Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Figure 2. Attending endoscopist *(right)* and registered nurse *(left)* wearing "low-risk" personal protective equipment, at the doorstep of the critical care unit. Foldable moving cart stacked with portable equipment, stored in suitcases (from *top* to *bottom*: power source, 2 gastroscopes, ancillary tools, and processor).

to perform urgent procedures. All necessary precautions and procedures are those described in the recent publication by Repici et al.[1]

This new organization allows a more optimal deployment of caregivers in other departments. A mobile team reduces the need to transport patients at a time when the ambulance system and logistics are saturated. We expect that it also probably reduces the risk of dissemination of the virus. Furthermore, street traffic is virtually nonexistent because of the restrictions on travel, which allow rapid transit between hospitals. We believe that this system simplifies how urgent endoscopies are performed at a time of crisis when smart protocols and logistics procedures are critical.

DISCLOSURE

Dr Camus is a consultant for Boston Scientific and Cook Medical. Dr Dray is a consultant for Boston Scientific, Fujifilm, Medtronic, Pentax, Alfasigma, Bouchara, and Recordati and a cofounder of, and a shareholder in, Augmented Endoscopy. The other authors disclosed no financial relationships.

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ERCP during the pandemic of COVID-19 in Wuhan, China

To the Editor:

We read with great interest the recent articles by Repici et al[1] and Soetikno et al.[2] An outbreak of a novel coronavirus pneumonia spread rapidly through the whole country and is now a worldwide pandemic. Up until

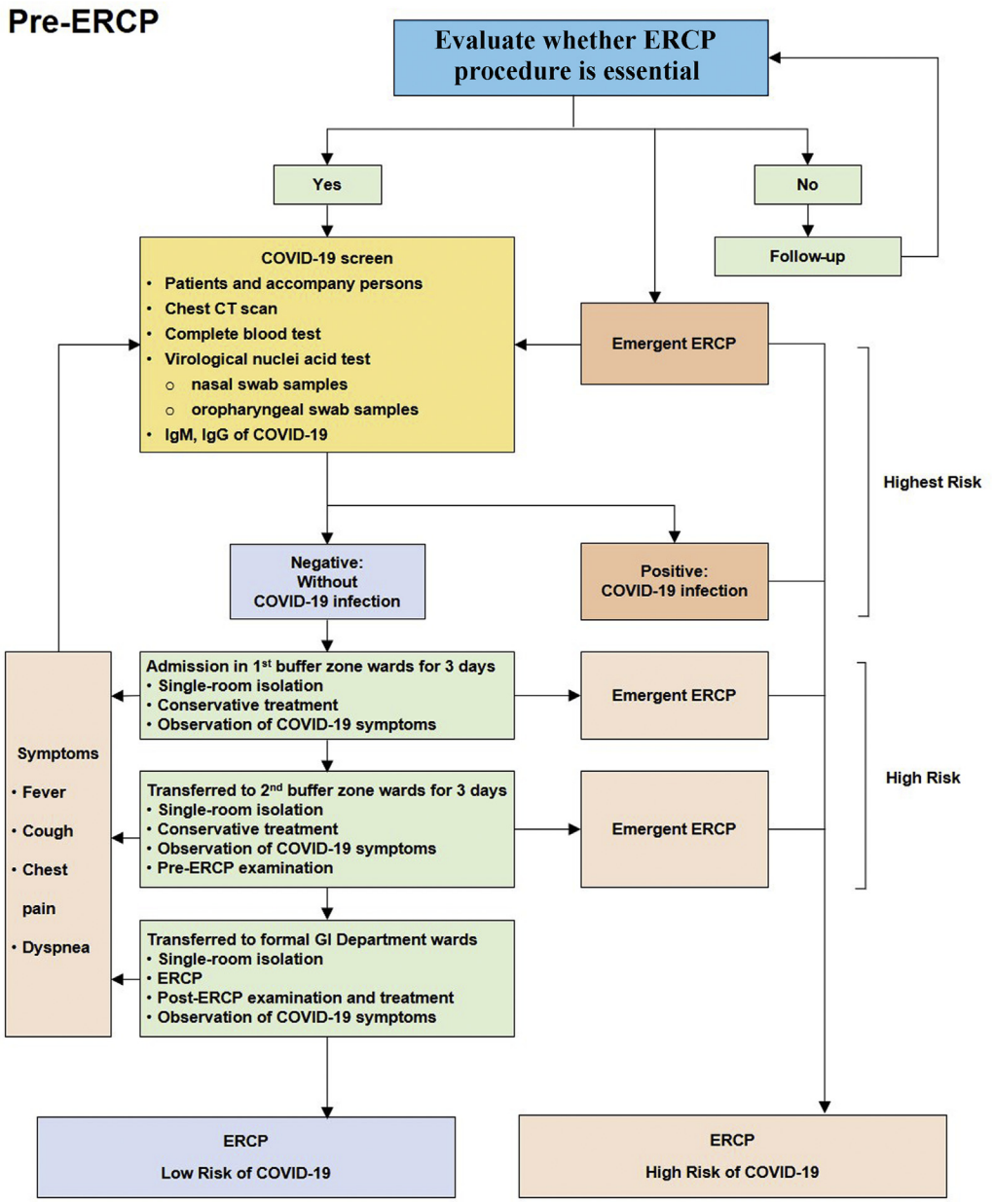
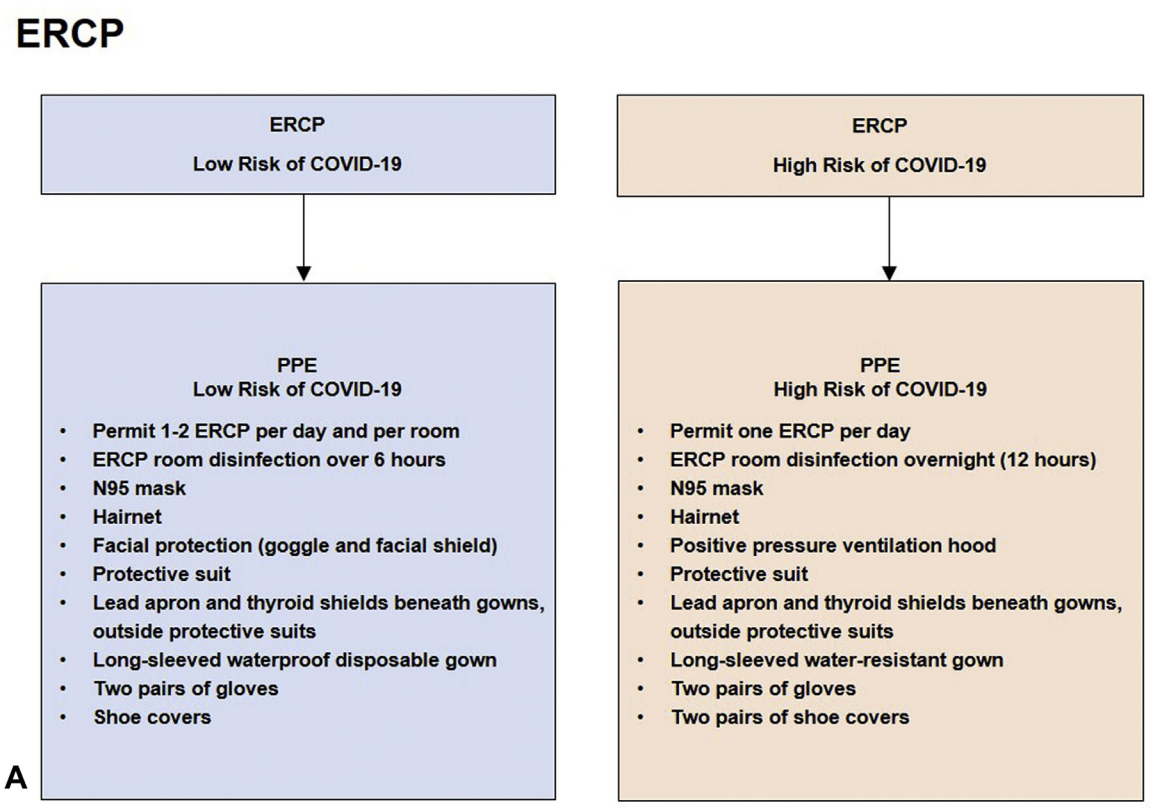


Figure 1. Pre-ERCP management.

March 30, the National Health Commission of China reported a total of 82,423 confirmed cases in 31 provinces and 3306 deaths, in addition to 615,699 confirmed cases worldwide.[3] With the development of the pandemic, more countries have become involved in this serious battle against the virus.

ERCP is an important and effective procedure of choice for biliary decompression. Despite the high danger of infection in COVID-19 outbreak areas, ERCP is still required for patients with emergent biliary obstruction and for those who cannot wait until the next available elective list. Direct contact, airborne droplets, contamination by touch, and uncertain fecal–oral transmission greatly increase the infection risk of ERCP procedures.[4]

To guarantee the safety of healthcare workers and patients for ERCP procedures, we established infection prevention measures and standard operating procedures in the endoscopy center of our gastroenterology department to guarantee a safe environment for both patients and healthcare personnel. Here, we report a retrospective review of ERCP procedures in 31 patients during the COVID-19 pandemic to evaluate the safety of these essential protective measures (Figs. 1 through 4).



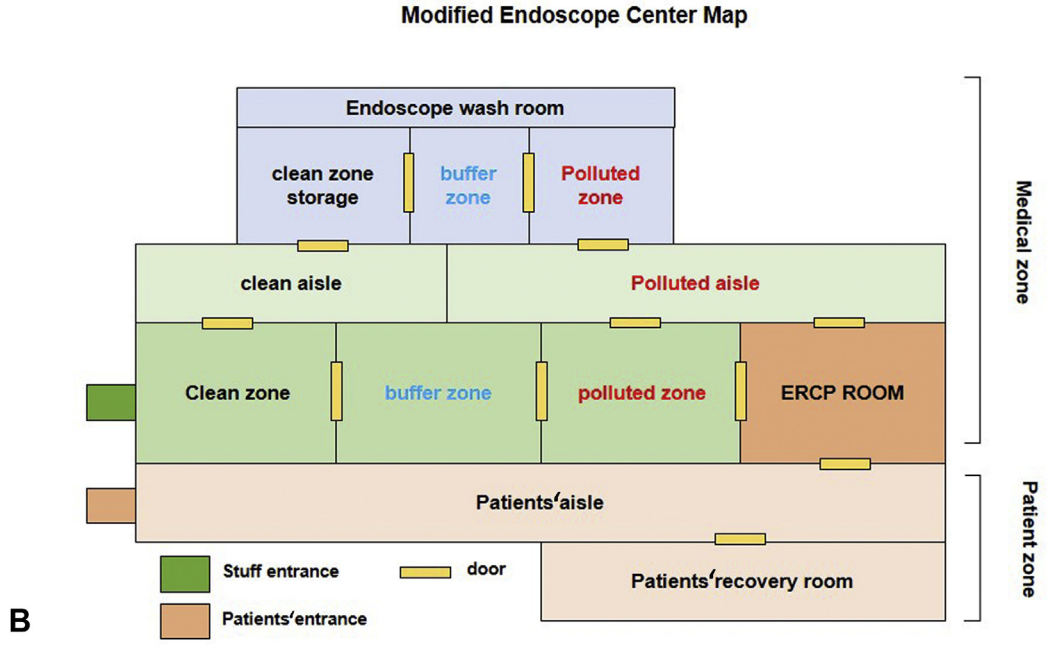
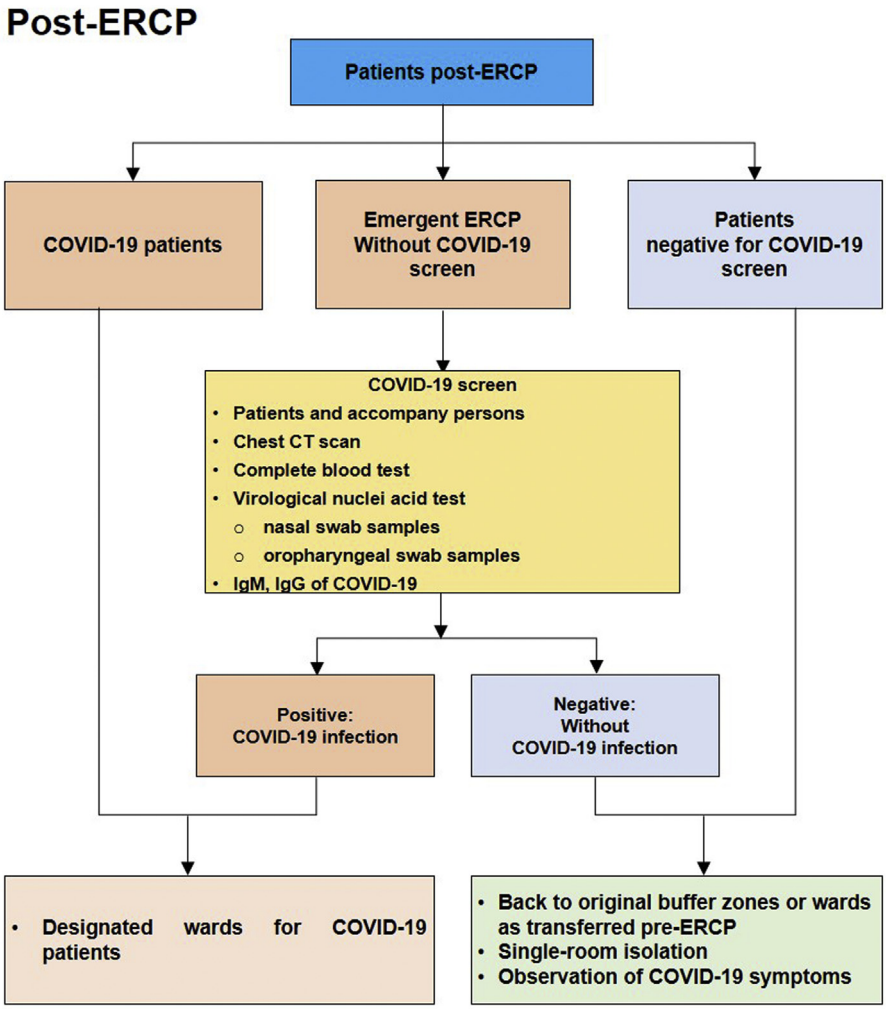


Figure 2. ERCP and endoscopic center management. *PPE*, Personal protective equipment.

Figure 3. Personal protective equipment of ERCP for high-risk patients. **A,** N95 mask, disposable hairnet, goggles, protective suit, 1 pair of gloves, 2 pairs of shoe covers. **B,** Lead apron and thyroid shields. **C,** Positive pressure ventilation hood. **D,** Long-sleeved waterproof disposable gown, another pair of gloves. **E,** Disposable sheet isolates between endoscopist and patient.

Patients with acute obstructive cholangitis, aggravated bile duct obstruction (rapid increase in serum total bilirubin), acute biliary pancreatitis, and common bile duct gallstones with fever, abdominal pain, and jaundice underwent ERCP during the outbreak. COVID-19 screening examinations, including chest CT scans, complete blood tests, virologic nuclei acid polymerase chain reaction tests (nasal and oropharyngeal swab samples), and COVID-19 IgM/IgG determinations, were mandatory for all patients and for the persons accompanying those patients before ERCP, except for emergent cases. COVID-19–positive patients were admitted to designated wards. Other patients negative to COVID-19 infection spent 6 days of observation and preparation to transfer from 2 buffer zone wards (with 3 days of observation per ward) to GI department wards. Patients with COVID-19–related symptoms, including fever, cough, chest pain, and dyspnea, were kept under observation during the whole hospitalization, and COVID-19 screenings were considered once these alerting symptoms occurred. The study protocol was approved by



Post-ERCP management in endoscopic center

- Endoscope host, operation table, monitor, workstation and clinic bed are wiped and disinfected with 75% alcohol.
- The ground was disinfected with chlorine disinfectant for 30 minutes and wiped off later.
- Air disinfection: ventilation with medical dynamic air disinfection equipment for 2h and UV disinfection for 2h.
- Immediately after the operation, the endoscope and reusable accessories are placed in a double-layer yellow medical waste bags and sealed, marked with the COVID-19 logo, and transferred to the washing room for decontamination.
- Soak all endoscopes and reusable accessories in 0.2 % peracetic acid for 5 minutes to ensure full immersion in each lumen of the endoscope and then clean and sterilize according to specifications.
- After the daily cleaning and disinfection work is completed, the cleaning tank, rinsing tank, perfusion device and cleaning brush should be thoroughly cleaned, and disinfected with chlorine disinfectant for 30 minutes.
- Medical waste is packaged in double-layer yellow medical waste bags and marked with the COVID-19 logo

Figure 4. Post-ERCP management.

the ethics committee of Renmin Hospital of Wuhan University, and waiver of informed consent was obtained (ID: WDRY2020-K075). All ERCPs were performed with the patient under conscious sedation with propofol and pethidine, and the patient was monitored by an anesthesiologist or endoscopist during the procedures.

After ERCP, COVID-19 patients returned to their designated wards, and uninfected patients were admitted back to the buffer zone or GI wards for further treatment and observation.

During the outbreak of COVID-19 in Wuhan, from February 1 to March 31, 31 ERCPs were performed for hospitalized patients admitted to Renmin Hospital of Wuhan University. The median age of the patients was 61 years (range, 40–84 years), and the majority were men (19 M:12 F). Most patients had comorbidities, and ≤41.9% of patients had hypertension. Anorexia (n = 29, 93.4%), fatigue (n = 29, 93.4%), and jaundice (n = 23, 74.2%) were the most common signs and symptoms. A total of 19.4% of patients (n = 6) had fever, and 35.5% (n = 11) had abdominal pain. The indications that necessitated ERCP included common bile duct gallstones (n = 15, 48.4%), acute biliary pancreatitis (n = 5, 16.1%), and carcinoma: cholangiocarcinoma (n = 8, 25.8%), ampullary cancer (n = 1, 3.2%), and duodenal papillary carcinoma (n = 2, 6.5%). Most patients (n = 21, 67.7%) underwent COVID-19 screening and then were admitted to wards by transfer from buffer zones to the GI department, whereas 32.3% of patients (n = 10) finished the screening after ERCP for emergent situations, including acute obstructive cholangitis and acute biliary pancreatitis (n = 5, 16.1%).

One patient who underwent emergent ERCP had a positive test result to COVID-19 nuclei acid in oropharyngeal swab samples taken right before the procedure. This patient was later confirmed to be an asymptomatic carrier of COVID-19. At the time the manuscript for this article was submitted, none of the other patients, their accompanying persons, or healthcare workers in our endoscopy center were reported to have the COVID-19 infection.

In the current new era of the COVID-19 outbreak and rapidly evolving epidemiologic information, hospitals have become one of the highest-risk places for both healthcare personnel and patients. With the dramatic development of this pandemic, the risk of aerosol-generating medical procedures gained extensive attention, especially for upper endoscopic procedures, including EGD, ERCP, and EUS, which carry the highest risk of exposure to aerosols.

Current guidelines and consensus recommendations advise that patient treatment should be based on a risk assessment of COVID-19 infection, which includes the patient's exposure history (if the patient stayed in a high-risk area during the previous 14 days and had contact with an infected person) and typical symptoms regarding fever, cough, breathlessness, and diarrhea. Personal protective equipment was suggested to be provided accordingly.[5] However, given that atypical symptoms without fever and respiratory presentations and current community transmission from asymptomatic patients with COVID-19 have already been documented (and false-negative results of virologic tests in some cases), it is challenging to identify all COVID-19 patients before ERCP procedures. Furthermore, for patients who need urgent ERCP, fever, abdominal pain, anorexia, and diarrhea are commonly seen and greatly increase the complexity of differential diagnosis. Therefore, in the standard operating procedure of our ERCP team, we regarded all new patients as potential COVID-19 candidates regardless of whether the patients were considered to be at low or high risk for COVID-19.

Although all patients underwent screening for COVID-19 before ERCP, some patients with emergent conditions could not wait for the results. In these patients, samples were taken for virus screening right before the procedure. It is important to differentiate community infection from nosocomial infection of the virus. One COVID-19 patient was identified in the first buffer zone ward after the ERCP procedure and was confirmed as having a community infection. Our measurements successfully identified this infected patient and prevented risky transmission. By the date of this article submission, no other patients, accompanying persons, or medical workers in our endoscopic center were reported or received diagnoses of COVID-19 infection.

In conclusion, our measures guaranteed that all healthcare workers in our endoscopy center, patients, and accompanying persons could avoid COVID-19 infection and that virus-infected patients could be identified during the procedure. Our experiences and measures for ERCP could help others establish optimal measures or standard operating procedures to avoid further unrecognized spread of the disease.

DISCLOSURE

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Management of upper GI bleeding in patients with COVID-19 pneumonia

To the Editor:

Coronavirus disease 2019 (COVID-19) has become a worldwide pandemic. The typical presentation is a respiratory illness with fever, cough, and shortness of breath. GI symptoms are being increasingly recognized and include abdominal pain, vomiting, diarrhea, and nausea.[1] We present a case series of 6 patients who were admitted to our hospital with COVID-19–associated pneumonia (fever, shortness of breath requiring oxygen, positive COVID-19 polymerase chain reaction test result, and infiltrates showing on chest radiograph), and upper GI bleeding. The patient and clinical characteristics are shown in Table 1. The GI manifestations were hematemesis or melena.

Guidelines advise that patients who present with acute upper GI bleeding undergo endoscopy within 24 hours of presentation.[2] Endoscopy can not only provide therapy but also allow for risk stratification for rebleeding that can dictate management. However, the discussion for endoscopy in patients with COVID-19 pneumonia brings about unique management decisions. Although endoscopy can provide therapy if a discrete visible vessel is seen, the risk of the procedure may outweigh the benefit in patients with COVID-19 pneumonia.

First, 5 of the 6 patients in this series were receiving supplemental oxygen, and 1 patient had an endotracheal tube. Performing upper endoscopy would have likely required general anesthesia with an endotracheal tube in the 5 patients, given their oxygen requirements, the indication for the procedure (hematemesis), or both. Extubation after the procedure becomes challenging in the setting of pneumonia. In addition, a recent study from China demonstrated an increased mortality rate once a patient with COVID-19 pneumonia is intubated.[3] Although the data for this concerned emergent intubation for respiratory failure (not an elective procedure), the data are compelling. Second, there is a real concern for transmission of the virus to the anesthesiologist, staff, and endoscopist, given the aerosolization of respiratory droplets during endoscopy.[4]

Given that the risks of endoscopy might outweigh the benefits, we decided to treat these patients conservatively with a proton pump inhibitor drip, blood transfusion as needed, and frequent monitoring of vital signs, GI symptoms, and hemoglobin value. Endoscopy was reserved if the patient did not respond to conservative management by 24 hours (lack of hemodynamic stability and if the hemoglobin was not stable). Delaying the endoscopy for 24 hours has recently been shown to not affect 30-day mortality in comparison with earlier endoscopy.[5] All 6 of our patients responded to conservative management. Cessation of clinical symptoms of acute upper GI bleeding was seen in all of our patients in combination with stabilization of hemoglobin. None of the patients required upper endoscopy during their clinical course.

The exact cause of GI bleeding in this cohort is unknown because endoscopy was not performed. The most likely cause is ulcer related. Another cause being recognized is COVID-related coagulopathy.[6] Given that the patients responded to conservative management, the former is more likely.

In conclusion, the treatment of patients admitted with COVID-19 pneumonia who experience upper GI bleeding is challenging. It can possibly be managed