

COVID-19 and Clarity RMS[®]

ABSTRACT

The Coronavirus (COVID-19) pandemic is presenting unique challenges to clinical healthcare providers, health systems and patients. Challenges that include logistical issues, managing patients with the disease, stopping the spread, prioritizing those with comorbidities and preexisting conditions and protecting hospital teams from exposure. Emerging data on the COVID-19 disease has revealed that kidney involvement appears to be recurrent in coronavirus-infected individuals. This review discusses the importance of the Sensor based, electronic urine output monitoring system, by RenalSense, which provides new value among patients in isolation and managing comorbidities.

PATIENTS IN ISOLATION

In hospitals around the world, various forms of isolation have been implemented to reduce the spread of COVID-19. These techniques include avoiding contact with blood and other body fluids. These precautions also serve to reduce the risk of transmission of infectious agents between patient and healthcare worker (which is relatively high in COVID19), even if presence of an infectious agent is not apparent. Monitoring urine output in patients has historically been a manual process that requires direct contact with them and is not captured remotely. Systematically monitoring urine output requires hospital staff (nursing) to contact the patient's bed, get low to the floor, manipulate the tubing from the patients Foley catheter, force urine from the tubing into the container, and then try to accurately assess the volume – a laborious and high exposure method for contamination in general, especially in COVID-19 patients.

That is unless the hospital has adopted a unique approach to monitoring a patient's urine flow, one that eliminates this near-proximity, manual and time-consuming process. With novel electronic, urine-monitoring systems like the Clarity RMS[®] from RenalSense, a monitoring system that continuously measures urine flow, automatically transmitting to the medical staff real-time data, and notifications of fluctuations, on a 24/7 basis, the hospital staff has peace of mind knowing the patients urine flow is being captured on the hour and tracked electronically. This

information, which reflects changes in renal function, provides an early sign of acute kidney injury (AKI) risk and facilitates rapid intervention. In addition, it is invaluable for monitoring treatment efficacy and managing fluid balance.

Once the patient is connected, the hospital staff can monitor urine output of a patient at a distance - a very useful tool for the isolation room. The technology limits the number of times that staff needs to go into an isolation room that maintains an infected patient and allows them to view the graphically trended urine output remotely – this alerts them automatically that a patient’s urine output has dropped below accepted global standards.

Professor Hassan Khouli, Chair of the Department of Critical Care Medicine at the Cleveland Clinic, says:

“That when it comes to surveillance, the CDC states: “when transmission of epidemiologically-important organisms continues despite implementation and documented adherence to infection prevention and control strategies, obtain consultation from persons knowledgeable in infection control and healthcare epidemiology to review the situation and recommend additional measures for control”.

COVID-19 might infect people through body fluids. The World Health Organization (WHO) published a study on the contamination rate and virus survival of SARS⁽⁹⁾, (COVID-19 a close relative of SARS); the virus survival in urine is 1 to 2 days.

COMORBIDITIES

In addition to the challenges around patient isolation and ‘breaking the chain of infection’, findings around COVID-19 show that more consideration should be given to comorbidities in the treatment. COVID-19 is distinguished by symptoms⁽¹⁾ that include viral pneumonia such as fever, cough and fatigue. Many of the older patients who become severely ill have evidence of underlying illnesses. These illnesses include kidney disease. These patients often die of their original comorbidities. This tells us that accurately evaluating all original comorbidities of individuals with COVID-19 is important.

COVID-19 may also cause damage to organ systems such as the blood and the immune system. Patients can eventually succumb to multiple organ, heart and renal failure as well as other respiratory conditions. Devices that can aid in the early detection of renal failure can help manage mortality rates related to COVID-19.

According to recent research accomplished by the European Renal Association – European Dialysis and Transplant Association (ERA-EDTA), Proteinuria (and/or blood in urine) often occurs at the beginning or during the coronavirus infection; a few patients even develop AKI. This shows that COVID-19 also attacks the kidneys. Given the involvement of the kidneys during coronavirus infection, patients should also be monitored after the disease.

Professor Carmine Zoccali, President of the ERA-EDTA (Parma, Italy) says

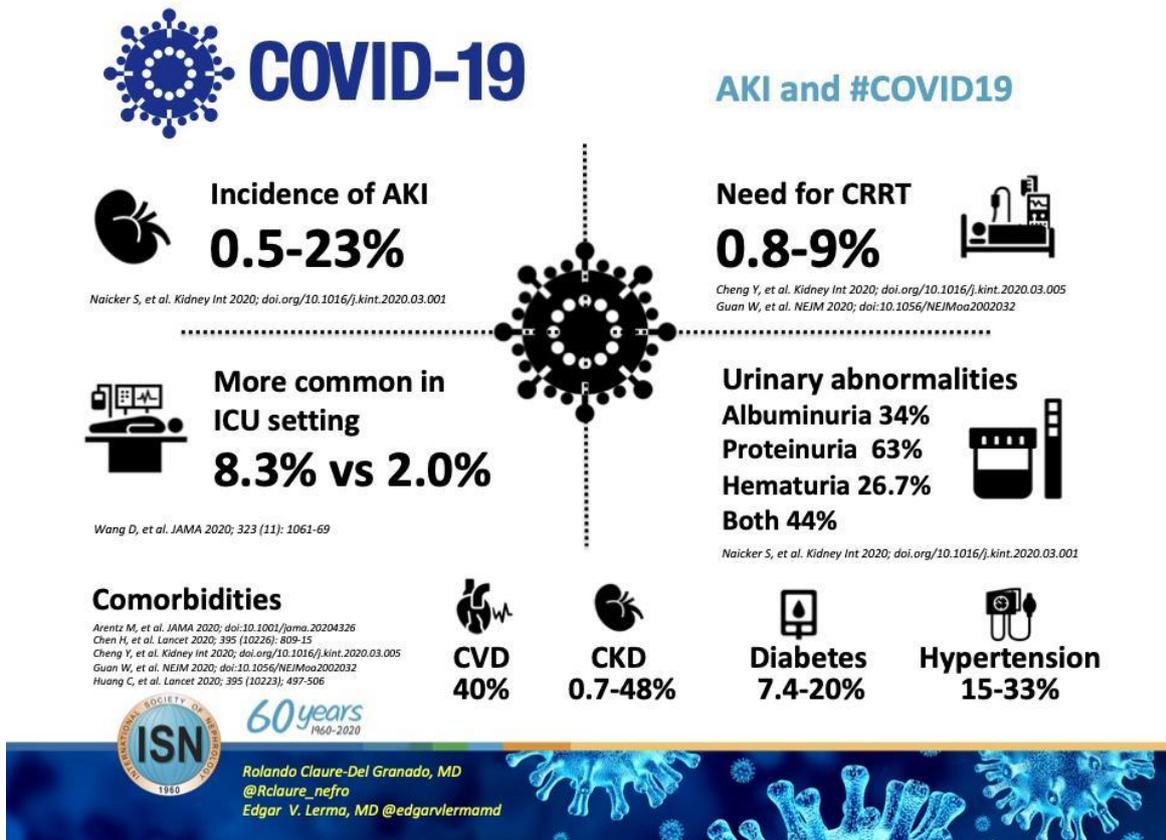
“COVID-19 also attacks the kidneys, not just the lungs. Although the percentage of overall group of COVID-19 infected patients that develop AKI during infection is rather low (about 3-9 percent), we have to keep in mind that these patients obviously have a poor prognosis. These patients should be treated in accordance with best-practice guidelines in nephrology, which includes supportive management as well as dialysis,” opined “

A recent study from Wuhan ⁽²⁾ shows that AKI is a severe symptom after coronavirus infection, the incidence of which is second only to respiratory system injuries ⁽³⁾. AKI may be infringed by synergistic assaults from the virus-induced cytopathic effect and systemic inflammatory response, especially in severe patients. Therefore, we need to closely monitor renal function in patients with COVID-19 and take early clinical interventions. It was reported that 8.3-23% patients with ICU care were infringed by AKI during COVID-19 ^(5, 6)

Another study show Kidney impairment is associated with in-hospital death of COVID-19 patients ⁽⁷⁾. Clinicians should increase their awareness of kidney impairment in hospitalized COVID-19 patients.

When AKI accompanies pneumonia, post discharge outcomes are worse than either diagnosis alone. Patients who survive a pneumonia hospitalization and develop AKI are at high risk for major adverse kidney events including death and should receive careful follow-up ⁽⁸⁾. The virus attack the lungs and therefore the fluid management of these patients are highly important! Edema vs dehydration states on respiration

machines is a very delicate treatment. Therefore, it is highly important to record urine flow-rates accurately and continuously.



CONCLUSION

There are inherent challenges when caring for patients in isolation and those challenges include basic healthcare procedures including monitoring a patients' vitals. Urine output is a measurement that is monitored and documented every hour in a hospital ICU. Monitoring urine output can be a challenge in an isolated patient, requiring healthcare workers to get within close proximity to the patient. The Clarity RMS[®] from RenalSense allows for distance monitoring of urine flow of patients in isolation, thus reducing the staff exposure.

The overall incidence of AKI in the ICU is approximately 50% and can have a mortality over 50%. Kidney disease is an underlying illness for those with severe cases of COVID-19 with renal failure increasing mortality rates.

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