Risk prediction for acute kidney injury in acute medical admissions in the UK: The RISK study RiSK Kidney)ResearchUK

The RISK Study investigators

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BACKGROUND

- Hospital-acquired acute kidney injury (h-AKI) occurs in up to 1 in 5 hospital admissions ¹
- Even minor increases in serum creatinine (SCr) are associated with increased mortality and length of stay ^{2,3}
- Identifying those at risk of h-AKI could enable targeted prevention strategies
- Few risk models have been developed in the general medical

STUDY DESIGN

- Prospective multi-centre cohort study
- Patients presenting to Acute Medical Units over a 24-hour period
- Data collected were generated as part of routine care and were recorded on admission up until discharge or a maximum of 7 days
- Primary outcome: the development of h-AKI (KDIGO stages 1-3)
 - h-AKI = AKI occurring after the first 24-hours of admission



ADMISSION DATA

- **Observations**: blood pressure; pulse rate; respiratory rate; oxygen saturations; FiO2; AVPU score
- Bedside monitoring: CBG; urine dip; 6-hour urine output
- Arterial blood gas: pO2; pCO2; pH; bicarbonate; lactate; base excess
- Blood tests: Haemoglobin; red cell distribution width; white cell count; lymphocytes; neutrophils; platelets; sodium; urea; potassium; creatinine; corrected calcium; phosphate; magnesium; chloride; urate; bilirubin; AST; ALT: GGT: albumin: ammonia: INR; CRP; troponin; BNP; d-

Age (years)

dimer; CK

COHORT SELECTION



ANALYSIS

- Univariate and multivariate logistical regression models
- Backwards stepwise regression used to select variables for the multivariate analysis, that included all variables with a p-value of < 0.2 on univariate analysis

Univariate analysis: factors predictive of h-AKI

Variable	Category/term	OR (95% CI)	P-value
Age (10 year increase)	-	1.16 (1.03, 1.31)	0.02
Diuretic	No Yes	1 2.93 (1.91, 4.51)	<0.001
Other antihypertensive	No Yes	1 1.77 (1.16, 2.71)	0.008
Established proteinuria	No Yes Unknown	1 2.46 (1.08, 5.63) 0.91 (0.57, 1.46)	0.04
CKD	Stage 1-2 Stage 3-5	1 3.34 (2.13, 5.22)	<0.001
CVD	No Yes	1 2.06 (1.35, 3.17)	0.001

Multivariate model: factors predictive of h-AKI

Variable	Category/term	OR (95% CI)	P-value
Diuretic	No Yes	1 2.61 (1.66, 4.11)	<0.001
CKD	Stage 1-2 Stage 3-5 Unknown	1 2.73 (1.70, 4.38) 1.19 (0.44, 3.18)	<0.001
Bilirubin	≤ 17 ug/L >17 ug/L Not done	1 1.97 (1.18, 3.29) 1.71 (0.89, 3.28)	0.02
Haemoglobin	Normal Abnormal	1 1.67 (1.06, 2.62)	0.03





CONCLUSIONS

- The RISK dataset allows the development of a simple clinical risk score for AMU admissions, although further refinement and validation is necessary
- Risk assessment at 24-hours post-admission may be appropriate given the significant numbers who do not have a follow-up creatinine
- The proposed model could be employed alongside complementary strategies to improve performance (e.g. AKI biomarkers)

For a full list of RISK Study investigators visit: www.kidneyresearchuk.org/research/the-risk-study

1. Wang et al., Am J Nephrol, 2012; 35:349-55. 2. Chertow et al., JASN, 2005; 16:3365-70. 3. Coca et al., Am J Kidney Dis, 2007; 50:712-20.



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AUROC = 0.72

1.00