Impact of the COVID-19 Pandemic on Lung Cancer Treatment & Research

Shreya Kailas Lovlekar, Yihua Wang*

Biological Sciences, Faculty of Environmental and Life Sciences, University of Southampton SO17 1BJ, UK.
*Correspondence should be addressed to YW (E-mail: yihua.wang@soton.ac.uk).

To the Editor,

Despite recent advances in immunotherapy and targeted therapy, the mortality rate seen in lung cancer (LC) is the highest of all cancer forms. The recently topical coronavirus disease 19 (COVID-19) and its subsequent pandemic has resulted in over 505 million confirmed cases and approximately 6.2 million fatalities as of April 2022 (1), with a staggering 30-50% mortality rate seen in LC patients with COVID-19 (2). Cancer patients in particular are highly vulnerable to COVID-19 infection due to immunosuppression, from both the tumour and treatments. Here we report the impact of the pandemic to be largely negative on LC treatment and research.

Impacts on Lung Cancer Treatments

As seen in Figure 1A, many countries saw a significant decline in observed LC cases during the first peak pandemic period. Cancer care was also notably affected – a global study by Jazieh *et al.* (3) compiled data from 356 centres across 54 countries to gauge this effect. Although this study focuses on cancer care in general, rather than providing a breakdown of individual cancer types, it provides insight into reasons why care may have been affected. Most centres (around 64%) remained open over the pandemic but at suboptimal capacity and reported various reasons for this such as precautionary measures, staff shortages and overburden to the system (3). Nearly half the centres also reported a shortage of personal protective equipment (PPE). Around 9% of centres were either fully or partially closed and the rest remained open at full capacity. The majority of centres in the study kept most services as either partially or fully available, but of those that fully stopped, surgery appears to be the most disrupted across centres and systemic therapy the least. This is likely due to the increased risk of infection and immunosuppression that accompany surgery. However, the extent to which services were partially available was not quantified and thus the magnitude of disruption cannot be fully concluded. Jazieh and colleagues (3) also found the distribution of disruption was relatively equal in countries across all levels of income, however only 9 of the 356 centres were in the low-income level, so the conclusion that low-income countries were not affected disproportionately cannot be applied to all low-income countries.

Impacts on Trials and Research

A search for the term "lung cancer" was conducted using the PubMed database, and the number of papers published each year was plotted onto a graph (Figure 1B). This search revealed no significant change to the overall trend in publications on lung cancer following the start of the pandemic in 2020, however this does not necessarily mean that research was unaffected whatsoever. Over the pandemic, the sheer volume of COVID-19 related literature rapidly accumulated, with over 132,000 publications on PubMed in 2021 alone – 8 times as many as those on lung cancer. Whilst this is understandable given the topical nature of COVID-19, it may have resulted in some publications of lesser reliability and quality when compared with pre-pandemic levels due to relaxation or even absence of vigorous peer-reviewing processes (4). The same could extend for publications on lung cancer, meaning further assessment of literature published over the pandemic must be carried out to ensure their quality and trustworthiness.

Another search on PubMed for papers including both "lung cancer" and "COVID-19" yielded a total of 698 results, from 2020 to present. This number is significantly lesser than the quantity of results for "COVID-19", which may indicate the neglection of lung cancer in terms of its relevance to COVID-19 as a respiratory illness, despite the severity of lung cancer and COVID-19 comorbidity.

In terms of trials, a search on the clinical trials database (clinicaltrials.gov) for "lung cancer" studies revealed no negative impacts on the number of new trials being set up over the pandemic when compared with pre-pandemic figures (Figure 1C), although there was a global decline of 14% in clinical trial participation over the peak of the pandemic (5). However, trials can take years to complete and thus the completion and relative success of these trials cannot yet be determined at present.

Conclusions

Overall, the COVID-19 pandemic has had a distinctly negative impact on the lung cancer community, with increased morbidity and mortality, as well as a reduction in trial participation. Many countries saw a sharp decline in LC cases and there was also

much public anxiety of attending in-person appointments, supplemented by conflicting messages from the government and lung cancer organisations that contributed to this decrease. The effectiveness of telehealth, which was outside the scope of this review, is another possible aspect that may have improved or worsened delivery of care.

Further global collaborative studies need to be conducted in the near future in order to determine how different countries have been impacted based on income, magnitude of research and availability of specialist centres and relative number of COVID-19 cases. Focus should also be on if racial/ethnic disparities in the lung cancer community were further amplified due to the pandemic. Additionally, more funding and resources should be given to lung cancer trials and research, particularly for developing more early detection methods, as this is proven to significantly reduce mortality rates.

The volume of research paper publications may not have been outwardly affected, but the reliability and quality of a small number still remains in question due to more lenient peer-reviewing processes. Furthermore, the data reviewed was from a singular database, *i.e.*, PubMed, and thus evaluation of data from multiple databases should be considered in the future when determining the impacts on published literature. There may also be a delayed effect on clinical trials, and subsequent approval of therapies, due to the lockdowns and reduction in trial participation. Whilst the pandemic restrictions now appear to be lifting around the world and a majority of people are immunised, there are still cases of COVID-19 present which could impact the unvaccinated and immunocompromised, especially those with lung cancer. A slight relaxation of lung screening criteria may aid in the detection of missed cases but does pose a risk of increasing false-positive diagnosis. It could also expose those with a slightly lower risk of lung cancer to ionising radiation, meaning the risks outweigh possible benefits. Regardless, the effects of missed cases will surely be seen in the next 5 to 10 years, with an increased number of deaths, however if novel therapies currently in development are approved in time, this may change.

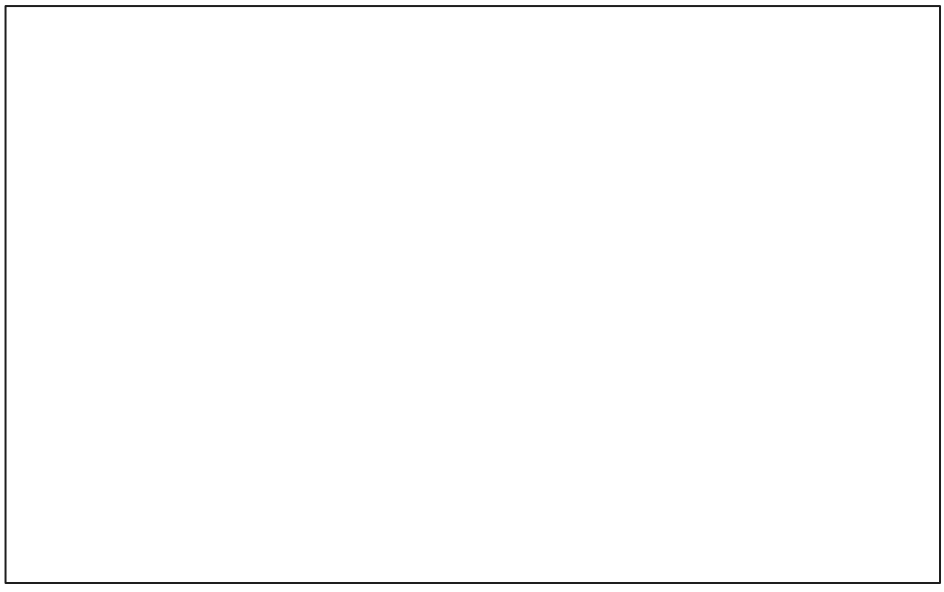
Figure legend

Figure 1 – (**A**) Visualisation of percentage decrease in the number of lung cancer cases in various countries during the approximate March – May period in 2020 when compared with the baseline number of cases from previous years during the same March – May period. (**B**) Visualisation of the trend in the number of new papers published annually on lung cancer on PubMed from 2005 to 2021. The red arrow indicates the start of the pandemic in 2020. Data obtained from PubMed using the search criteria "lung cancer". (**C**) Visualisation of the trend in number of new lung cancer trials registered on clinicaltrials.gov each month from August 2019 to April 2022. The red line denotes the official start of the COVID-19 pandemic in March 2020.

!

"

#



References:

1. World Health Organisation. WHO Coronavirus (COVID-19) Dashboard [Internet]. [cited 2022 Oct 27]. Available from: https://covid19.who.int

2. Peravali M, Joshi I, Ahn J, Kim C. A Systematic Review and Meta-Analysis of Clinical Characteristics and Outcomes in Patients With Lung Cancer with Coronavirus Disease 2019. JTO Clinical and Research Reports. 2021 Mar;2(3):100141.

3. Jazieh AR, Akbulut H, Curigliano G, Rogado A, Alsharm AA, Razis ED, et al. Impact of the COVID-19 Pandemic on Cancer Care: A Global Collaborative Study. JCO Global Oncology. 2020 Nov;(6):1428–38.

4. Martins RS, Cheema DA, Sohail MR. The Pandemic of Publications: Are We Sacrificing Quality for Quantity? Mayo Clinic Proceedings. 2020 Oct;95(10):2288–90.

5. Zhang C, Wu YL, Zhong WZ. New Normal for Lung Cancer Clinical Trials Under Coronavirus Disease 2019. Journal of Thoracic Oncology. 2022 May;17(5):588–91.

Acknowledgements

YW was supported by the Medical Research Council [grant no: MR/S025480/1] and an Academy of Medical Sciences/the Wellcome Trust Springboard Award [grant no: SBF002\1038]. SKL would like to dedicate this work to her brother Adi Lovlekar. For the purpose of open access, the authors have applied a CC-BY public copyright license to any Author Accepted Manuscript version arising from this submission.

Competing interests

The authors declare that they have no relevant conflict of interest.