

Electronic alerting for AKI

Dr Edward Stern
Renal Registrar
UCL/ Royal Free Hospital
Centre for Nephrology



“Acute kidney injury, mortality, length of stay and costs in hospitalized patients”

19,982 pts admitted to academic medical centre in Boston

9,205 pts with >1 creatinine results

Rise in creatinine	Hospital mortality multivariable OR	Length of stay in survivors
≥ 0.3 mg/dl	4.1	
≥ 0.5 mg/dl	6.5	+3.6 d
≥ 1.0 mg/dl	9.7	+5.8 d
≥ 2.0 mg/dl	16.4	+9.0 d

AKI as a cause of CKD

Grouping	Comparison	Outcome	# Studies	References	HR
Overall	AKI vs. no AKI	CKD	7	11,13,15,16,19,21,22	8.8
	AKI vs. no AKI	ESRD	7	10,12,14,15,17,18,20	3.1
Dose response	Mild AKI vs. no AKI	CKD	2	15,21	2.0
	Moderate AKI vs. no AKI		3	13,15,21	3.3
	Severe AKI vs. no AKI		2	11,13	28.2
	Mild AKI vs. no AKI	ESRD	4	12,14,15,18	2.3
	Moderate AKI vs. no AKI		3	12,14,15	5.0
	Severe AKI vs. no AKI		2	12,17	8.0

Coca et al, Kidney International (2012) 81, 442–448

AKI: avoidable and unrecognised

Table 4.12 Predictability/avoidability of post-admission AKI

	Avoidable	Unavoidable	Not specified	Total
Predictable	22	22	21	65
Unpredictable	-	11	7	18
Not specified	11	4	9	24
Total	33	37	37	107

Table 4.6 Advisors opinion on delays in recognition, pre- vs post-admission AKI

<u>Unacceptable delay</u>	Pre-admission (%)	Post-admission (%)	Total (%)
Yes	22 (5)	42 (43)	64 (12)
No	422 (95)	56 (57)	478 (88)
Subtotal	444	98	542
Insufficient data	13	9	22
Total	457	107	564

Aim

- Improve early recognition of AKI
- Improve awareness of the significance of small absolute creatinine rises
- Provide a gateway to standardised clinical guidance for AKI management

Pilot electronic alert in two hospitals

- University College London Hospitals: 900-bed multi-site teaching hospital in Central London
- Whittington Health: 500 bed district general hospital in North London

Electronic alerting for AKI

- Automated rule for Clinisys WinPath
- Real-time 24-hour “ Δ check”
- Inclusion: every creatinine processed in hospital lab where patient has previous creatinine result within 90 days
- If current value $\geq 150\%$ previous: automated message attached to result and fed to the clinician reporting system
- Lab staff use discretion to contact requesting clinician

UE CREATININE

Sodium		140	mmol/L	135 - 145
Potassium		4.6	mmol/L	3.5 - 5.1
Urea	*	13.3	mmol/L	2.9 - 8.2
Creatinine	*	180	umol/L	66 - 112

?AKI - creatinine increase >50%
www.londonaki.net/clinical

Whittington AKI

- 100 adult patients triggered AKI alert
- 50 days
- 25,017 creatinine requests during same period
- Aged 16-100
- 86 inpatients (including ED) /
14 outpatients

Whittington AKI

- Median time from baseline to alert 20 days (1-90)
- Mean rise in creatinine at alert 1.3 mg/dl (0.2 – 9.6)
- Actual creatinine at alert 0.5 – 11 mg/dl
- Delta creatinine 51% - 1214%
- 4/100 “false positives” (spuriously low baseline)

Whittington results

	AKI I	AKI II	AKI III
Number	56	29	15
ITU admission	2	1	4
90 day mortality	5 (9%)	8 (28%)	2 (13%)

What next...

- Standardised electronic alert now live across 5 hospitals in North Central London
- Standardised response in hospital:
critical care outreach for AKI 3?
- Standardised response for GPs:
how often should they monitor creatinine after an episode of AKI?
- Extending the alert system across London

Thanks to my co-authors...

- Clinical biochemists UCLH (Anne Dawnay) and Whittington (Rebecca Edwards)
- Dr Mark Harber at the Whittington
- Dr Chris Laing at RFH / London AKI Network