR <30 ml/min/1.73 m².³ It results in prolonged hospital stay, delay in actual cancer-specific treatment, psychological trauma, and financial burden to the patient. The first case of CIN was reported by Bartels *et al.* in a multiple myeloma patient who underwent IV pyelography.⁴

Fused positron emission tomography-computed tomography (PET-CT) has been an emerging modality in cancer imaging for the last two decades. It is essential for staging workup in lymphoma, esophageal, and lung cancers.⁵ PET-CT scan also helps differentiate the residual tumour from post-treatment-related fibrotic changes, as both show contrast enhancement.

In PET-CT scan, positron emitting radionuclide is utilised instead of a contrast agent, which does not harm already compromised kidneys of cancer patients as a radiotracer is eliminated from the body by radioactive decay in addition to renal excretion. Fludeoxyglucose F18 (FDG) is the most commonly used tracer in PET/CT imaging; it is a glucose analog which is taken up by cancer cells and remains in the tissue until decay. Other receptor-specific positron emitting ligands like PSMA-Ga-68 and Ga-68- DOTATOC also trap cancer tissue and are used in specific cancer types.⁶

Sindh Institute of Urology and Transplantation, Karachi, is Pakistan's largest kidney disease hospital. Since the last decade, the institute has scanned PET-CT in cancer patients with compromised renal function and obtained fruitful results without accentuating kidney-related adverse events.

COMPETING INTEREST:

The authors declared no competing interest.

AUTHORS' CONTRIBUTION:

DA: Concept and writing of the manuscript.

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REFERENCES

1. Beckett KR, Moriarity AK, Langer JM. Safe use of contrast media: What the radiologist needs to know. *Radiographics* 2015; **35**(6):1738-50. doi: 10.1148/rq.2015150033.
2. Moro AB, Strauch JG, Groto AD, Toregeani JF. Creatinine level variation in patients subjected to contrast-enhanced tomography: A meta-analysis. *J Vas Bras* 2021; **20**. doi: 10.1590/1677-5449.200161.
3. Modi K, Padala SA, Gupta M. Contrast-Induced Nephropathy. National Library of Medicine, StatPearls Publishing; 2023 [Updated 2022 July 25] Available from: <http://www.ncbi.nlm.nih.gov/books/NBK448066>.
4. Bartels ED, Brun GC, Gammeltoft A, Gjørup PA. Acute anuria following intravenous pyelography in a patient with myelomatosis. *Acta Med Scand* 1954; **150**(4):297-302. doi: 10.1111/j.0954-6820.1954.tb18632.x.
5. Kapoor M, Kasi A. PET Scanning. National Library of Medicine, StatPearls Publishing; 2023 [Updated 2022 Oct 3]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK559089>.
6. Shell J, Keutgen XM, Millo C, Nilubol N, Patel D, Sadowski S, *et al.* 68-Gallium Dotatate scanning in symptomatic patients with negative anatomic imaging but suspected neuroendocrine tumor. *Int J Endocr Oncol* 2018; **5**(1):1JE04. doi: 10.2217/ije-2017-0005.

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