

COMMENTARY

Setting Up a Transfusion Laboratory for Covid-19 Samples: An Experience from a New Teaching Hospital

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University Putra Malaysia (UPM) Teaching Hospital or Hospital Pengajar UPM (HPUPM) is a new 400-bed teaching hospital that started operations in 2019 and initially did not manage COVID-19 patients. However, due to a surge of COVID-19 patients in Malaysia in 2021, HPUPM needs to manage COVID-19 patients in various categories, including those needing intensive care. This paper explored the experience of setting up the transfusion laboratory for COVID-19 samples within a short notice, including the development of the protocol, challenges, and lessons learnt during the whole process.

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INTRODUCTION

Hospital Pengajar University Putra Malaysia (HPUPM) is a 400-bed teaching hospital for the Faculty of Medicine and Health Sciences, UPM. It started operation in September 2019 and by August 2022, 150-200 beds with 16 wards, including intensive care, were in operation at one time.

The transfusion laboratory started operation in March 2020, and we offered standard pre-transfusion testing—ABO/RhD blood grouping, antibody screening, crossmatching, and direct and indirect antiglobulin tests. The National Blood Centre (NBC) supplied the blood products, and we kept a stock of blood products based on the forecast needs of the service. Platelet concentrates were supplied on a case-by-case basis.

Starting in March-April 2021, Malaysia faced a surge of COVID-19 cases (1) and by May 2021, HPUPM was involved in the management of COVID-19 patients for various categories, including those needing intensive care. Within a short notice, the laboratory services need to set up a dedicated space and develop the protocols and training to handle and process the samples from COVID-19 patients.

SETTING UP THE COVID-19 LABORATORY

Communication was mostly done via WhatsApp group

between the head of the unit, specialists, medical officers, scientific officers, and senior medical laboratory technologists (MLTs). Discussion included choosing the appropriate space to handle the specimens, development of protocol, training, and liaison with the COVID-19 hospital task force. Even though the indirect contact transmission risk for laboratory personnel is assumed to be low with a low viral load in non-respiratory samples, standard precautions for handling COVID-19 samples are still needed (2, 3). These include appropriate facilities, safety equipment, personal protective equipment, protocols, biohazard waste disposal, and a good training program.

A room near the integrated laboratory was chosen as a sample processing area for haematology, chemical pathology, and pre-transfusion testing. The laboratory was well equipped with specific personal protective equipment (PPE), a biosafety cabinet, appropriate disinfectants, and biohazardous waste disposal systems to ensure staff safety. The route to and from the COVID-19 lab was identified, and the staff involved in the sample processing were supplied with personal protective equipment (PPE). The emergency equipment is placed in a reachable area and is regularly checked.

PROTOCOL DEVELOPMENT

We referred to a few established local guidelines (4-5) to develop our protocols. Some modifications were made to reduce the risk of exposure to the laboratory personnel and ease the samples' processing without compromising the quality of testing (Table 1). The pre-transfusion tests

Table 1: Modification of transfusion protocol for COVID-19 sample requests.

Process	Modifications
Sample requests	No group, screen and hold (GSH) requests were allowed for COVID-19 patients. To write SUSPECTED/ CONFIRMED COVID-19 at the blood transfusion request form.
Transportation of samples	Each tube is sent wrapped in a double biohazard bag and put in a dedicated polystyrene box and the request form was inserted on top of the box (figure). The box is sent by only by hand to the TMU reception counter.
Processing and testing of samples	The capped EDTA tubes were taken out of the centrifuge after 15 minutes. Sample processing and testing were done in BSC and the tube cap was discarded after it was uncapped. The tube and the gel card were covered with paraffin tape and all consumables and the patient sample were discarded after completion of the test.
Documentation	It was done in the COVID-19 laboratory using a dedicated pen. The request form was kept in the box labelled with BIOHAZARD GXM FORM after cross-matching.
Return of the empty bag	The used empty blood bag was wrapped with double biohazard bags. The compatibility card was kept in a special box labelled with BIOHAZARD.



Figure 1: The preparation for setting up the transfusion laboratory for COVID-19 samples.

for COVID-19 samples were done manually in the COVID-19 laboratory.

IMPLEMENTATION OF COVID-19 TRANSFUSION LABORATORY SERVICES

COVID-19 laboratory space was successfully set up in a reasonable time. Once the needs are identified, the staff in charge arranged all the equipment needed, sourced the PPE, and planned the training. One on-call room was converted to be a donning and doffing PPE area to minimise contamination. The hospital infectious disease (ID) team gave full cooperation by giving feedback on the layout of the COVID-19 lab, making suggestions to improve the arrangement, and providing training for donning and doffing the PPE (figure 1).

The established protocol was distributed via email and WhatsApp, and training for the laboratory personnel was carried out within a week. The MLTs who were on-call each day will be the ones in charge of processing COVID-19 samples. The implementation of the COVID protocol was monitored closely. Regular review of the strategies, gathering feedback from all stakeholders, and peer group discussions with other hospitals were accomplished to fine-tune the guidelines.

The use of a polystyrene box for pre-transfusion samples worked well to ensure the integrity of the blood samples and avoid spillage during transport. With the box’s clear labelling, the pre-transfusion COVID-19 samples were identified with minimal confusion.

The decision to only allow GXM request was a step welcomed by all staff. This reduced the unnecessary request, and the staff could prioritise the process and

minimise unnecessary exposure as the pre-transfusion sample for GSH is kept for 48 hours in the laboratory.

As this is a new experience for all staff, the fear of uncertainty is something that cannot be avoided. Anyhow, constant reminders were given to consistently practise good personal hygiene and laboratory practice, together with universal precautions to ensure everybody is safe. To the best of our knowledge, none of our staff has contracted a COVID-19 infection during their services in our transfusion laboratory.

CHALLENGES

Manpower and instrument shortages

With a limited number of MLTs working after office hours to cover both the COVID-19 and non-COVID-19 samples, and the extra time needed to process the samples, the usual turnaround time (TAT: 1 hour) was inevitably not achievable. We also faced a shortage of staff when some went into quarantine after close contact with infected family members. Prompt action was taken to re-organize the schedule and re-mobilise staff from other units to cover the shortage. To reduce the effect of uncertainty, fear, physical and emotional fatigue on MLTs, we limited the frequency of their work in the COVID-19 laboratory to once a week, even though it was not always possible. During office hours, they only focused on processing COVID-19 samples.

A Shortage of PPE

At one point, we faced a shortage of PPE for the staff, and lacked coordination in collecting the “dirty” PPE for washing and disinfection. Some staff bought their PPE sets online and arranged for the washing themselves.

Communication with the clinical team

In the initial phase of the operation, some miscommunication was unavoidable. The procedure to send the samples was not strictly followed, and we still received GSH requests. Medical officers played a crucial role in the screening of each transfusion request. Unlike other hospitals where the demand for blood usage was reduced during the pandemic, ours saw an increment in requests and usage during the same period. Our hospital was in the early phase of operation when the pandemic started, and the initial demand for blood transfusions was not high compared to other established hospitals. The demand for blood increased as more patients, including COVID-19 patients, were admitted to our hospital.

At the same time, Malaysia had a nationwide shortage of blood supply (6), and requests were granted on a case-by-case basis. Effective communication with the clinical team was essential to ensure patient safety. Repeated reminders were sent out regarding the transfusion protocol and judicious use of blood products, strict adherence to the Maximum Surgical Blood Order Schedule (MSBOS), and optimal patient blood management (PBM) practices.

LESSON LEARNED

As the quote says, “the most predictable thing about life is its unpredictability,” and when the COVID-19 pandemic happened, it took us by huge surprise. We now know that we must always be prepared for all possibilities and challenges at work, as well as be agile and adaptable to change. Teamwork, clear communication, full cooperation, and prompt action from all levels in the organization are crucial for effective implementation without compromising quality. With the different requirements during the pandemic, laboratory personnel are more aware of the requirements of the laboratory working spaces such as ventilation, hygiene, and risk assessment. This shows that continuous education on laboratory safety and workplace health is important.

Effective communication among all stakeholders is crucial, not only to ensure the smooth running of services but also to build trust and optimism in organisations. Clear communication within the laboratory itself is also vital, as situations keep changing, and prompt action was taken to accommodate any change. We found using WhatsApp for prompt communication between us worked well.

There is no better time than now to incorporate and practise PBM, as the blood supply was at its lowest point at the peak of the pandemic. Every clinical discipline

needs to understand and practise the vigilant use of blood to ensure the blood products are used by those who need them the most.

The worst has left us, and we are grateful for it. However, the lessons learnt should be cherished forever. The way forward: let the skills of improved safety practices, clear communication, creativity, and efficiency stay. Then, the notion of facing future major challenges-pandemic or not-will not be as difficult and scary as it was a couple of years ago.

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