Letter to the Editor

COVID-19; beyond the obvious: how do we move forward?

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Dear Sir,

The recent global spread of SARS-COV2 virus has challenged the healthcare systems all around the world to an unprecedented level. The impact on nuclear medicine departments has been significant with the major shift of priorities away from delivering therapies and restriction of the output to essential only services that could not be deferred safely, with emphasis on abbreviated diagnostic protocols [1, 2]. The number of cases is still on the rise in some communities and the likelihood of further perennial or periodical surge in numbers remains a real concern, despite our best attempt to swab, detect, and isolate. This is concurrent with a rather disappointing outlook for developing a reliable remedy or a vaccine in the short to intermediate term.

We read with great enthusiasm the recent publication of PET/CT features of pulmonary disease in four cases of COVID-19 from China and a more recent report of a single case from Iran in your journal [3, 4]. As a major oncology center in Ireland, with a high throughput of oncology cases, we have inadvertently carried out PET/CT studies on a number of patients with suspected or confirmed COVID-19 condition, particularly early on during the epidemic and observed rather similar pattern of radiological manifestations. We share a similar concern that unless due consideration was given to the timing of a staging PET/CT study, there would be a risk of erroneously over-staging the cancer, particularly in the case of lung or lymphoproliferative malignancies, due to the nodal uptake which can occur even in asymptomatic patients with COVID-19 infection [5].

The focus of many publications so far has been centered over the FDG patterns and morphological features of the disease with some authors, suggesting a role for PET/CT even in asymptomatic patients and some proposing "PET light protocols" for screening [6, 7].

However, we sense the opportunity to look beyond the imaging findings of the disease on FDG PET/CT and would like to propose a more holistic view on the subject to the nuclear medicine community. In our view, the question is whether there could be a role for molecular imaging in steering and moving towards the future, perhaps shedding light on the biology and biomarkers of disease activity and severity in vivo with potential to predict predisposition to a more adverse clinical outcome or long-term progression to pulmonary fibrosis in individual cases, or as an epidemiological tool to predict the potential transformation of the virus into a more virulent and contagious variant. The aim is ultimately to provide better clinical care and prognostication to the patients and monitoring disease activity and severity in different geographical areas and between different clusters.

Limited publications thus far have strongly suggested a direct relationship between the infection with COVID-19 and increased rate of thrombo-embolic vascular events involving various organs with the lungs as the primary but not the only target [8]. The current practice is supportive of using CT pulmonary angiogram to detect cases of pulmonary embolism as a vascular complication of infection particularly when D-dimer levels are significantly raised. The data is suggestive of deranged coagulation homeostasis during the acute phase of the infection which, as advocated by other authors, may be more meaningfully assessed with perfusion only SPECT/CT and as such, eliminate the risk of contaminating the staff in the department from aerosols during the ventilation phase [9, 10, 11]. Furthermore, using this technique might be helpful by enabling quantification of the embolic insult to the lung parenchyma and its chance of recovery. A second more exotic approach is certainly using quantitative CT and PET/CT data analysis for deriving radiomics and imaging biomarkers of pulmonary blood flow and volume, by utilizing the texture software and kinetic analysis for FDG, now more readily available through different manufacturers and platforms [12].

FDG PET/CT could also potentially reveal and quantify in vivo mechanisms of pathology in COVID-19 either for prognostication or monitoring response to treatment. Similar to what demonstrated for other infections, the presence of lymphadenopathy could offer a potential value to prognosticate severity of infection and be used as a second endpoint to evaluate severity of disease and treatment planning and ultimately defining a better strategy for patient management [13].

Finally, alternative radiotracers (e.g., gallium-68, CXCR4, or FAPI) already used to assess inflammation and infection may offer a more specific role in identifying novel biomarkers of disease status and to evaluate new therapies [14, 15]. In view of the ongoing COVID-19 pandemic, further research in this area is anticipated in the coming months.

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Compliance with ethical standards

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