https://doi.org/10.1590/1806-9282.20221624

Comment on "Evaluation of pulmonary nodules by magnetic resonance imaging sequences: which sequence will replace computed tomography?"

Aleksandar Georgiev[1,2*], Lyubomir Chervenkov[1], Vania Anastasova[3], Tanya Kitova[4,5]

Dear Editor,

We have read with great interest a manuscript entitled "Evaluation of pulmonary nodules by magnetic resonance imaging sequences: which sequence will replace computed tomography?" by Kızıloğlu et al.[1]. We fully agree with the authors that magnetic resonance imaging (MRI) is emerging as a promising method for the follow-up of small nonmalignant pulmonary nodules.

Based on our personal experience from the oncological practice and the available data in medical literature, we would like to make some clarifications, which, in our opinion, would contribute to elucidating some of the existing controversial points. Conventional X-rays of the chest are still used for diagnosing pulmonary diseases. Not every patient has immediate access to CT or MRI, especially people living in more rural areas, smaller cities, or less developed countries. As an example, in our country, only the biggest cities have access to MRI. CT scanners have better availability but still not every hospital or medical center has one. Positron emission computed tomography (PET/CT) is the method that is in common use in oncology for staging and restaging as it reveals not only anatomical information but also the metabolic activity of tumors and metastases. Therefore, the hybrid method gives insight into the neoplasm's activity and response to treatment that neither CT nor MRI is capable of. As PET/CT will greatly increase the radiation exposure of patients, the hybrid method does not have the potential to be utilized in the follow-up of benign pulmonary nodules. In general, all other imaging methods represent a better option for the surveillance of pulmonary nodules. PET/CT is also very expensive for both initial investment and running costs. MRI is the slowest method and second most expensive option for both installing and running, followed by CT. X-rays are the fastest and cheapest method available, but this method can visualize nodules in around 50% of the cases[2]. PET/MRI is a novel but still emerging hybrid method, due to the lack of available devices, that will have wider clinical implications for oncological imaging in the future.

The majority of diagnosed small pulmonary nodules are incidental findings[3], and globally more than half of lung cancer patients are diagnosed initially in stage IV or more advanced stage[4]. The free survival rate in stage IV and above according to medical literature is approximately 1 year or less, and 5-year survival rates are close to 0%[5,6]. Are radiation exposure and late related neoplasms from radiation that big of an issue? Do we really have the luxury to choose the method for lung malignancies? In our opinion, we should benefit from every imaging modality that can detect lung cancer and provide our patients a chance for better survival. Patients fully depend on a fast diagnostic process, including x-rays, which can trigger further diagnostic evaluation and biopsy.

From the perspective of oncological imaging, we have to stage and restage lung cancer and metastatic lung disease. For both of these, we need full-body scans with head and neck anatomical regions included in the scan protocol. Common metastatic locations for lung cancer include the brain, bones, suprarenal glands, lymphatic metastases, and bones; therefore, we have to include all the anatomical regions mentioned above. Neoplasms that have invaded the lungs are usually involving other organs or systems. To stage/restage an oncological disease based on a single anatomical region is not advisable as it may compromise the decision for the proper line of therapy.

[1]Medical University Plovdiv, Department of Diagnostic Imaging – Plovdiv, Bulgaria.
[2]Complex Oncology Center Plovdiv, Department of Diagnostic Imaging – Plovdiv, Bulgaria.
[3]Medical University Plovdiv, Faculty of Medicine, Department of Propaedeutics of Surgical Diseases, Section of Plastic, Reconstructive and Aesthetic Surgery and Thermal Trauma – Plovdiv, Bulgaria.
[4]Medical University Plovdiv, Department of Human Anatomy, Histology and Embryology – Plovdiv, Bulgaria.
[5]Trakia University, Medical College – Stara Zagora, Bulgaria.
*Corresponding author: dralgeorgiev@gmail.com
Conflicts of interest: the authors declare there is no conflicts of interest. Funding: none.
Received on January 09, 2023. Accepted on January 10, 2023.

Cancer therapy is based on histology combined with all imaging findings and the presence of local and distant metastases that should be regularly followed up for the progression of the disease. Screening in those cases assesses the need for a second or third line of therapy[7]. The restaging should be based on RECIST 1.1 criteria[8]. For such full-body exams, CT is still the preferred option as MRI is too slow and expensive. MRI has its limitations in more advanced oncological cases because of scanning times, narrower openings, and longer tunnels compared to CT. Patients with full or partial pneumonectomy, for example, will be challenged with MRI's longer apneic pauses. Vascular imaging with CT or MRI, in our experience and available literature, has almost identical clinical value when performed with contrast for both tumor invasion and pulmonary embolism caused by neoplasms[9]. For pulmonary embolism, CT is highly preferred than MRI as it is faster and the patient can receive critical care if needed by using normal hospital equipment. Specialized MRI equipment that is shielded from electromagnetic impulses is very expensive and scarce in many hospitals. MRI has the upper hand only in non-contrasted scans. We do agree with the authors that MRI is superior for mediastinum and soft-tissue lesions.

All controversial points that we find are related to lung cancer or lung metastatic disease staging and restaging. We completely agree with the authors that for small or even bigger benign pulmonary nodules, we should advocate for methods that do not rely on radiation exposure. We happily look forward to such innovations. The minor clarifications discussed here will not diminish the immense practical value of the work and publication of Kızıloğlu et al., for which we would like to congratulate them.

AUTHORS' CONTRIBUTIONS

AG: Conceptualization, Data curation, Formal Analysis, Investigation, Resources, Writing – original draft, Writing – review & editing. **LC**: Conceptualization, Resources, Supervision, Validation. **VA**: Conceptualization, Supervision, Validation. **TK**: Conceptualization, Supervision, Validation.

REFERENCES

1. Kızıloğlu HA, Karaman A, Dilek O, Kasali K, Alper F. Evaluation of pulmonary nodules by magnetic resonance imaging sequences: which sequence will replace computed tomography? Rev Assoc Med Bras (1992). 2022;68(11):1519-23. https://doi.org/10.1590/1806-9282.20220215
2. Ketai L, Malby M, Jordan K, Meholic A, Locken J. Small nodules detected on chest radiography: does size predict calcification? Chest. 2000;118(3):610-4. https://doi.org/10.1378/chest.118.3.610
3. Jacob M, Romano J, Ara Jo D, Pereira JM, Ramos I, Hespanhol V. Predicting lung nodules malignancy. Pulmonology. 2022;28(6):454-60. https://doi.org/10.1016/j.pulmoe.2020.06.011
4. Wu Z, Wang F, Cao W, Qin C, Dong X, Yang Z, et al. Lung cancer risk prediction models based on pulmonary nodules: a systematic review. Thorac Cancer. 2022;13(5):664-77. https://doi.org/10.1111/1759-7714.14333
5. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68(6):394-424. https://doi.org/10.3322/caac.21492
6. Du Q, Peng J, Wang X, Ji M, Liao Y, Tang B. Dynamic observation of lung nodules on chest CT before diagnosis of early lung cancer. Front Oncol. 2022;12:713881. https://doi.org/10.3389/fonc.2022.713881
7. Ma X, Bellomo L, Hooley I, Williams T, Samant M, Tan K, et al. Concordance of clinician-documented and imaging response in patients with stage IV non-small cell lung cancer treated with first-line therapy. JAMA Netw Open. 2022;5(5):e229655. https://doi.org/10.1001/jamanetworkopen.2022.9655. Erratum in: JAMA Netw Open. 2022;5(7):e2221224. PMID: 35552726
8. Manitz J, D'Angelo SP, Apolo AB, Eggleton SP, Bajars M, Bohnsack O, et al. Comparison of tumor assessments using RECIST 1.1 and irRECIST, and association with overall survival. J Immunother Cancer. 2022;10(2):e003302. https://doi.org/10.1136/jitc-2021-003302
9. Chen F, Shen YH, Zhu XQ, Zheng J, Wu FJ. Comparison between CT and MRI in the assessment of pulmonary embolism: a meta-analysis. Medicine (Baltimore). 2017;96(52):e8935. https://doi.org/10.1097/MD.0000000000008935