Reflections on research in the COVID-19 era: Crisis and Opportunity

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As far as my research was concerned, the announcement of a UK-wide lockdown due to COVID-19 in late March could not have come at a worse time. I had spent the previous 12 months traversing the perils of fellowship applications, ethics approvals and hospital bureaucracy in order to implement the prospective clinical component of my study. Of course, I fully supported the lockdown but I was acutely aware that I only had a limited amount of time 'out of programme' to complete my PhD before I had to return to complete the final stage of my training. What's more, I desperately needed data.

All research activity at the University of Birmingham, except for approved COVID-19 related research, had been suspended. For the foreseeable future, research staff were told to work from home and the mad rush to evacuate documents, files, computers and stationary from offices was reminiscent of the last chopper out of Saigon. My initial feelings of frustration were somewhat tempered with the realisation that home working potentially provided a much-needed opportunity to catch up with data analysis, lab books and publications. I also could not help but feel a degree of guilt as my clinical colleagues were about to face what seemed like an apocalyptic influx of sick patients. Whilst my studies were important, I really wanted to contribute to the effort against COVID-19 and was contemplating whether I would be returning to clinical pathology work, or even clinical ward work.

Adapting to home working went surprisingly smoothly. Online meetings and discussions soon became normal and companies were falling over themselves to offer free licences for academic software. The need to connect with other researchers and remain focused meant that I was interacting more with my supervisors and colleagues than prior to lockdown. The only drawback to the frequent yet productive teleconferences was the famed 'Zoom neck'. It was during one of these online discussions that I realised that there could be a way to contribute and continue my research.

My furloughed research project had been set to look at the immune response to standard of care cancer therapies such immune checkpoint inhibitors and targeted therapies, and how these immune changes influenced immune control over latent human herpesvirus, such as EBV. As the pandemic progressed, it was evident that COVID-19 would exert a secondary burden on patients with non-COVID-19 disease. Given that cancer patients are particularly vulnerable to infectious disease and many cancer therapies cause profound immunological changes, it was uncertain whether many adjuvant cancer therapies would go ahead. Even in those whose treatment was going ahead, it was unclear how treatment would affect COVID-19 susceptibility and whether COVID-19 would influence treatment toxicity and outcome. There was a clear opportunity to pivot my prospective research to look at the immune response to COVID-19 in cancer patients.

Refreshingly, with little other research going ahead, sponsor review and ethics amendments were processed in record time and the study was able to start recruiting within a matter of weeks. It finally felt like I was doing something useful. It occurred to me in the early weeks of the pandemic that many of the reports described the systemic immune response in COVID-19, but few were describing changes in tissue; the pathologist's raison d'etre! Utilising my pathology contacts in Wales, I was able to establish a post-mortem component to my study, comprising consent post-mortem tissue from COVID-19 related deaths. This enabled me to utilise my pathology knowledge to guide experimental design and led to many fascinating discussions between clinicians and scientists of various fields as diverse as critical care, immunology and molecular biology. This tissue-based research has galvanised many clinicians and scientists at the University and has led to a large funding bid which could see an exciting programme of work utilising high multiplex immunohistochemistry and cutting edge in-situ

transcriptomics techniques to better understand SARS-CoV-2. The last few weeks have been busier than ever and it seems that my PhD will take shape around the COVID-19 research both in cancer patients and the wider population.

Overall, it has been a strange and unique time to be in research. Many of my clinical colleagues have spent the lockdown period doing arduous clinical work and many of my academic colleagues have been stranded at home with little to do but data analysis and literature review. At the beginning of the pandemic I felt somewhat helpless and the Doctor in me hoped I'd be able help in some way. Fortunately, I was able to find a way to utilise my pathology background and existing research framework to make a contribution to COVID-19 understanding. In a time where everyone is separated by distance, working collaboratively has never seemed so important. Utilising old pathology contacts and forging new working bonds with diverse specialities has proven fruitful and enjoyable, a practice I hope to maintain long after the pandemic has passed. Most importantly, in an era dominated by big data and molecular biology, I have never felt so proud of my speciality. Traditional and emerging pathology techniques are still as important as ever in helping us understand emerging diseases. In fact, the lines between these traditionally disparate fields is becoming ever more blurred and working solely within our silos, even whilst siloed in lockdown, is no longer an option.