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Commentary—Aerosolization From Chest Drainage Systems in Patients With Air Leak: Risk of Viral Spreading in the Hospital and Community

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Air leak from the lung may represent a potential source of viral spreading through the generation of aerosolized particles in the environment. Approximately 30%—40% of patients have some degree of air leak immediately after surgery and 10%—15% of all patients following lung resection will develop a prolonged air leak which will require them to carry a chest drain for a long time. In many centers patients with prolonged air leak are discharged home with a chest drain in place connected to a portable system. The ongoing COVID-19 pandemic has understandably raised awareness of the possible danger of exposing health care professionals and the community to aerosolized biologic fluids such as those produced in individuals with a chest drain and an active air leakage from their lungs. While in the hospital environment strict protective measures are now adopted by health care professionals performing aerosol generating procedures, patients with conditions possibly spreading aerosolized particles may represent a hazard for other patients or the community. In this regard, the management of chest drains in patients with postoperative air leak may represent a critical issue under the current circumstances.

The study of Mustaev et al1 contributes to add to the current knowledge about safety of chest drainage systems currently in use in our operative rooms and wards. They were able to demonstrate through a basic laboratory simulation that single chamber systems are at increased risk of generating aerosols in the surrounding atmosphere in the presence of an active air leak. Three-compartment and digital systems did not appear in their simulation to generate aerosolized particles at different level of air leak volumes, fluid output and suction. Obviously, the results need to be interpreted taking into the account the limitations of the study, particularly the reproducibility of the lab model into the real-life patient care setting as aerosolization may depend by several external and variable factors which were not completely controlled in the laboratory. For this reason, it appears prudent to affirm that all current available chest drainage systems (not featuring an antiviral filter) may have the potential to generate aerosolized particles in the presence of an air leak.

The first critical phase when a patient with air leak could act as a spreader in the ward or community are during mobilization and physiotherapy, which however is an essential part of the postoperative care of lung resection patients to enhance their recovery from surgery. In many units, it is standard...
practice for patients to walk around the ward immediately after their operation, carrying their chest drainage system along. This is generally supervised by multiple health care professionals such as nurses and physiotherapists and the patient can get in contact with other patients circulating in the ward. The study from Mustaev et al. support the safety practice to organize this activity in a way to prevent the patient to wear a single chamber system while performing physical activity or mobilizing in the ward minimizing the risk of viral spreading to other patients and health care professionals.

The second critical phase in chest tube management is when they are discharged in the community with a chest drain in place. The portable systems most commonly used for outpatient chest tube care (one-way valve bags or other open systems) do not guarantee sufficient safety in terms of viral spreading. Digital systems are not licensed for outpatient care and traditional three-compartment systems are too cumbersome to be managed in an outpatient setting. This poses the dilemma on whether to manage all patients in the hospital setting until their air leaks stops and the tube is removed. However, this may increase the risk of other hospital related complications and substantially affect patient quality of life and enhanced recovery plan.

Unfortunately, there is no definitive solution which would apply to all settings and hopefully future research will lead to improved technology and safer drainage systems to overcome the current limitations unveiled by the ongoing pandemic.

The authors should be commended for conducting a very practical translational study which has the merit to inform the thoracic community and raise awareness on a very common problem in our practice.

REFERENCE
1. Mustaev M, Bille A, Hasan M, Garg S, Pontiki AA, Darwish O, Lucchese G: Simulation and measurement of aerosolisation in different chest drainage systems. Seminar Thorac Cardiovasc Surg 33:597–604, 2021