Acute Kidney Injury (AKI) is Prevalent, Costly and Deadly

INCIDENCE

- 7-18% of hospitalized patients.[5]
- 300,000 people die each year from AKI in the US.[5]
- Up to **50% of critically ill patients** develop some stage of AKI.[6]

MORBIDITY & MORTALITY

- **9-times higher risk** of development of Chronic Kidney Disease.[7]
- **2-times higher risk** of premature death.[7]
- In Europe, the **mortality rate** for AKI ranges from **17.2 to 26.1%**.[8]

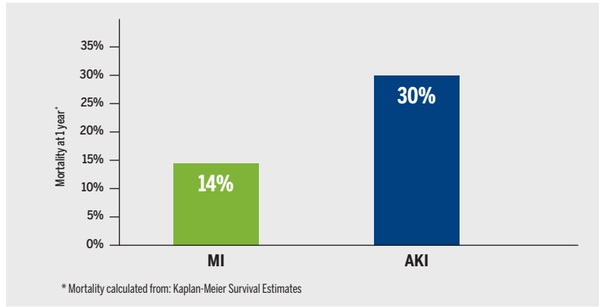
COST

- Estimated annual costs to **US** healthcare system attributable to hospital-acquired AKI is **> $10 billion**.[9]
- In the **UK**: "The annual AKI-related cost is estimated as **€1.12 billion per year**".[10]
- Length of stay increase between 1.1 days and 3.2 days.[11]

For a typical 400-bed community hospital, the incremental resources consumed by AKI in the ICU often exceed $20M and 8,500 bed days annually.[12]

AKI is potentially worse for an individual than a myocardial infarction

A study of over 36,000 hospitalized veterans demonstrated that patients who developed AKI without myocardial infarction (MI) had a higher mortality than those who suffered a MI without developing AKI.[13]

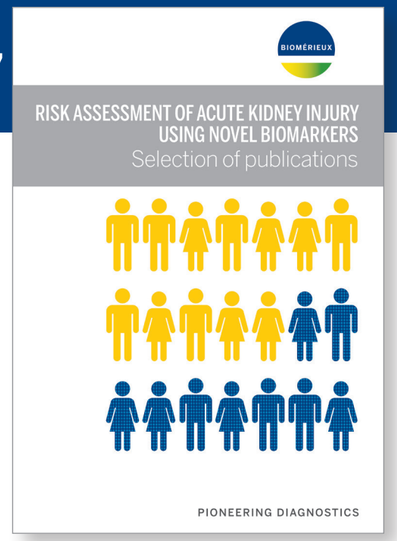


* Mortality calculated from: Kaplan-Meier Survival Estimates

AKI is twice as deadly as a myocardial infarction (MI)

BIOMÉRIEUX

You might also be interested in a Selection of Publications on the "risk assessment of Acute Kidney Injury using novel biomarkers"



Contact your local bioMérieux representative for any further information

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AKI: Acute Kidney Injury

Acute Kidney Injury (AKI),

is an abrupt loss of kidney function that develops within 7 days.[1]

It was previously known as Acute Renal Failure.[2]
It is a global public health concern impacting

~13.3 million patients per year.[3]

Etiology of AKI in the ICU

FIVE MOST COMMON CAUSES OF AKI IN THE ICU[4]

- Sepsis
- Major surgery
- Low cardiac output
- Hypovolemia
- Nephrotoxic Medications
  - Antimicrobials
  - Angiotensin-converting-enzyme inhibitor
  - Angiotensin II receptor blockers
  - Radiocontrast dye
  - Chemotherapeutic agents

OTHER COMMON CAUSES OF AKI IN THE ICU

- Hepato-renal syndrome
- Trauma
- Cardiopulmonary bypass
- Abdominal compartment syndrome
- Rhabdomyolysis
- Obstruction

Recommended management of AKI

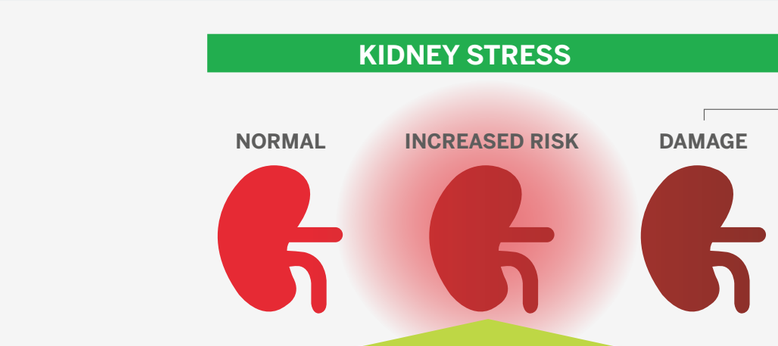
KDIGO Consensus Guideline for AKI

	AKI Stage		
High Risk	Stage 1	Stage 2	Stage 3
Discontinue all nephrotoxic agents when possible			
Ensure volume status and perfusion pressure			
Consider functional hemodynamic monitoring			
Monitor serum creatinine and urine output			
Avoid hyperglycemia			
Consider alternatives to radiocontrast procedures			
	Non-invasive diagnostic workup		
	Consider invasive diagnostic workup		
		Check for changes in drug dosing	
		Consider renal remplacement therapy	
		Consider ICU admission	
			Avoid subclavian catheters if possible

Adapted from KDIGO Guidelines 2012.

KDIGO highlights that in accordance with your current practice, these particular actions could be considered when patients are at risk for AKI.

RISK ASSESSMENT OF AKI: BIOMARKERS



PREDICT AKI BEFORE DAMAGE OCCURS

NOVEL AKI BIOMARKERS: TIMP-2* & IGFBP7**

Kidney stress is a precursor of AKI.[15]

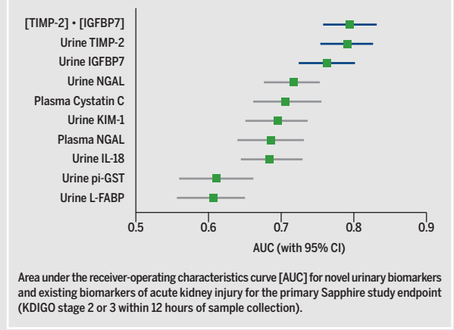
THE SAPPHIRE STUDY[16]

Rigorous discovery & validation studies performed to identify biomarkers of early AKI risk assessment

35 sites: 20 US and 15 Europe

744 patient cohort

Identify the best biomarker among **340 proteins**



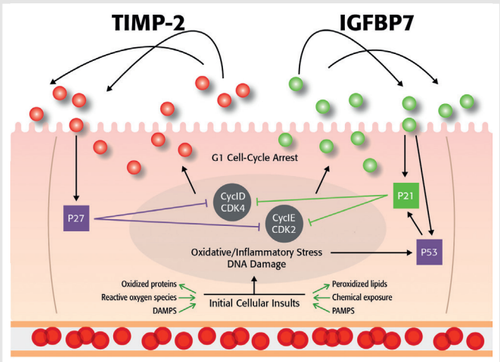
Area under the receiver-operating characteristics curve [AUC] for novel urinary biomarkers and existing biomarkers of acute kidney injury for the primary Sapphire study endpoint (KDIGO stage 2 or 3 within 12 hours of sample collection).

Urinary **IGFBP7 and TIMP-2 were the best-performing markers** in the discovery study.

TUBULAR CELL CYCLE ARREST BIOMARKERS[15]

TIMP-2 and IGFBP7 are:[17]

- **Biomarkers of cellular stress** in the early phase of tubular cell injury caused by a wide variety of insults (inflammation, ischemia, oxidative stress, drugs, and toxins)
- **Involved in G1 cell-cycle arrest** that prevents cells from dividing until damage can be repaired
- Both biomarkers appear as **"alarm" proteins** for other nearby cells



Adapted from Kellum and al.[15]

* Tissue inhibitor of metalloproteinase-2 ** Insulin-like growth factor-binding protein 7

DIAGNOSIS OF AKI: FUNCTIONAL BIOMARKERS

SYMPTOMATIC (DIAGNOSIS)
Functional Biomarkers
Serum Creatinine, Urine Output

KIDNEY DAMAGE HAS **ALREADY** OCCURRED

With **Novel Biomarkers**, you can predict kidney stress **BEFORE damage occurs**. **Serum Creatinine** and **Urine Output** are **NOT SPECIFIC to Kidney Stress.**[21]

SERUM CREATININE

- Lagging indicator[18]
- 24 – 48 hours to rise[19]
- Only elevates after 50% of kidney function lost[18]
- Non-diagnostic for up to 52% of moderate and severe AKI[20]
- Affected by non-renal factors[21]

URINE OUTPUT

- Lagging indicator[20]
- Minimum of 6 hours must pass to determine urine output[22]
- Tedious to measure[20]
- Affected by healthcare-associated infections[23]