Gastrointestinal Endoscopy in the Time of Covid-19 Pandemic: Current Guidelines and Experience From Indonesian Tertiary Endoscopy Centre

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ABSTRACT

Coronavirus disease-19 (COVID-19) is a respiratory disease caused by novel SARS-CoV-2. The disease has become a global pandemic since March 2020. Transmission of the disease is rapid and contagious through droplets and contaminated environments. Meanwhile, gastrointestinal endoscopy is a procedure that has a high risk of transmitting COVID-19. Proper strategies are needed to prevent transmission of the virus in the endoscopic unit. Some literature has published the guidelines for prevent COVID-19 in endoscopic units such as guidelines by AGA, APSDE, ESGE and ESGENA. These guidelines state that strategies for prevent the COVID-19 transmission in endoscopy unit must be done from before the procedure, during the procedure until after the procedure. These strategies must be followed by all patients and health care providers who working in endoscopy units.

Keywords: *COVID-19, SARS-COV-2, gastrointestinal endoscopy*

ABSTRAK

Coronavirus Disease-19 (COVID-19) adalah penyakit pada sistem respirasi yang disebabkan oleh virus SARS-CoV-2. Penyakit ini telah dinyatakan sebagai pandemi global sejak Maret 2020. Penularan penyakit ini berlangsung cepat melalui tetesan kecil dan lingkungan yang terkontaminasi. Sementara itu, endoskopi saluran gastrointestinal adalah salah satu prosedur yang memiliki risiko tinggi terhadap penularan COVID-19. Diperlukan strategi yang tepat untuk mencegah penularan virus tersebut di unit endoskopi. Beberapa literatur telah mempublikasikan pedoman untuk mencegah COVID-19 di unit endoskopi, misalnya pedoman oleh AGA, APSDE, ESGE dan ESGENA. Pedoman-pedoman tersebut menyatakan bahwa strategi untuk mencegah penularan COVID-19 di unit endoskopi harus dilakukan sejak sebelum prosedur, selama prosedur hingga setelah prosedur. Strategi ini harus diikuti oleh semua pasien dan penyedia layanan kesehatan yang bekerja di unit endoskopi.

Kata kunci: *COVID-19, SARS-COV-2, endoskopi saluran cerna*

INTRODUCTION

Coronavirus Disease-19 (COVID-19) has been announced as pandemic by World Health Organization (WHO) on March 12, 2020. There have been increased cases since the first time it was publicly announced in Wuhan and peaked between January to February 2020. On January 30, there have been 7.736 confirmed cases in China and 86 others in various countries such as Taiwan, Thailand, Vietnam, Malaysia, Nepal, Sri Lanka, Cambodia, Japan, Singapore, Saudi Arabia, South Korea, Philippines, India, Australia, Canada, Finland, France, and Germany. In Indonesia, the first two cases were reported on March 2. Since then, COVID-19 cases in Indonesia keeps escalating. On March 31, there have been 1.528 confirmed cases with 136 deaths. Indonesia's COVID-19 mortality rate, 8,9 percent, is the highest among in Southeast Asia.[1,2]

Coronavirus Disease-19 (COVID-19) is a disease caused by virus SARS-CoV-2 which spreads primarily through droplets and contaminated surfaces.[1] This virus is known to be transmitted between humans, either those who exhibited symptoms or not. Its particles can remain in the air 3 hours post aerosolization and can last up to 3 days on surrounding surfaces. It has been known recently that this virus can be found in oral cavity and fecal specimen of COVID-19 patients. Healt workers have high risk of infection since they have significant contacts with patients, both suspected and confirmed of COVID-19. Based on a research in Wuhan, health workers were accounted for 29% of COVID-19 patients.[1,3]

Endoscopy procedure has high risk of COVID-19 infection. This procedure increases chance endoscopist to contract virus from patient's respiratory or gastrointestinal tract. In addition, endoscopy procedure also needs to be done in close proximity between endoscopist and patient. Therefore, a strategy to prevent COVID-19 in endoscopy unit is urgently needed. There are some guidelines or recommendations to prevent COVID-19 infection during endoscopy procedure. This article is meant to give recommendation for endoscopy units implementing infection control and prevention during COVID-19 pandemic. Increasing COVID-19 cases in Indonesia is the reason we need practical guideline to be used to prevent COVID-19 spreads in gastrointestinal endoscopy units.[1,3,4] This article is based on review on some studies and guidelines regarding COVID-19 infection control and prevention during endoscopy procedure. The literatures used are those published in Asian Pacific Society for Digestive Endoscopy (APSDE), American Gastroenterological Association (AGA), European Society of Gastrointestinal Endoscopy (ESGE) and European Society of Gastroenterology and Endoscopy Nurses and Associates (ESGENA).

Gastrointestinal and Liver Manifestations of COVID-19

Health workers need to be aware of patient with gastrointestinal complaints. Some studies state that COVID-19 patients can exhibited gastrointestinal symptoms such as diarrhea, nausea, vomiting, and abdominal pain. A study by Lei Pan et al states that 48,5% COVID-19 patients have gastrointestinal symptoms for instance anorexia (83,8%), diarrhea (29,3%) and vomiting (0,8%).[2,3] It is also proven that SARS-CoV-2 RNA can be found in the fecal of patient who only complained diarrhea without respiratory symptoms nor fever. For that reason, there is a need to have awareness of patient with a single gastrointestinal complaint still has chance of having SARS-CoV-2, thus making the patient a carrier of the virus. Some studies also found that patient's fecal can have positive result of the virus although the patient has negative result on throat swab. Wang et al also states it is also possible for fecal specimen to be resulted positive of SARS-CoV-2 RNA without having diarrhea complaint.[3]

Approximately, 20-30% of COVID-19 patients have liver injury. It is thought to be the result of systemic immune response due to viral infection, with little chance to be a direct impact of viral infection. In addition, it is also still possible to be induced from drug consumed by patients.[3]

Risk of Transmission of COVID-19 to Health Care Workers who Performing Endoscopic Procedures

Health workers who work in the Endoscopy Unit have a high risk of COVID-19 infection through inhalation of droplets, contact with the conjunctiva, and fecal contamination during endoscopic procedures. Contamination of the surface environment can also occur around the procedure room which can increase the risk of infection to all health workers. Although the spread of COVID-19 is primarily through droplet transmission, endoscopic procedures can lead to aerosolization and subsequent airborne transmission.[3]

Asymptomatic COVID-19 patients can be a source of transmission of the virus. This is a challenge in preventing transmission of this virus. WHO and CDC report 2055 health workers who have been confirmed to be COVID-19 up to February 20, 2020. Research results in Europe also state that 20% of COVID-19 patients are health workers.[3]

Prevention Strategies for Transmission of COVID-19 in the Endoscopic Unit

Prevention of transmission of COVID-19 in the gastrointestinal endoscopy unit must be carried out by all staff involved, ranging from doctors, nurses, receptionists and janitors. These strategies are carried out thoroughly from the preparation stage until the end of the endoscopic procedure.[1,3]

BEFORE PROCEDURE

Screening of COVID-19

COVID-19 screening must be performed on all patients who will receive services in the endoscopic unit. APSDE publishes the COVID-19 screening flowchart in all patients undergoing gastrointestinal endoscopy (Figure 1). Before coming to the endoscopy unit, the patient must undergo initial screening with interviews related to symptoms and patient history, namely by asking for complaints of fever with temperatures over 37.5° C, history of travel to areas exposed to COVID-19 during the last 14 days, having work as a health care provider/laboratory assistants who have direct contact with specimens of COVID-19 patients, and a history of contact with COVID-19 patients during the last 14 days. If there is one or more of these symptoms/history, the patient must undergo a COVID-19 RT-PCR examination by taking a specimen from the throat swab. Patients with positive results are categorized as high risk groups so that the procedure that can be performed by these patients is only urgent endoscopic procedures.[1,3]

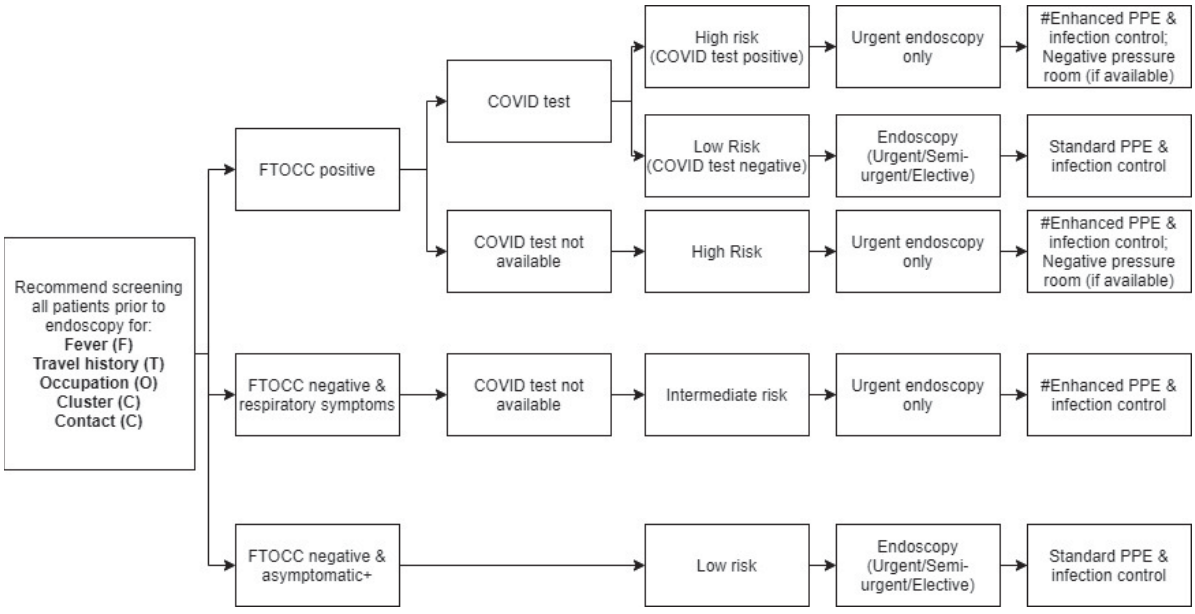
If the result of the COVID-19 test is negative, the patient is categorized as low risk group, so that any endoscopy can be carried out while still using appropriate PPE and infection control standards. If no COVID RT-PCR examination is available, all symptomatic/contact history patients are considered high risk patients.[1]

APSDE recommends that all elective endoscopy can be postponed until the COVID-19 pandemic ends. This strategy will minimizing the number of patients coming to health facilities to reduce the risk of COVID-19 transmission.[1]

Triage of Endoscopy Procedures

After conducting COVID-19 screening, it is necessary to triage the endoscopic procedure for all patients who will undergo an endoscopic procedure. This triage aims to determine the classification of procedures included in the group urgent or non-urgent. Urgent group can be done immediately by minimizing the risk of transmission of infection, while non-urgent group can be postponed according to the development of the COVID-19 pandemic, hospital's local policies and available resources.[3]

AGA divides triage groups into two groups namely time sensitive and non-time sensitive groups (Table 1). Procedures in time sensitive group must be done within 24 hours to 8 weeks, while procedures in non-time sensitive group can be postponed for more than 8 weeks.[3]



+: Asymptomatic, no symptom of upper or lower respiratory tract infection; #enhanced PPE: N95 mask, face shield, goggles, isolation gown, disposable gloves

Figure 1. Flowchart to prescreen and triage patients for endoscopy.[1]

Table 1. Framework for Triage based on AGA.[3]

Time-sensitive (within 24 hours-8 weeks)			Non-time sensitive
Threat to the patient's life or permanent dysfunction of an organ	Risk of metastasis or progression of stage od disease	Risk of rapidly worsening progression of disease or severity of symptoms	No short-term impact on patient-important outcomes
e.g. diagnosis and treatment of GI bleeding or cholangitis	e.g. work up of symptoms suggestive of cancer	e.g. management decisions, such as treatment for IBD	e.g. screening or surveillance colonoscopy, follow up colonoscopy for +FIT

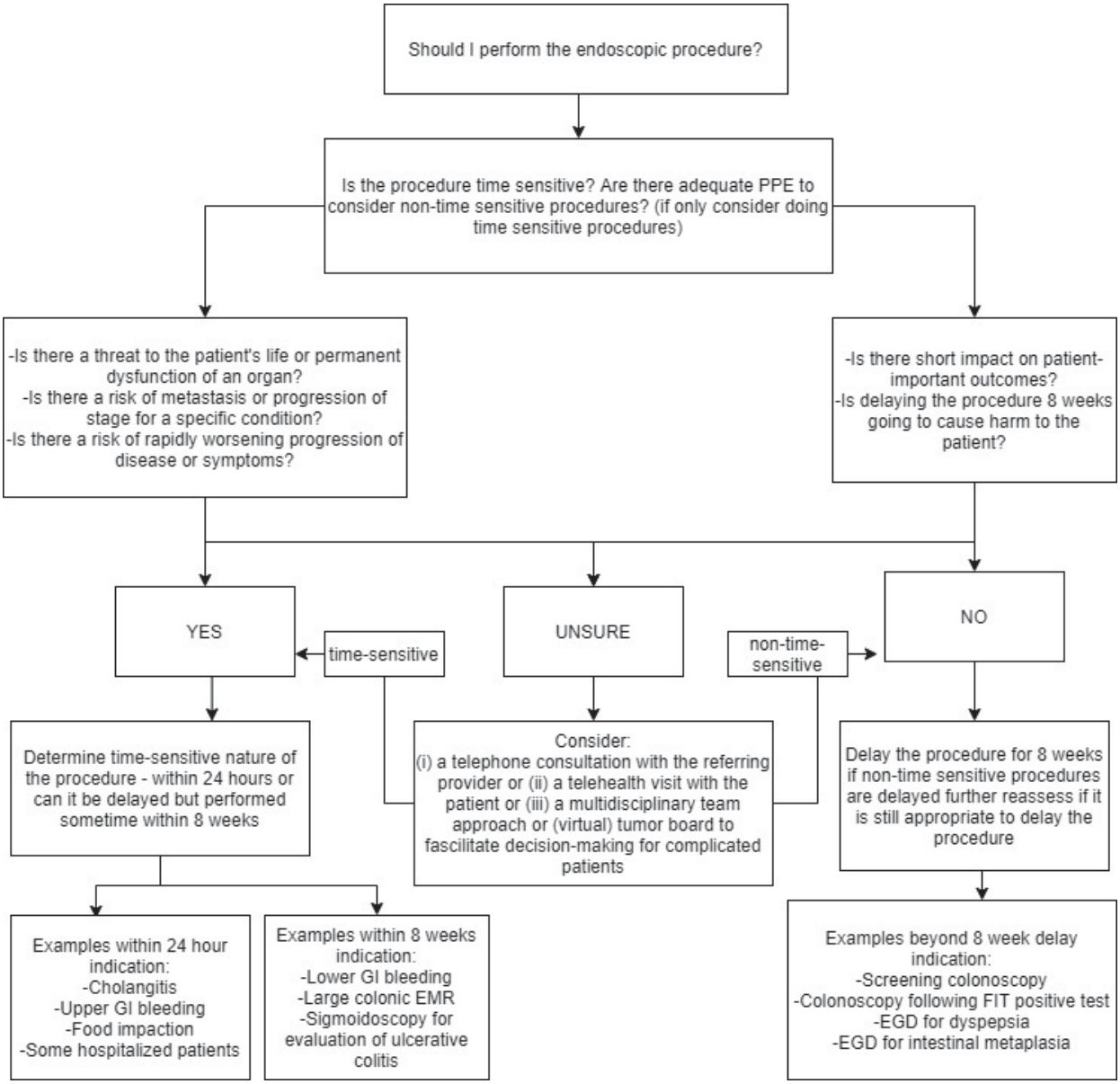


Figure 2. Flowchart for triage endoscopic procedures during COVID-19 pandemic.[3]

AGA publishes the triage flow of endoscopic procedures in patients who will receive services in endoscopic units during the COVID-19 pandemic (Figure 2).[3]

AGA gives consideration to the patient's medical conditions such as the possibility of permanent organ dysfunction or worsening disease that can threaten the patient's life if endoscopic procedures are not immediately performed. If there are conditions that make the patient must endoscopically immediately, then the patient must be included in the urgent group and endoscopic procedures can be done within 24 hours to 8 weeks. Good clinical considerations between doctors in the endoscopy unit and doctors who treat patients regarding the determination of endoscopic procedures are included in the time-sensitive or non-time-sensitive groups.[3]

APSDE also recommends conducting triage on endoscopic procedures that will be carried out during the COVID-19 pandemic. APSDE divides the triage group into three groups namely urgent endoscopy, semi-urgent endoscopy and elective endoscopy (Table 2). Procedures

that belong to the urgent group must be a top priority to work on, while the semi-urgent group can be considered by a doctor according to the patient's condition. Elective procedures can be postponed according to the future development of COVID -19. Table 2 shows the various procedures according to the triage group:[1,3]

AGA and APSDE triage have similarities, where the urgent and semi-urgent groups in APSDE are equivalent to the time-sensitive group in AGA, while the elective group in APSDE is equivalent to the non-time-sensitive group in AGA.[1,3] Triage of endoscopic procedures has an important role in minimizing the number of endoscopic procedures performed in endoscopic units to reduce the risk of transmission of COVID-19. In addition, a good triage system can also minimize and optimize the availability of PPE for health workers during the COVID-19 pandemic.[1,3]

Patient Preparations

All patients who will undergo an endoscopic procedure will undergo the registration process and wait in the waiting room. High risk patients must be separated from other patients in different rooms. While in the waiting room, the patient must wear a face mask and gloves without considering the risk of COVID-19 in the patient. The distance between patients is at least 2 meters. All patients should receive education about how to cough properly and washing hands using soap or hand rub. Caregivers or families are not permitted to enter the endoscopic unit. If it is needed, then a maximum of one caregiver can accompany the patient. Caregivers should be treated as patients who enter the endoscopy unit. They must wear a mask, gloves and keep a minimum distance of 2 meters.[3]

Health Workers Preparation

It is necessary to limit the number of health workers present in endoscopic units to reduce the risk of contact and to maintain the availability of PPE. This can be realized by making shift assignments scheduled for all health workers. Health workers who are not in the work schedule, as much as possible remain at home.[6,7]

Before entering the endoscopy unit, all health workers must undergo a body temperature check. If the body temperature is more than 37.5°C, then health workers are not permitted to enter the endoscopic unit and must undergo further examination and independent isolation for 14 days. All health professionals must also maintain hand hygiene by washing hands using soap at least in 40 seconds or using alcohol-based hand rub before and after interacting with patients, after contact with potential sources of infectious sources (potentially infectious sources) and before/after using personal protective equipment. The preparation of these health workers must be carried out by all personnel in the endoscopy unit.[3,6,7]

DURING PROCEDURE

During the procedure, it is necessary to pay attention to the principles of infection control such as rational use of PPE, hand hygiene and prevent contamination. When implementing Time Out, verification of the patient's COVID-19 status must be carried out.[1]

Personal protective equipment must be ensured available before starting the procedure. Personal protective equipment must be adjusted with the type of procedures. APSDE provides recommendations for types of personal protective equipment for various gastrointestinal endoscopy procedures. Patients with suspected or confirmed COVID-19 must use specific PPE recommendations and differ from the low-risk group of patients. Figure 2 shows the differences in PPE in both conditions:[3-5]

In patients with suspected/confirmed COVID-19, personnel must wear N-95 masks, face shields / goggles / cap, isolation gown (AAMI level 3) and disposable gloves. While in general patients, personnel can use surgical masks, face shields, isolation gowns (AAMI

Table 2. Framework for Triage based on APSDE

Urgent Endoscopy	Semi-Urgent Endoscopy (to be discussed on a case by case basis)	Elective Endoscopy (deferred until further notice)
• Acute gastrointestinal bleeding • Management of perforations and leakage • Biliary sepsis • Foreign body • Gastrointestinal obstruction requiring stenting • GI access for urgent feeding	• Endoscopic treatment for gastrointestinal neoplasia (EMR/ESD) • Endoscopy for highly suspicious case of cancer • Small bowel enteroscopy for occult GI bleeding • ERCP for hepatobiliary pancreatic cancers	• All routine diagnostic endoscopy • All surveillance and follow-up endoscopy (Barret's oesophagus/polyp/IBD/gastric intestinal metaplasia/ history of GI cancer) • Therapeutic endoscopy for non-cancer disease • Other ERCP cases-asymptomatic stones; therapy for chronic pancreatitis; metal stent removal/change; ampullectomy follow-up • EUS for diagnosis of benign condition • ERCP for non-malignant conditions • Endoscopic therapy for benign GI disorders (bariatric, GORD)

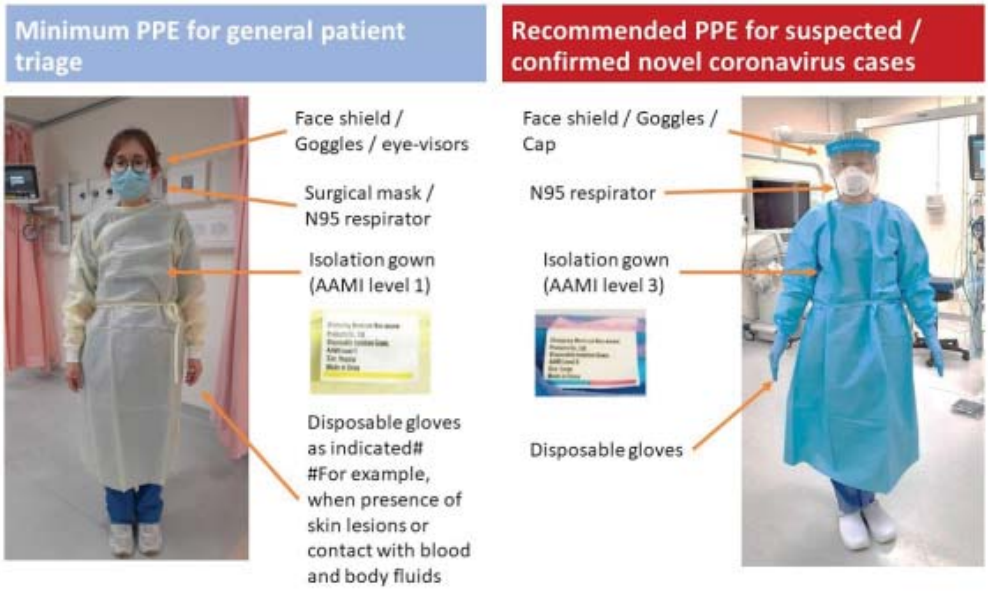


Figure 2. APD recommendations for general patients (left) and suspicion / confirmation of COVID-19 (right) in the endoscopic unit.[1]

Tabel 3. Types of PPE Based on Endoscopic Procedure Type.[1]

Procedure	AGP	Standard PPE for non-suspected/test negative cases	Enhanced PPE for high risk/ confirmed COVID-19	Frequency of gown down
OGD	To be determined	- Surgical mask or N95 - Blue isolation gown - Gloves - Standard endoscopy room	- N95 - Blue isolation gown - Gloves - Goggles or face shield - Negative pressure room	- Mask: end of each session - Gown: change when contaminated - Gloves: after each case
Colonoscopy	To be determined	- Surgical mask or N95 - Blue isolation gown - Gloves - Standard endoscopy room	- N95 - Blue isolation gown - Gloves - Goggles or face shield - Negative pressure room	- Mask: end of each session - Gown: change when contaminated - Gloves: after each case
ERCP	To be determined	- Surgical mask or N95 - Blue isolation gown - Gloves - Standard endoscopy room	- N95 - Blue isolation gown - Gloves - Goggles or face shield - Negative pressure room (with enough space and X-ray shielding)	- Mask: end of each session - Gown: change when contaminated - Gloves: after each case
Broncoscopy	Yes	- N95 - Blue isolation gown - Gloves - Goggles or face shield - Negative pressure room	- N95 - Blue isolation gown - Gloves - Goggles or face shield - Negative pressure room	- Mask: end of each session - Gown: change when contaminated - Gloves: after each case

level 1) and disposable gloves when they want to make contact with patients. APSDE also recommends the type of PPE needed based on the type of procedure performed (Table 3).[1]

AGA recommends the use of N-95 masks during the COVID-19 pandemic for all personnel who performing endoscopic procedures. The N-95 mask effectively filters 95% aerosols (<5 um) and droplet particles of size 5 um to 50 um. AGA also recommends the use/ re-use of N-95 when compared to the use of surgical masks. Based on APSDE and AGA recommendations, it can be concluded that the use of N-95 masks is highly recommended in all gastrointestinal endoscopy procedures. In the condition of limited PPE, the use of re-use N-95 is more recommended than the use of surgical masks, but if the availability of PPE is very limited then the procedure with low-risk patients (has proven negative COVID-19) can use surgical masks as an alternative to prioritize N-95 masks for procedures in high risk patients.[3]

Disposable gloves are recommended for all endoscopic procedures. The use of double gloves is highly recommended when compared to single gloves. This has moderate quality evidence to reduce the risk of transmission of COVID-19 because it further reduces the risk of contamination.[3]

The choice of endoscopic procedure room must be adjusted to the patient's COVID-19 status. In patients with suspected/confirmed COVID-19, it is highly recommended that the endoscopic procedure be carried

out in a negative pressure room. If it is not available, the procedure can be done in a normal room, but it must be in a room that is reserved for patients with suspected/confirmed COVID-19.[3]

AFTER PROCEDURE

It is very important to pay attention to releasing PPE procedures, decontamination of endoscopic devices and procedure rooms, as well as patient follow-up after endoscopic procedures are performed. After the procedure is complete, all PPE must be removed in the procedure room and disposed of in a special rubbish bin for infectious waste. Personnel must wash their hands according to procedure/clean the whole body if they want to leave the endoscopic unit.[1,3,4]

All patients must wear a surgical mask while in the recovery room. It should also be noted that the distance between patients is at least 2 meters. Separate toilet must be provided for patients and advise patients to flush the toilets after use with the lids closed, because toilet flush is known to cause bioaerosols and possibly can be a medium of transmission. Patients who have undergone the procedure must be followed for 14 days to assess whether clinical symptoms of COVID-19 arise.[1,3,4]

Disinfection management is still carried out as usual, which is according to the standard procedure for disinfection management of endoscopic devices, while remaining vigilant with water splashes during cleaning. The SARS-CoV-2 virus can be deactivated using alcohol or chlorine-based disinfecting solutions. After carrying out the procedure, it is necessary to disinfect all parts of the endoscopy room and replace the patient's pillows and bed sheets.[1,3,4]

EXPERIENCE FROM INDONESIAN TERTIARY HOSPITAL ENDOSCOPY CENTER

Our endoscopy center in Cipto Mangunkusumo National Hospital is the largest in Indonesia and have routine procedures from basic endoscopy (EGD and colonoscopy) to advanced endoscopy (such as ERCP, EUS and POEM). During the start of the COVID-19 cases finding in Indonesia (early March 2020) we quickly adapt our situation using guidelines from first articles available such as article from Soetikno et al[7]. Our biggest obstacle at first is providing the necessary PPE for the staff which is quite expensive and rare even for a big hospital. We follow protocols that recommends the use of N95 mask for all procedures. We re-use the N95 masks using UV methods. We quickly adjust the procedures appointment only for bleeding, cholangitis, nutritional access and urgent diagnostics (suspected malignancy) and with restriction of daily number of procedures. All patient undergoing endoscopy procedures must be screen for COVID-19 infection by history taking and chest x-ray.

CONCLUSION

Endoscopic units need to anticipate the transmission of COVID-19 during the pandemic. Patients who are recommended to undergo endoscopy have the possibility of becoming a SARS-CoV-2 virus carrier, so it is necessary to prevent transmission strategies that are carried out starting from before the procedure, during the procedure until the procedure is performed. The strategy of screening COVID-19 for all patients who will undergo the procedure and triage endoscopic procedures to assess the urgency of the procedure is a very important. In addition, the use of appropriate PPE is also very important in reducing the risk of transmission of this disease. At the end of the procedure it is also necessary to manage the disinfection of equipment, procedure rooms and management of PPE that has been used. This strategy is expected to be carried out by all personnel working in the endoscopy unit to reduce the possible risk of transmission of COVID-19 in the gastrointestinal endoscopy unit.

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