



## The COVID-19 Outbreak Action Plan for Endoscopy Services in a Tertiary Hospital in East Malaysia

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### *Authors' contributions*

*This work was carried out in collaboration among all authors. Author JE designed the study and wrote the original draft of the manuscript. Authors NS and RM managed the writing - review and editing of this study. All authors read and approved the final manuscript.*

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### **ABSTRACT**

The COVID-19 Pandemic continues to evolve and its effects will leave a lasting impact on all levels of health care delivery system long after the dust settles. The Endoscopy unit which is an integral component of gastroenterology services has been recognised as a potential portal of transmission with prospective ascertainment of endoscopist exposure to infectious particles during GI procedures. The State of Sabah recorded its first COVID-19 positive case on March 12<sup>th</sup>, 2020. To date there has been a total number of 402 confirmed cases and 8 deaths recorded in this state. At our Endoscopy unit, a new Action Plan was introduced to the existing framework as a response measure to ameliorate the risk of nosocomial transmission. The strategies drawn up were predicated on local statistics of clinical presentation, recognised mode of transmission and clinical urgency of performing a procedure. Postponement of all elective cases at our unit was a major decision justified by reports of community spread of COVID-19 infection. Local data which disclosed a large proportion of asymptomatic COVID-19 patients, were a crucial factor in our decision to subject every patient under the semi urgent list to RT-PCR testing prior to an endoscopic procedure. These policies were executed with the objective of protecting our workforce and minimising the risk of nosocomial transmission in the unit. Though it may not address every

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clinical eventuality, our aim with these risk management strategies, is to maintain zero percent infection while continuing to provide optimal endoscopy services.

**Keywords:** COVID-19; Sabah; endoscopy; action plan; RT-PCR test.

## 1. INTRODUCTION

The COVID-19 Pandemic continues to evolve and its effects will leave a lasting impact on all levels of health care delivery system long after the dust settles. Coronaviruses are from the Coronaviridae family with evidence suggesting that this novel virus has a zoonotic source.[1] More than half of the patients infected develop shortness of breath with few progressing to acute respiratory distress syndrome [2]. With the estimated number of infected healthcare workers reaching into the thousands, endoscopy units have been identified as a potential portal for viral transmission due to inhalation of airborne droplets, conjunctival contact and potential fecal-oral transmission [1,2]. The State of Sabah recorded its first COVID-19 positive case on March 12<sup>th</sup>, 2020. To date there has been a total number of 402 confirmed cases and 8 deaths recorded in this state. With new information emerging daily on ways to combat this deadly infection, our unit had implemented response measures in advance of the issued central directive. The heterogeneity of the clinical presentation and modes of transmission of this novel virus were taken into account when developing an action plan which was implemented on March 20<sup>th</sup>, 2020, while synchronously trying to maintain continuity of services [3].

## 2. ENDOSCOPY SERVICES IN QUEEN ELIZABETH HOSPITAL (QEH), KOTA KINABALU, SABAH

Queen Elizabeth Hospital is the sole provider of gastroenterology services in Sabah, a state in East Malaysia with a population of 3.9 million people. Our unit performs approximately 10,000

endoscopic procedures annually with a substantial number of referrals directed from district hospitals and primary healthcare clinics. Table 1 is a breakdown of the endoscopic procedures performed at our unit before and after the COVID-19 outbreak action plan implementation.

All referrals from district hospitals and health clinics for urgent cases are relayed via phone calls whereas referrals for semi urgent and elective procedures are communicated through email correspondence. This existing network system continued to lay the foundation for relaying important information on endoscopic services during the ongoing COVID-19 pandemic.

Services offered by our unit range from basic luminal scopes to advanced endoscopy as well as the colorectal cancer screening programme. The latter two services involve patients in the older age bracket and with the COVID-19 virus heavily weighted against this cohort, we were faced with a daunting challenge of restructuring the provision of Endoscopic services. The following (Table 2) are the steps that were undertaken by our unit in light of the COVID-19 outbreak.

## 3. ACTION PLAN

### 3.1 Categorisation of Endoscopic Cases Based on Urgency

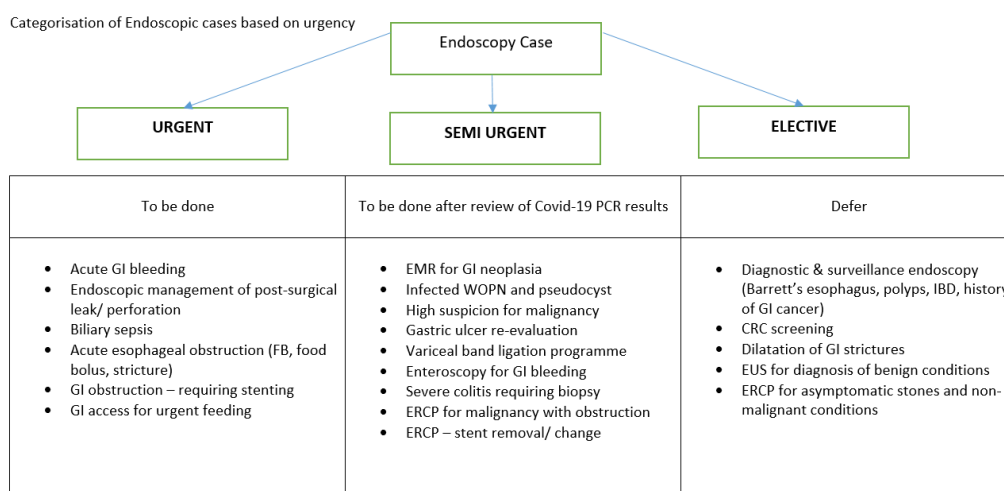
During the COVID-19 pandemic, endoscopic procedures undergoes categorisation based on clinical urgency (Flow chart 1). This will determine the time frame and venue for the procedure to be carried out in. The COVID-19

**Table 1. Queen Elizabeth Hospital, Kota Kinabalu, Sabah endoscopic statistics**

Procedure	2019	2020				
		Jan	Feb	March 1-20	March 21-31	April
OGDS	5279	427	484	263	26	108
COLONOSCOPY	3221	247	293	195	19	26
ERCP	680	52	71	58	7	24
EUS	371	33	46	31	1	9
PEG	29	2	2	0	0	0

**Table 2. Action plan during the COVID-19 pandemic**

ACTION PLAN DURING THE COVID-19 PANDEMIC
CATEGORISATION OF ENDOSCOPIC CASES BASED ON URGENCY
RESCHEDULING ELECTIVE ENDOSCOPIC PROCEDURES
STAFF MANAGEMENT
PRESCREEN ALL PATIENTS UNDERGOING PROCEDURES
PRE PROCEDURE RISK MANAGEMENT
PERIPROCEDURAL MANAGEMENT
POST PROCEDURE MANAGEMENT
MANAGEMENT OF COVID-19 POSITIVE PATIENTS
REVIEW OF POLICY



**Flow chart 1. Categorisation of Endoscopic cases based on urgency.**

swab testing is done for all patients in the semi-urgent category and this result will determine the type of PPE (Personal Protective Equipment) used as well as the location the procedure is carried out at. This strategy allows procedures to be carried out within the clinically recommended time frame while mitigating the risk of nosocomial transmission through safety practises.

### 3.2 Rescheduling Elective Non-urgent Endoscopic Procedures

All elective endoscopic procedures have been deferred till further notice. Our unit contacted the respective patients and new appointment dates were issued. The reason for this decision was that the current local data estimates that 60-70 % of COVID-19 positive patients in the state of Sabah are asymptomatic. Therefore, the screening assessment tools may not be an accurate representation of the true status of the patient. In addition to minimizing the risk of cross

infection, this approach also conserves PPE and hospital resources.

### 3.3 Staff Management

#### 3.3.1 Limiting staff working at the endoscopy unit and reassigning the rest to other essential areas

The deferment of elective cases has significantly reduced the workload in the Endoscopy Unit hence allowing for staff to be redeployed to more essential areas. Out of a total of 30 endoscopic staff, 15 of them were reassigned to Covid wards to preserve a surge capacity in the event of a sudden influx of patients. Admission of all Covid positive patients regardless of the spectrum of illness as part of the Sabah state containment strategy increases the likelihood of staff shortage thus highlighting the importance of this measure.

Drawing experiences from our neighbouring state that witnessed a halt in endoscopy services due to a nosocomial outbreak, staff at our centre who have been re-deployed could be re-engaged during period of exigency.

### **3.3.2 Staff with symptoms or close contact**

Endoscopy staff will be screened daily with a temperature check. Any staff who develops symptoms will report to OSH (Occupational Safety and Health) unit and undergo testing as per protocol. In the event they are exposed to a Covid positive individual they will adhere to a 14-day household quarantine.

## **3.4 Pre-screening**

### **3.4.1 Covid swab testing**

Patients in the semi urgent category undergoing endoscopic procedure will be subjected to Covid swab RT-PCR testing which has a turn around time of 48-72 hours. Patients who are referred to us from district hospitals and health clinics through email correspondence will undergo Covid swab testing at the respective hospitals/screening centre based on geographic catchment. The procedure will then be carried out within a week following a negative result. The limitation of this strategy remains that there may be a risk of post testing exposure prior to the endoscopic procedure. This highlights the need for the next step which is pre-screening at the Endoscopy unit on the day of the procedure as an additional precautionary measure.

### **3.4.2 Pre-screening all patients at the endoscopy unit assessment counter with a COVID-19 screening form**

Patients planned for endoscopic procedures will undergo pre-screening with a data form that contains the following information : (1) fever of more than 37.5 C (F); (2) travel history (T); (3) occupational exposure (O); (4) contact history (C) and (5) clustering (C) (FTOCC).[4] The travel history would include all recent travels to countries with a high incidence of COVID-19 within the past 14 days.

## **3.5 Pre Procedure Risk Management**

### **3.5.1 Social distancing of patients**

Schedulers will ensure that patients' appointments (semi urgent cases) are staggered to avoid unnecessary congestion at the Endoscopy Unit. With the exception of special

circumstances wherein patients may require assistance, individuals should be advised to refrain from accompanying patients to the Endoscopy Unit. This is essential to minimise transmission amplification situations as all individuals are potential carriers of infectious pathogens [5]. Social distancing among patients and staff members have to be strictly adhered to.

### **3.5.2 Access to hand hygiene facilities**

Alcohol based hand sanitizers are readily available in each section of the Endoscopy unit for both staff and patient use to prevent contact transmission through contaminated hands [6]. Strict adherence to hand hygiene are crucial as there are data to suggest significant environmental contamination by COVID-19 positive patients through respiratory droplets and fecal shedding [7].

## **3.6 Peri-procedural Risk Management**

### **3.6.1 Ensuring adequate Personal Protective Equipment (PPE) is available at all times and is worn by staff during each endoscopic procedure**

Endoscopy staff must wear surgical masks at all times while working at the endoscopy unit. For staff who are involved in endoscopic procedures, appropriate Personal Protective Equipment (PPE) must be worn correctly and disposed off as per protocol (gloves, N95 mask, face shields, gown and shoe covers). N95 masks will have to be used while performing all endoscopic cases while double gloves has to be used in high risk cases. Adequacy of PPE stock will be regularly monitored by designated staff and forecasted shortage will be conveyed to the relevant parties in advance.

### **3.6.2 Minimising number of staff and procedural time for each case**

The number of staff in each room is limited to one endoscopist and two assisting nurses. A supervising consultant may be present if a complex case warrants input. Consultants will solely perform cases which are estimated to have a lengthy procedural time. Each team will be maintained in the same room for the entire session of the day.

## **3.7 Post Procedure Risk Management**

### **3.7.1 Disinfection of endoscopy rooms**

Endoscopy rooms must undergo rigorous disinfection using virucidal agents at the end of

each session. Studies have shown extensive environmental contamination could occur even amongst the milder spectrum COVID-19 positive patients [7]. In the absence of negative pressure rooms at our disposal in the Endoscopy unit, and with unrecognised infection being a major contributor to the pandemic,[8] disinfection of the Endoscopy Unit is of utmost importance to curtail risk of nosocomial infection.

### 3.7.2 Reprocessing of instruments

Reprocessing of the endoscope and instruments/accessories will be maintained as per standard practice. Staff will have to ensure that mucosal surfaces are protected during reprocessing.[3]

### 3.7.3 Post procedure follow-up

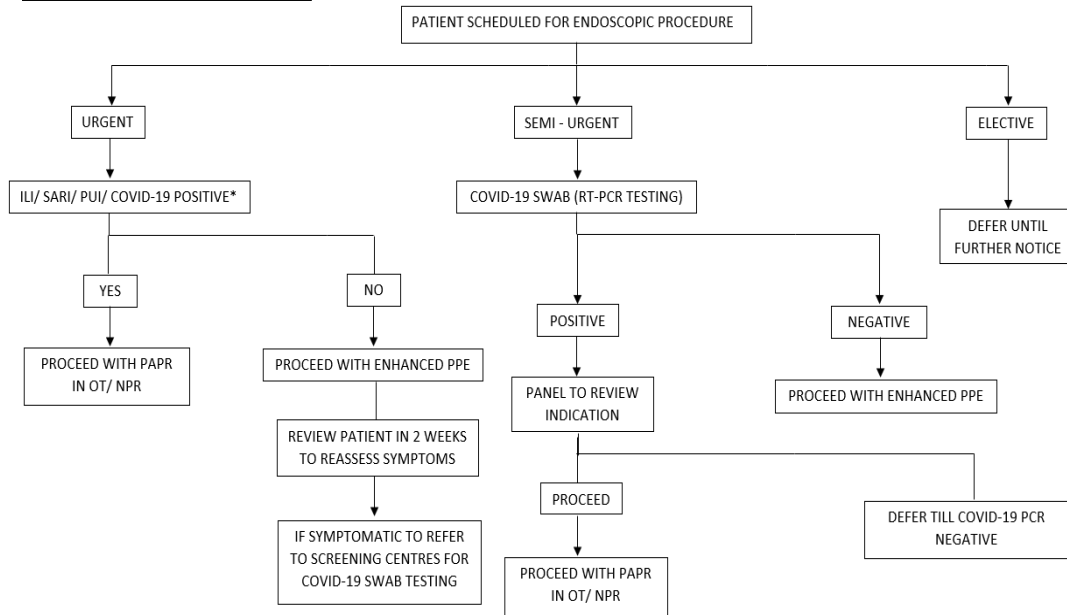
Asymptomatic patients without risk factors requiring an urgent endoscopic procedure are not subjected to COVID-19 swab testing due to the limited time frame. The viral incubation period of 2 weeks coupled with the possibility of asymptomatic transmission from aerosol

generating procedures,[6,7] highlight the need for these patients to be followed up. Endoscopy staff will contact the aforementioned patients within 2 weeks of the procedure to enquire regarding the onset of any new symptoms. Consequently, if the patient has developed related symptoms during this interval, they will be referred to the screening centres for testing. In the event their COVID-19 swab testing is determined to be positive, the endoscopy staff involved in the procedure will have to undergo a 14-day household quarantine.

### 3.8 COVID-19 Positive/ PUI and SARI Patients

For COVID-19 positive patients that require urgent endoscopic intervention, designated negative pressure rooms have been allocated within the Covid wards for procedures to be conducted. In high risk cases which are carried out in negative pressure rooms, a 30 minute interval is given prior to performing the next case. Procedures which involve unstable patients or ones that require fluoroscopy will be carried out in OT. COVID-19 Endoscopic procedure pathway is shown in Flow chart 2.

COVID-19 ENDOSCOPIC PROCEDURE PATHWAY



\*COVID-19 SWAB (RT-PCR TESTING) WILL BE TAKEN FOR ALL ILI/ SARI/ PUI PATIENTS

### Flow chart 2. COVID-19 ENDOSCOPIC PROCEDURE PATHWAY

\*Enhanced PPE Comprises of N95 mask, isolation gown (fluid-repellent long-sleeved gown), gloves, eye protection (face shield/ goggles), shoe/ boot cover, head cover

**Table 3. Case definitions: Based on the Ministry of Health Malaysia guidelines of infection control and clinical management of COVID-19**

ILI (influenza-like illness)	Fever >38C and cough with onset within last 10 days
SARI (severe acute respiratory infection)	Fever >38C and cough with onset within last 10 days and requires hospitalisation
PUI (person under investigation)	Acute respiratory infection with or without fever AND travelled to/ resided in foreign country within 14 days of onset of illness OR close contact in 14 days before illness with a confirmed COVID-19 case OR attended event associated with known COVID-19 outbreak
COVID-19 POSITIVE	A person with laboratory confirmation of infection with the COVID-19

### 3.9 Reviewing Protocol Every 2 Weeks

As there are varying factors that interact to determine the outcome of this pandemic, there is a need for policies to be reviewed on a regular basis to ensure they are aligned with best practise, taking into account the interests of patients and health care providers. In the occurrence of an outbreak these policies have to be reviewed in a timely manner to facilitate revision while keeping a finger on the pulse of this evolving pandemic.

## 4. DISCUSSION

The current COVID-19 pandemic has generated unprecedented levels of pressure on all areas of our healthcare delivery system. The rapid spread of this novel virus with a reproductive number (R0) of 2.2 is postulated to be due to atypical symptoms in the preliminary stage of the infection [6,7,9]. The Endoscopy unit which is an integral component of gastroenterology services has been recognised as a potential portal of transmission with prospective ascertainment of endoscopist exposure to infectious particles during GI procedures [10]. The close proximity of the patient and endoscopist during the procedure and the putative SARS-CoV-2-binding site expressed in the duodenal brush border are among the factors that increases the risk of transmission during endoscopic procedures.[11,12] To prevent the unfettered spread of this virus, key emphasis on risk management protocols have to be developed according to healthcare priorities and resource availabilities of individual centres.[4] At our Endoscopy unit, a new Action Plan was introduced to the existing framework as a response measure to ameliorate the risk of nosocomial transmission. The strategies drawn up were predicated on local statistics of clinical

presentation, recognised mode of transmission and clinical urgency of performing a procedure. Postponement of all elective cases at our unit was a major decision justified by reports of community spread of COVID-19 infection [5]. The inevitability of exposure to respiratory and gastrointestinal fluids while performing endoscopic procedures were factored in when making recommendations on the type of PPE to be utilised. Local data which disclosed a large proportion of asymptomatic COVID-19 patients, were a crucial factor in our decision to subject every patient under the semi urgent list to RT-PCR testing prior to an endoscopic procedure. Patients that require urgent endoscopic intervention are risk stratified based on presence of respiratory symptoms and risk factors before arriving to a decision on type of PPE utilised and venue of the procedure. With these practises, we have thus far have been able to maintain a zero occupational infection among Endoscopy staff though it may be premature to extrapolate this same outcome to a wider cohort of patients.

## 5. CONCLUSION

The COVID-19 Outbreak Action Plan was implemented by our unit in March 2020 as a response measure to the pandemic which has divested endoscopy units of its operational capacity on a global scale. These policies were executed with the objective of protecting our workforce and reducing the risk of nosocomial transmission in the unit. Though it may not address every clinical eventuality, our aim with these risk management strategies, is to maintain zero percent infection while continuing to provide optimal endoscopy services.

## CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and

ethical approval has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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