ART MEDICAL
PATIENT SAFETY TECHNOLOGY

Acute Kidney Injury (AKI) in ICU Patients

The Challenge

Timely urine output analysis is crucial for the prevention of acute kidney injury (AKI) which often results in longer hospital stays and increased mortality rates among ICU patients.

Studies have shown that mortality is significantly higher in AKI patients (27 % vs. 6%), as is their length of stay (3-10 days vs. 2-6 days) [1][2]

Studies indicate that patient mortality is not a result of AKI with comorbidities but that in fact, AKI is the primary cause. [1]

50%
of ICU patients will have one stage of AKI after 24 hours [2]

Adding urine output criteria to AKI detection methods has been found to detect AKI on average 11h earlier than serum creatinine criteria alone [3]

Current Solutions

Ideally, urine output should be checked once per hour. However, manual observations and documentation are often not carried out frequently enough due to heavy workloads and lack of time.

Manual observation is often inaccurate

AKI is classified in stages of severity for severity according to the following criteria:

Stage	Serum creatinine	Urine output
1	1.5-1.9 times baseline **OR** >0.3 mg/dl (≥ 26.5 µmol/l) increase	< 0.5 ml/kg/h for 6-12 hours
2	2.0-2.9 time baseline	< 0.5 ml/kg/h for ≥ 12 hours
3	3.0 times baseline **OR** Increase in serum creatinine to ≥ 4.0 mg/dl (≥353.6 µmol/l) **OR** Initiation of renal replacement therapy **OR**, In patient < 18 years, decrease in eGFR to < 35 ml/min per 1.73 m²	< 0.3 ml/kg/h for ≥ 24 hours **OR** Anuria for ≥ 12 hours

International Society of Nephrology (KDIGO Guidelines)

References

1. Mark E. Thomas, Caroline Blaine, Anne Dawnay. The definition of acute kidney injury and its use in practice. Society of Nephrology, 2014.
2. Xuying Luo, Li Jiang, Bin Du. A comparison of different diagnostic criteria of acute kidney injury in critically ill patients. Critical Care, 2014.
3. J. Koeze, F. Keus, W. Dieperink. Incidence, timing and outcome of AKI in critically ill patients varies with the definition used and the addition of urine output criteria. BMC Nephrology, 2017.

Not Available for Sale in the United States

smART+™ Platform

Automatically & Continuously Monitors Urine Flow

Abnormalities in flow rate, such as a future increase or decrease in urine output, are predicted in real-time, and alerts based on the KDIGO guidelines are issued to the medical staff before kidney function can deteriorate to critical levels.

smART+™ Console
A nutrition management system and optimal feeding plan to achieve 100% feeding efficiency

smART+™ Metabolism
Continuous Resting Energy Expenditure (REE) measurement

smART+™ Sensor - based feeding tube
Detection of gastric reflux and reduction of aspiration

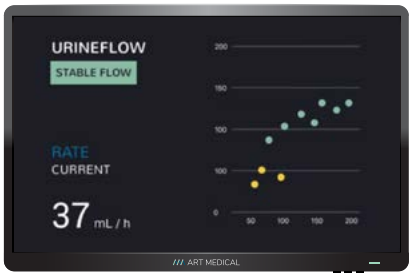
smART+™ Hub
Dynamic, real-time micro-residual evacuation

smART+™ urineFlow
Real-time urine flow monitoring and trend prediction

smART+™ helps reduce VAP/VAE using automatic reflux detection, which reduces aspiration and related serious complications.

smART+™ assists in detecting all stages of AKI as early as possible.

Monitors urine flow, detects abnormalities and provides real-time reports and alarms



Predicts low urine output that indicates potential AKI

Detects urine output trends

Alerts medical personnel to consider taking action

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