A NATION OF DIAGNOSTIC TESTS

Text and photos by Dr Jipson Quah, Editorial Board member

A couple of years ago, I moved into private practice and joined a general practice group. But even as I embarked on my career in family medicine, I continued to maintain a special interest in pathology and stayed in touch with my ex-colleagues and seniors in the discipline. I constantly sought online Continuing Medical Education sessions, journals and courses to keep myself acquainted with the latest developments in the field. Another field that fascinated me greatly was digital health, especially with the advent of teleconsultations and digital medicine applications. These two interests were thrust into the forefront by the COVID-19 pandemic. I have previously written about the impact of digital health for the medical fraternity in *SMA News* (https://bit.ly/5201Opinion3, https://bit.ly/5209Feature), and will be focusing more on the pathology aspect this time.

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Improving diagnoses

I was very fortunate to contribute to the Diagnostics Development Hub at A*STAR, where I was able to utilise my experience in laboratory operations, standard operating procedures and testing services in the field of pathology. My work involved collaborating with project managers and researchers to understand their novel diagnostic technologies and how a test could develop a clinical use-case. One of these new biomarkers was the MiRXES GASTROClear, a qPCR-based diagnostic test kit that measures 12 microRNA biomarkers linked to gastric cancer to calculate a cancer risk score for each patient using a proprietary algorithm that has been clinically validated. Gastric cancer, with its many variants, is known to be notoriously hard to detect at an early stage. The late symptoms of gastric obstruction, poor nutritional intake and unexplained weight loss usually herald a poor prognosis. A product of Singapore, this test was jointly developed by the Singapore Gastric Cancer Consortium, a translational research group comprising clinicians and scientists working in gastric cancer research, and other healthcare partners. The Consortium aims to solve important clinical questions to improve the care of gastric cancer patients, facilitated by close interactions between clinicians and scientists, and with synergism that enables biologic discoveries in the laboratory to be validated in the clinical setting. Thousands of tests have been performed since and it is gradually becoming a useful tool in the screening and monitoring of gastric cancer.

As with new medical technologies, there are many detractors who feel that the clinical use is not developed enough, or perhaps that the results are inconclusive. One may prefer to recommend an oesophago-gastro-duodenoscopy or MRI instead for a more conventional and definitive diagnosis. The cost, at a couple hundred dollars per test, could prove to be prohibitive for some patients, especially for a screening modality. However, I take the viewpoint that instead of applying a one-size-fits-all strategy, some patients may benefit from the availability of other diagnostic options. For example, some patients may be unwilling to undergo a gastrointestinal scope procedure or have an insurmountable fear of MRI machines. This may also prove to be a valuable option for another patient with a strong family history of gastric cancer and predisposing risk factors, who has undergone yearly scopes and radiology screening but without any significant findings. Over time, I believe

that the diagnostic option's clinical use does evolve and will ultimately benefit different patient populations. Medicine has always been about marrying art and science, hasn't it?

COVID-19 pathologies

As COVID-19 started to rage in 2020, the scientific community was galvanised into action. We witnessed several local companies launching their COVID-19 polymerase chain reaction and serology test kits, hence putting Singapore in the limelight. With impressive speed in research and development and manufacturing, Singapore's diagnostic companies were able to quickly ramp up their testing capacities and also supply test kits to international clients. Local laboratories armed themselves with highly expensive but accurate testing technologies to serve the community while Public Health Preparedness Clinics swabbed patients aggressively. These increased testing capabilities allowed us to detect and limit the spread of COVID-19 effectively. When the dormitory clusters emerged, our colleagues from both the private and public sectors were able to implement high-volume testing and control the surge. As we move into the next phase of COVID-19 as "a nation of diagnostic tests", these are also fruits borne of our nation's efforts in the biomedical and diagnostic industries. (Nobody really imagined it would culminate in rostered routine testing, widened nostrils and abused turbinates, but what choice do we have, honestly?)

In my clinical practice, I also assisted a biotechnology company in obtaining blood samples from patients who had recovered from COVID-19. These patients were a treasure trove of IgG antibodies which were used to validate point-of-care serology test kits. Although they are not commonly used in practice nowadays, it was an honour to be one of the first clinicians to trial these products on recovered patients and discuss the findings with industry partners. It is also sobering to know that sometimes, new products may not find the same use and acceptance as what was initially intended. Regulatory hurdles and health policies are also tremendous challenges for new diagnostic products.

Another new test that emerged during the pandemic is the cPass™ assay, which detects COVID-19 neutralising antibodies. It is the first US Food and Drug Administration approved test for the presence of neutralising antibodies which may block COVID-19 viral infection. Although the clinical use is still in development, I find that the technology and potential indications are very fascinating. According to recent immunology literature, there are indeed a variety of antibody responses to vaccination, and these do differ for mRNA and inactivated vaccines. As we speak, researchers are conducting trials on the antibody responses of the different vaccine and booster schedules and their effects on public health. On a personal note, I have had my cPass™ levels checked three times, and obtained one pre-vaccination and two post-vaccination levels. Unfortunately, it appears that I may need a booster. When, where and what vaccine is still yet to be determined though.

On a lighter note

As part of my work in pathology, I also delve into the field of medical humanities to enliven our experiences as doctors. The SingHealth Pathology Academic Clinical Programme will be raising funds for research through their concert series, in which I will be joining my pathologist colleagues in a live-streamed pop concert performance. Do look out for this upcoming event and support us if you can! ◆

*Disclaimer: The writer is under employment at Accelerate Technologies Pte Ltd, A*STAR to provide clinical support for laboratory operations and diagnostics technology development. This article does not aim to market any of the tests mentioned.*

Legend

1. Dr Quah at the microscope

2. Dr Claire Swa, Dr Sidney Yee and Dr Jipson Quah representing Diagnostics Development Hub at a test demonstration

Dr Quah is currently a clinical laboratory professional with a global clinical research organisation. He is also a member of the SMA Telemedicine Workgroup. He enjoys football, music-making and editorial work in his spare time, and has been actively trying to assemble a performing ensemble of local doctor-musicians.