STARTING MECHANICAL THROMBECTOMY SERVICE DURING COVID-19 PANDEMIC: OUR EARLY INSTITUTION EXPERIENCE.

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As we are writing this manuscript in early May 2020, we are still living in COVID-19 (also known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)) pandemic era (1). Malaysia is one of the many countries affected by this global pandemic.

To prevent the spread of COVID-19, National Health Institutions all over the world imposed mandatory usage of Personal protective equipments (PPE) to protect health care workers (HCW) when dealing with high risk patients and COVID-19 positive patients². However, the PPEs are finite and episodic shortages of PPEs are common all over the world²,³.

During this challenging time, University Putra Malaysia Teaching Hospital (HPUPM) has leapt forward to offer optimum stroke care to the community. The acute stroke patients will be stratified for eligibility for mechanical thrombectomy and thrombolysis treatment in our institution. The criteria used is dependant on institutional practice. At the height of the pandemic, it is difficult to ascertain which patient had contracted COVID-19. Alarming evidence emerged suggesting that one of the central nervous system (CNS) manifestation of COVID-19 is acute stroke. The patient may be asymptomatic or exhibiting COVID-19 symptoms⁴. There are also reports suggesting acute stroke in young and middle-aged adults as a sequela of COVID-19⁵. This manuscript aims to share our experience in starting the mechanical thrombectomy service for acute stroke at the height of COVID-19 pandemic.

Our hospital was launched amid the pandemic, in early 2020. We have a dedicated Emergency Unit catering for stroke named as Regional Emergency Stroke Quick (RESQ) Response Unit. During the current pandemic era, all hospital admissions including the ones via RESQ will be vetted by a special task force in order to assist with the COVID-19 protocol via a special platform so as not to jeopardise the door to needle time.

To reduce staff exposure to COVID-19; all patients are screened for signs and symptoms of COVID-19⁶. Declaration forms are given to the patient or next of kin to be filled (Figure 1). This form is formulated based on Infectious Disease Prevention and Control Act 1988-Malaysia⁷ and is a prerequisite for admission. Its main purpose is to notify the HCW about the current status of the patient, to identify and predict which patients are at high risk of COVID-19 infection. A rapid test is performed (SARS-COV-2 Antibody Test- Lateral Flow Method, Wondfo⁸) which is complementary to the reverse-transcription polymerase chain reaction (RT-PCR) test. A throat and nasal swab for RT-PCR tests is performed in all patients immediately after rapid blood test procedure. This test is mandatory for every patient. The result will be traced the day after (RT-PCR) swab was taken. If there is suspicion of COVID-19, the patient will be transferred to the nearest COVID-19 hospital for further management.

Team members evaluating code red patients should be kept to a minimum and the attending HCW will need to wear full PPE which includes full-body protection coverall suits, N95 mask, eye protection and double-layer gloves for easier doffing (Figure 2). This “enhanced” full PPE helps to alleviate any aerosolized events such as coughing, sneezing, CPR, and intubation⁹. The full PPE gives a strong perception of protection among the HCW and consequently will boost HCW morale. However the use of full PPE is not without problems. This coverall protective suit is usually a “non-breatheable” type (Figure 2). This kind of coverall protective suit will hamper heat and moisture transfer. The HCW wearing full PPE will experience heat stress, body irritation, discomfort and even may restrict movement. Wearing eye
If there are positive pulmonary symptoms such as unequal breath sounds or a slight increase in temperature, we will consider low-dose chest CT at the same time as the CT angiography brain and neck. CT chest may aid in the diagnosis of COVID-19 (7). If there is any suspicion of ground-glass appearance on the low dose CT thorax, we will presume that the patient may have COVID-19 and will be referred to the nearest COVID-19 hospitals7,8.

If CTA is already performed in the referring hospital and a large vessel occlusion (LVO) is identified, a direct pathway to the angiography room is created in order to reduce the exposure to the RESQ and radiology personnel9,10. We have a standard MRI room with ceiling mounted air conditioner. The room is neither positive nor negative pressured. HCW who transfer the patient will always be in full PPE and will be inside the MRI room during the examination, with hearing protection device. This is to reduce contamination to the MRI control room and limit the burnt rate of PPE. We covered the gantry table with plastic. However, the head coil will not be covered since it may interfere with the MRI signal, may cause claustrophobia and potentially has suffocation hazard to the patient. Terminal cleaning is mandatory after each case.

Our angiographic room is equipped with positive pressure ventilation and High-efficiency particulate air (HEPA). Due to the presence of positive pressure ventilation, the air will flow from the main angiographic suite to the next adjacent lower pressure rooms. It is important for the person/s inside the control room, scrub area and anteroom with the dual airlock system to wear a proper N95 mask. Door to the inside the control room, scrub area and anteroom with the adjacent lower pressure rooms. It is important for the person/s to observe each other during donning procedure to minimize risks of contamination. The clinical waste and disposable equipments will be collected and put into biohazard labeled plastic bags.

The patient will then be transferred to ICU with all the receiving staffs protected with PPE. It is important to reduce the time of transfer to prevent contamination to the surrounding. The patient will be transferred via a special isolated lift elevator.

In the ICU, the patient will be placed in an isolation room. All procedures will adhere to COVID-19 protocol for examinations, clinical assessments and nursing care, until their COVID-19 status is known. The swab test done earlier during admission will be traced on Day 1 of admission. Once the result of RT-PCR COVID-19 is negative; the patient will be transferred out from isolation and treated as usual patient.

If the transfer requires maintaining intubation; there is a special designated close circuit portable ventilator. The patient will be placed in the ICU. The management of the patient must adhere to COVID-19 protocol. Once the patient is stabilized, the decision to extubate will be made collectively by the respective departments. Care must be taken during extubation to minimize potential exposure to the surrounding and the HCW.

In conclusion, it is feasible to start an emergency mechanical thrombectomy service during a pandemic. The initiatives taken to ensure the safety of the healthcare worker (HCW) will not compromise patient care.

**Conflict of Interest**

None declared.

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Table 1. Our Institutional MRI protocol and its acquisition time
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