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.

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Letters to the Editor

Handheld ultrasound devices: An emerging technology to reduce viral spread during the Covid-19 pandemic

Coronavirus 2019 (COVID-19) is highly contagious and has spread around the world at an unprecedented rate. The American College of Radiology has discouraged the use of routine imaging studies to reduce risk of contamination.[1] Ultrasound is useful for ventilatory and hemodynamics optimization, and has been shown to be superior to the stethoscope and chest radiography,[2] and comparable to computed tomography in the diagnosis of many pathologies.[3] Handheld ultrasound devices fit into a single-use plastic cover (Fig 1) and can be easily decontaminated, making them ideal for minimizing viral contamination and sperad during the COVID-19 pandemic.

Table 1 shows the duration that many common hospital pathogens are viable on surfaces. While many pathogens are viable for much longer than SARS-CoV-2, their level of contagiousness is markedly diminished. A survey by Westerway et al[4] found that a majority of ultrasound users did not appropriately disinfect traditional ultrasound machines, with only 47% using proper disinfectant solution and only 15% and 47% disinfecting the keyboard and cords, respectively. Single use gels should also be used given that community gel has been a source of contamination. As many in-hospital providers are burdened with increasing patient volumes during the current pandemic, there could be even less adherence to best practices for decontamination.

Because of their compact size and profile, handheld devices can be easily decontaminated with a single disinfectant wipe. In contast, decontamination of traditional ultrasound machines can be challenging if not impossible due to greater surface area, and components such as keyboards, knobs, and cords. This process can be time consuming and costly, as many hospitals are rationing disinfectant supplies. In addition, many handheld ultrasound devices now have teleguidance capabilities that allow experts to guide a novice user through an exam remotely thereby minimizing exposure, conserving

Fig. 1. A portable ultrasound device and connected tablet can be placed in a single-use plastic sheath prior to entering a patient's room to minimize the risk of viral contamination and spread.

Table 1
Survival time of common hospital pathogens on dry inaminate surfaces.

Type of pathogen	Duration of persistence
Bacteria	
Acinetobacter spp.	3 days to 5 months
Clostiridium difficile	5 months
Escherichia coli	1.5 hours to 16 months
Enterococcus spp.	5 days to 4 months
Haemophilus influenza	12 days
Klebsiella spp.	2 hours to >30 months
Listeria spp.	1 day to months
Mycobacterium tuberculosis	Up to 4 months
Proteus vulgaris	Up to 2 days
Pseudomonas aeruginosa	Up to 16 months
Serratia marcescens	3 days to 2 months
Staphylococcus aureus	Up to 7 months
Streptococcus pneumoniae	1 to 20 days
Streptococcus pyogenes	3 days to 6.5 months
Fungi	
Candida albicans	Up to 120 days
Torulopsis glabrata	102 to 150 days
Viruses	
Adenovirus	7 days to 3 months
HAV	2 hours to 60 days
HBV	Greater than one week
HIV	Greater than 7 days
HSV	4.5 hours to 8 weeks
Influenza virus	1 to 2 days
Norovirus	8 hours to 7 days
MERS-CoV	Up to 48 hours
Respiratory syncytial virus	Up to 6 hours
SARS-CoV	3 to 10 days
SARS-CoV-2	Up to 3 days

Adapted from Kramer et al[7], Otter et al[8], and van Doremalen et al.[9]

personal protective equipment, and reducing patient transport for imaging studies. Nurses and respiratory therapists can also be easily trained to perform focused ultrasound assessments.[5,6]

During the current pandemic, disease containment and provider safety are high priorities. We must embrace emerging technologies such as handheld ultrasound devices to allow us to achieve these aims while providing high quality care to our patients.

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Chest tube with air leaks is a potential "super spreader" of COVID-19

To the Editor:

The COVID-19 pandemic has spread worldwide, causing more than 5.8 million infections at present (May 30, 2020).[1] Infectious aerosols disperse during aerosol-generating procedures such as tracheal intubation.[2] There is a concern that aerosols may also be generated from the chest tube, especially with air leaks, even after placement.[3] We would like to share our experience.

An 85-year-old man was admitted to our hospital with fever, cough, and dyspnea. Chest computed tomography revealed unilateral pleural effusion and no findings of pneumonia. We performed chest tube drainage and diagnosed an acute empyema with a bronchopleural fistula causing persistent air leaks. Three days later, screening RT-PCR assays for COVID-19 were positive for the patient and his 5 nurses. We strictly used personal protective equipment; nevertheless, another 7 people (2 physicians and 5 nurses) associated with the patient were infected with COVID-19. The outbreak of COVID-19 in our hospital was thought to be related to aerosols produced by the chest tube with air leaks. For the outbreak, we could not rule out accidental hospital-acquired infection or community-acquired infection.

Further research is required to determine whether chest tubes with air leaks are a source of infectious aerosols. However, we clinicians should be attentive to the risk of nosocomial infection with COVID-19 due to chest tubes. To prevent aerosols, closing the safety valve of a suction system is proposed.[3] It is important to note that the intrathoracic pressure will increase and tension pneumothorax may occur if the suction system is switched off with the valve closed.

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Cautious handling of urine from moderate to severe COVID-19 patients

To the Editor,

Since December 2019, coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-