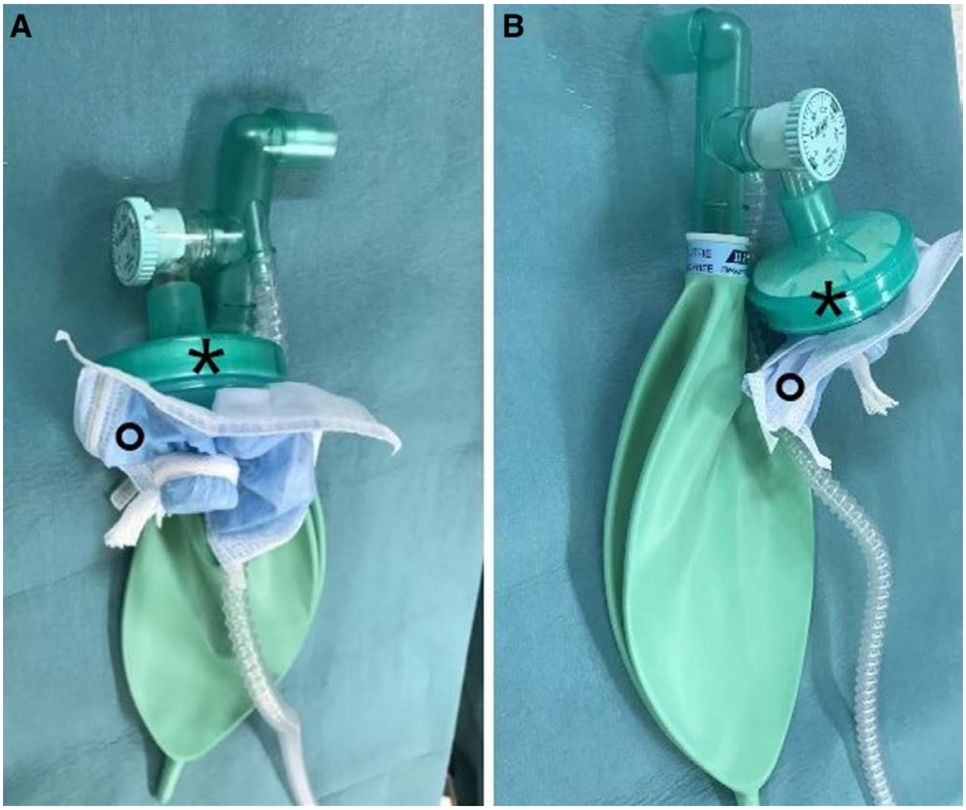

Figure. DAR reservoir bag, with DAR filter at the expiratory exit of the bag, on which the surgical mask is placed. A and B, *Filter on the expiratory exit of the DAR reservoir bag. ○Surgical mask fixed on the filter with hemmed bandage.

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Adaptation to the Plastic Barrier Sheet to Facilitate Intubation During the COVID-19 Pandemic

To the Editor

We read with interest the recent article by Brown et al,[1] titled "Barrier System for Airway Management of COVID-19 Patients," which described the use of a plastic drape attached to a plastic bag as a protective measure during endotracheal intubation and extubation. We wish to commend the authors on developing this technique, which has a great benefit of containing and facilitating the disposal of contaminated surfaces surrounding the patient's airway at the end of the surgical case.

Because of its close geographical proximity to China, Taiwan had been on alert for coronavirus disease 2019 (COVID-19) as early as December 31, 2019.[2] As more and more information was learned regarding the virulence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), we used a plastic drape at our institution to protect anesthesia professionals during airway manipulation but made modifications to our technique as problems arose during proof of concept and real-world use. We found that when

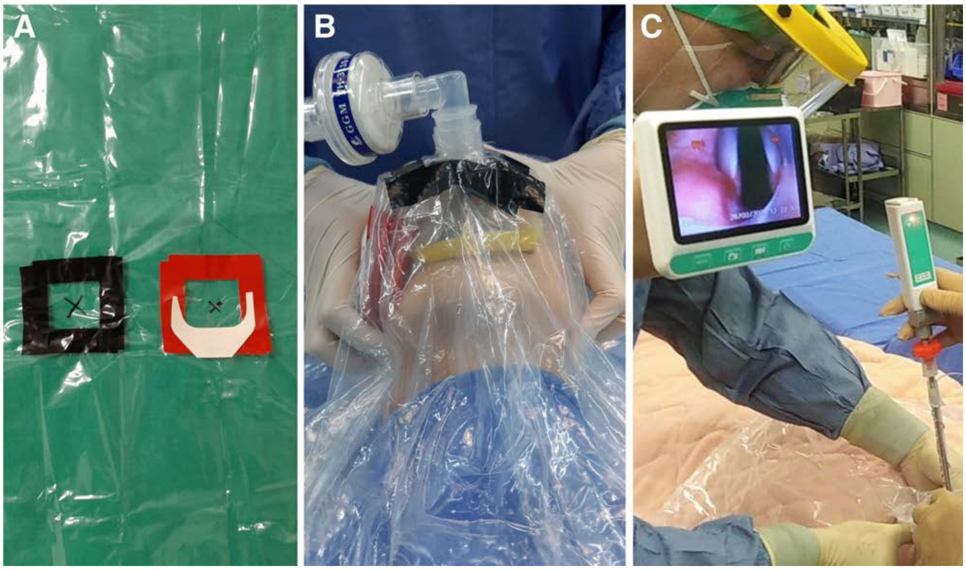

Figure. Adaptation to plastic sheet to facilitate endotracheal intubation. A, Two diagonal crosses are cut into the drape and reinforced with tape. B, First cross allows connection of breathing circuit to oxygen facemask. C, Second cross allows introduction of video stylet and endotracheal tube.

intubation of the airway was challenging, manipulating the laryngoscope under a sheet proved to be problematic. Although Brown et al[1] proposed the removal of the clear drape during midlaryngoscopy as an option should difficulties with intubation arise, elimination of the barrier sheet defeats its purpose of protecting the operating room staff, and may further aerosolize viral particles on and under the drape when it is removed in an emergent manner.

To facilitate intubation, we make the following adaptations to the plastic sheet. We cut a small 3 × 3 cm cross in the drape with a surgical blade and reinforce the perimeter of the cross with tape so it does not widen over the course of the case (Figure, panel A). The purpose of this first X is to connect the anesthesia breathing circuit to the oxygen facemask under the drape (Figure, panel B). A second 2 × 2 cm cross is cut and reinforced in close proximity to the first (Figure, panel A). The purpose of this second X is for passage of the videolaryngoscope, endotracheal tube, or Yankauer suction tip.

At our institution, we use the Trachway video light stylet (Markstein Sichtec Medical Corp., Taichung, Taiwan) as the preferred video-assisted intubating device (≈5000 cases in 2019). Because of its small profile, only a small X is needed to introduce the intubating device and endotracheal tube (Figure, panel C). When using the video stylet, we cover the second cross with a small transparent film dressing, making a small nick in the center of the dressing with a surgical blade. As the stylet and endotracheal tube are introduced, the hole in the film will dilate in size to accommodate the endotracheal tube, while the elasticity of the dressing allows it to adhere around the tube, minimizing the defect in the plastic barrier. If a videolaryngoscope is utilized for intubation, the cross is widened to 3 × 3 cm to accommodate passage of both the disposable blade and the endotracheal tube. A transparent dressing should not be utilized with videolaryngoscopy as the film's adhesive nature may interfere with the maneuvering of laryngoscope or endotracheal tube, but a dressing can be placed over the X after successful intubation to reduce the size of the defect in the plastic sheet. Typical airway maneuvers, such as jaw thrust by an assistant, can still be performed over the sheet. If mask ventilation is needed after an initial laryngoscopy attempt, we can easily shift the plastic drape back over to the first cross to allow resumption of mask ventilation.

A benefit of utilizing a plastic sheet as the barrier device is that it is simple and inexpensive and can be constructed with existing materials in the hospital, such as a surgical drape or even a plastic trash bag. The use of a transparent acrylic intubation shield has been proposed and may afford improved visibility but would require construction of the device as well as disinfection of the unit after each use.[3] In addition, patient anatomy may preclude effective manipulation of the airway through the 2 circular openings. A potential negative aspect of our modified drape technique is the theoretical transmission of viral particles into the operating room through the defect in the barrier. However, we feel that the risk of contamination is low, and our modified technique improves the success rate of the initial intubation attempt, especially when a difficult airway is encountered. If additional protection is desired, using 2 plastic drapes as a double layer can further reduce the risk of accidental transmission, as the Xs on both sheets would have to be aligned in order for aerosolization of viral particles to occur.

Although we have been carefully removing the drape after successful intubation, we feel that Brown et al[1] and other authors make an excellent point that the sheet can be left in place for the duration of surgery, and the patient can be subsequently extubated under the drape, shielding anesthesia providers and other operating room personnel when the endotracheal tube is removed.[4] During these trying times, it is encouraging to see how health care professionals over the globe are readily sharing clinical insights, and we hope that our experiences with a simple modification to the barrier sheet method may help others improve their success rate of initial intubation while still providing protection to anesthesia professionals during the COVID-19 pandemic.

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Return to Normal: Prioritizing Elective Surgeries With Low Resource Utilization

To the Editor

Suspension of elective surgeries was among the first mitigation efforts in anticipation of a surge in demand for critical care services during the coronavirus disease 2019 (COVID-19) pandemic.[1] As the United States nears the peak of this pandemic, policymakers need to determine the optimal strategy to safely return to "normal" operations while remaining vigilant and prepared for future recurrent outbreaks.

We therefore evaluated intensive care unit (ICU) utilization and mechanical ventilation following common elective surgical procedures to (1) determine which procedures are the least resource intensive and (2) which patient populations are less likely to require postoperative ICU admission or ventilation.

After Institutional Review Board approval (IRB no. 2016-436), we conducted a retrospective analysis of patients captured in the Premier Healthcare database (2006–2016) who underwent common elective inpatient procedures (Supplemental Digital Content, Appendix, http://links.lww.com/AA/D93).[2] For each surgical cohort, we identified ICU admission, length of ICU (and hospital) stay, and use and length of (non-) invasive ventilation (≥96 or <96 hours). Multivariable logistic regression models measured the association between patient age/comorbidity burden as measured by Charlson-Deyo index,[3] and the outcomes of ICU admission and ventilation, to validate the perception that younger and healthier patients are less likely to require these resources.

Of the 15 elective surgeries evaluated, cardiac procedures were the most resource intensive with 83.9% of patients admitted to the ICU and 27.9% requiring ventilation, followed by abdominal procedures that had an average ICU admission rate of 20.3%. Gynecological surgeries and joint arthroplasties appeared to be the least resource intensive with fewer than 5.5% of patients admitted to the ICU and <2% requiring postoperative ventilation (Table). In regression models, greater comorbidity burden was associated with significantly increased odds of ICU admission or any form of ventilation in almost all procedure cohorts; this association was more subdued and sometimes reversed for older age (Figure).

The highest ICU utilization was seen in cardiac, abdominal, and spine surgeries. Outside of cardiac procedures, postoperative ventilation was relatively uncommon, indicating that limiting elective procedures is primarily beneficial in maximizing ICU capacity rather than freeing up ventilators.

In almost all procedure cohorts, younger patients with a low comorbidity burden were less likely to require ICU admission and/or ventilation. Comorbidity burden was a stronger risk factor and thus should be prioritized over age for optimal patient selection. There is

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Conflicts of Interest: S. G. Memtsoudis is a director on the boards of the American Society of Regional Anesthesia and Pain Medicine (ASRA) and the Society of Anesthesia and Sleep Medicine (SASM). He is a one-time consultant for Sandoz Inc and Teikoku and is currently on the medical advisory board of HATH. He has a pending US Patent application for a Multicatheter Infusion System. US-2017-0361063. He is the owner of SGM Consulting, LLC, and co-owner of Football Club (FC) Monmouth, LLC. None of the above relations influenced the conduct of the present study. The remaining authors declare no conflicts of interest.

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