RESEARCH DURING THE COVID-19 PANDEMIC: THE USE OF CLOUD-BASED IMAGE ANALYSIS

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The COVID-19 pandemic has affected most aspects of our lives, no matter where we live or what we do. We all have tried to cope with this condition in our own way. The current situation provides an opportunity to test and use some instruments that have been overlooked for a while. In medical research and clinical practice, we have implemented new online tools and platforms which have not been part of our daily routine. Such unconventional approaches may encounter resistance of specialists with interest in organ-specific disciplines such as cardiology and rheumatology. Traditional and alternative metrics of research evaluation are required for better understanding implications of such approaches [1-3].

Our Cardiovascular Research Group at the Department of Nuclear Medicine, Odense University Hospital, Odense, Denmark, has tried to use existing facilities to enhance performance of our research field despite the challenges posed by the pandemic. Cloud-based image analysis is the method that we decided to experiment with. Computer software for advanced image analysis have been precious assets of various research groups because of their high processing power. There is, however, scarcity of such software and these are not

affordable for most, particularly for dynamically developing research groups. Most research groups prefer to use freely available or modified online tools, meeting their specific needs. The modification by own resources is often time-consuming and far from perfection, preventing from offering a universally applicable tool. Also, hospital computers are usually stationary with limited accessibility. By introducing cloud-based image analysis [4, 5], we have been able to overcome these limitations. And we can now perform, for example, an advanced image analysis of positron emission tomography/computed tomography (PET/CT) by using an ordinary computer without extraordinary processing power, anywhere during the lockdown and quarantine.

Another tool that we have been using to overcome these limitations is artificial intelligence model analyzing molecular imaging scans obtained by PET/CT. The analysis of these digitalized scans with gigabytes of information is often the most time-consuming phase of our research. With the utilization of artificial intelligence model, we can analyze images with better reproducibility and 50-100 times faster than with ordinary manual or

semiautomated processing tools. We plan to develop different artificial intelligence models to better visualize anatomic structures of vessels in different locations. Cloud-based and artificial intelligence methods have enriched our research, allowing to cope with the pandemic-related issues and plan our activities beyond the pandemic. Our experience is exemplary for those

who encounter difficulties with performing clinical research during the lockdown and quarantine.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest relevant to this manuscript.

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**COVID-19 ПАНДЕМИЯСЫ КЕЗІНДЕ ЗЕРТТЕУЛЕР ЖҮРГІЗУ: КЕСКІНДІНІҢ БҰЛТТЫ
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