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COVID-19 Challenges

Challenges and Management in Italy and Lessons Learned, *M. Cecconi*

From Hydroxychloroquine and Remdesivir to Plasma Administration, *JL Vincent*

Adaptive Strategies for Intensive Care: The Brussels Experience, *E. De Waele et al.*

Tracheal Intubation in the ICU, *A. Higgs, M. Udberg, G. Hopkin*

An Adaptive Response, *J. Nosta*

Ultrasound in Times of COVID-19, *A. Wong, O. Olusanya, J. Wilkinson, C. McDermott*

Nutrition for Critically Ill Patients with COVID-19, *L. Chapple, K. Fetterplace, E. Ridley*

The Calm Before the Storm, *K. Naidoo, D. Kloeck, L. Mathivha*

Personal Experience: 66 days in Wuhan, *C. Wang*

Masks in Intensive Care Units, *A. Cornejo, A. Cunha*

History of Pandemics, *J. Poole*

What COVID-19 Has Taught Me, *A. Wong*

Intensive Care in the Coronavirus Era: Collective Intelligence, *H. Ksouri, S. Doll, G. Carrel, L. Hergafi, G. Sridharan*

Thoughts on COVID-19, *M. Malbrain, S. Ho, A. Wong*

Overview of Nurse Assessment, *C. Nicole*

Immersive Virtual Reality in the Intensive Care Unit, *C. Lynch, G. Jones*

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Continuous Monitoring of Urine Flow in COVID-19 and Other Critical Care Patients: Why and How

Acute Kidney Injury (AKI) develops in over 55% of ICU patients patients (Hoste et al. 2015). As infections and the need for mechanical ventilation are known to be among the high-risk factors for the development of AKI (Bellomo et al. 2017), the incidence may be even higher in the COVID-19 era.

For ICU patients with COVID-19 or other complex conditions, essential physiological functions such as cardiac output, respiration rate, blood pressure, body temperature, and blood gases are routinely electronically monitored and displayed around the clock, alerting the staff of irregularities and enabling them to provide minute-by-minute, life-saving care. However, despite the fact that real-time urine monitoring can provide critical information regarding impaired renal function and/or fluid balance (Kaddourah et al. 2017), urine output is still being recorded manually and intermittently.

The importance of continuous urine flow monitoring for AKI and fluid management in critically ill patients has been emphasized by leading nephrologists and critical care experts. In a retrospective study of close to 16,000 ICU patients, intensive monitoring of urine output (UO) was associated with improved detection of AKI and reduced 30-day mortality in patients experiencing AKI, as well as less fluid overload for all patients (Jin et al. 2017).

Manual urine flow measurements are time-consuming, requiring manipulation of urine meters, visual assessment and painstaking data recording. These difficulties in measuring, monitoring and accurately recording urine output bring into question the reliability of urine bag readings, in terms of frequency, regularity, and accuracy (Macedo 2015).

The availability of electronic, real-time urine flow information can facilitate early AKI risk assessment, staging and early intervention, as well as improved monitoring of fluid balance and assessment of response to diuretics in patients with fluid overload.

In addition, "no-contact" data transmission can reduce the risk of cross-infection for COVID-19 and other ICU patients in isolation.

With a urine monitoring system like the Clarity RMS® by RenalSense, real-time urine flow data and notifications of fluctuations are automatically transmitted to the medical staff on a 24/7 basis, similarly to other vital signs, providing an early sign of acute kidney injury (AKI) risk and facilitating rapid intervention. This enhances monitoring of treatment efficacy and management of fluid balance. The system's patented electronic sensor can be used with any existing, indwelling Foley catheter, and patient data is displayed graphically on a cordless, battery-operated bedside monitor. It is currently in use in leading medical institutions in the US and Europe. ■

References

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