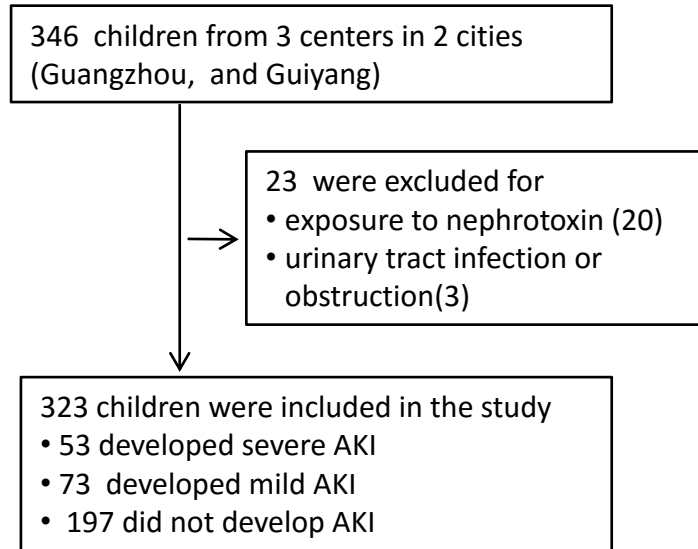
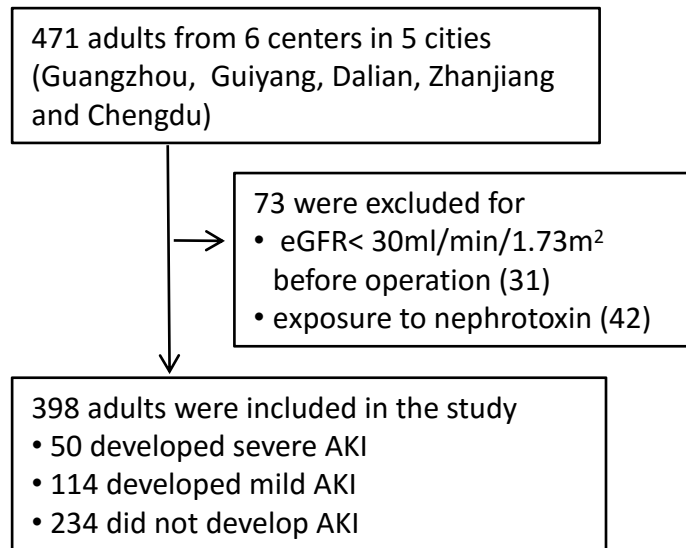


Supplementary Figure 1. Flow chart of enrollment of the study participants

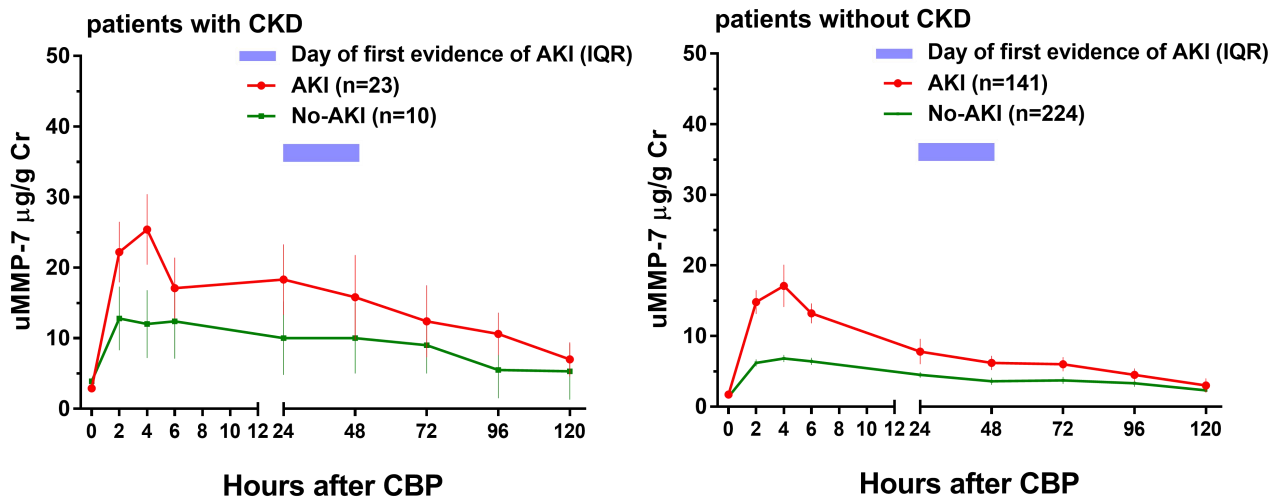
Test set (pediatric cohort)



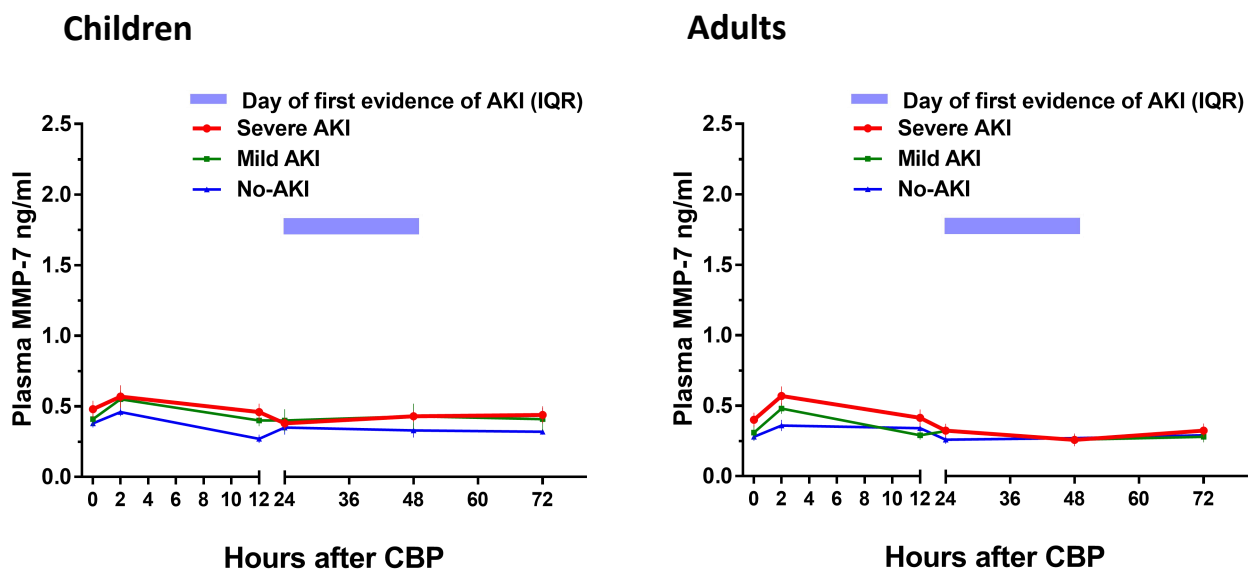
Validation set (adult cohort)



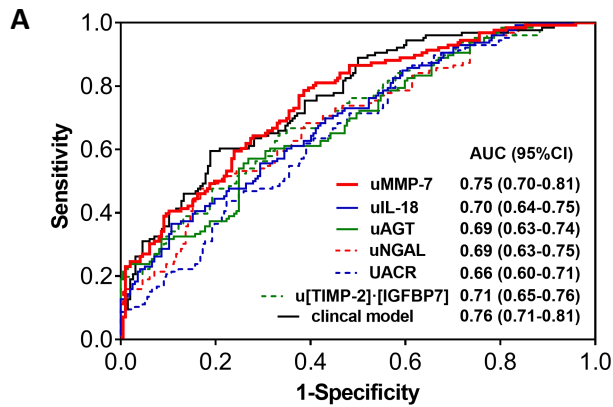
Supplementary Figure 2. uMMP-7 levels pre- and post- cardiac surgery in adult patients with or without preexisting CKD



Supplementary Figure 3. Plasma MMP-7 levels pre- and post- cardiac surgery in pediatric and adult patients

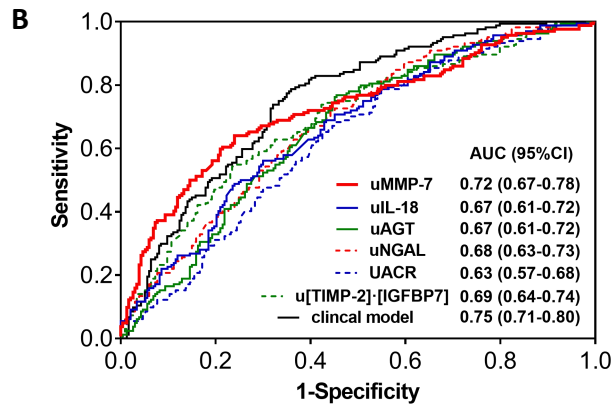


Supplementary Figure 4. ROC analyses of uMMP-7 and other urinary biomarkers for predicting AKI



Predicting AKI in children after cardiac surgery

Marker	Best cutoff	Sensitivity	Specificity
uMMP-7, $\mu\text{g/g Cr}$	6.3	0.81	0.59
uIL-18, ng/g Cr	794	0.79	0.45
uAGT, $\mu\text{g/g Cr}$	588	0.79	0.45
uNGAL, $\mu\text{g/g Cr}$	125	0.79	0.42
UACR, mg/g Cr	126	0.79	0.43
u[TIMP-2]:[IGFBP7], $(\mu\text{g/g Cr})^2$	21601	0.79	0.46

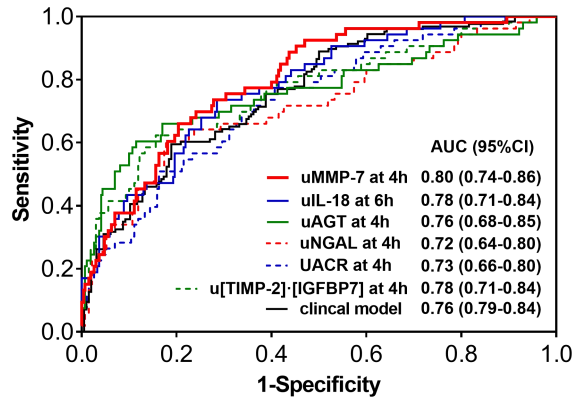


Predicting AKI in adults after cardiac surgery

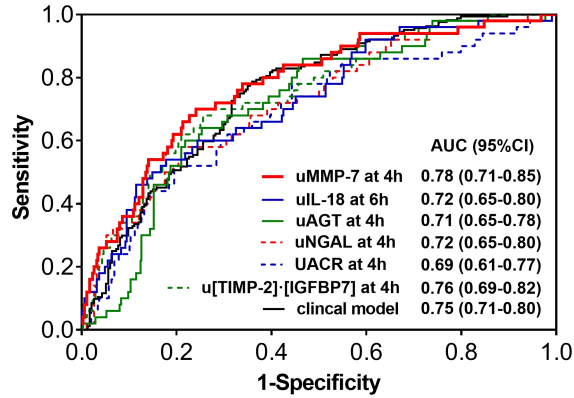
Marker	Best cutoff	Sensitivity	Specificity
uMMP-7, $\mu\text{g/g Cr}$	4.7	0.79	0.45
uIL-18, ng/g Cr	316	0.78	0.44
uAGT, $\mu\text{g/g Cr}$	339	0.78	0.43
uNGAL, $\mu\text{g/g Cr}$	63	0.77	0.50
UACR, mg/g Cr	50	0.77	0.44
u[TIMP-2]:[IGFBP7], $(\mu\text{g/g Cr})^2$	2448	0.78	0.48

Supplementary Figure 5. ROC analyses of uMMP-7 and other urinary biomarkers for predicting severe AKI at the best timepoint within the first 6 hours in children (A) and adults (B)

A



B



Supplementary Table 1. Multivariate logistic regression analyses of uMMP-7 for predicting AKI (KDIGO stage 1 to 3) after cardiac surgery ^a

uMMP-7 (µg/g Cr)	AKI ^b (%)	Unadjusted OR (95%CI)	P for trend	Adjusted OR ^c (95%CI)	P for trend
Pediatric cohort (n=323)					
Quintile 1 (<3.6)	14.1	1.0 (referent)	<0.001	1.0 (referent)	<0.001
Quintile 2 (3.6-6.6)	22.1	1.7 (0.7-4.3)		2.0 (0.7-5.7)	
Quintile 3 (6.7-11.6)	40.3	4.1 (1.7-9.8)		2.9 (1.1-8.4)	
Quintile 4 (11.7-22.6)	48.5	5.7 (2.4-13.5)		8.0 (2.7-23.9)	
Quintile 5 (>22.6)	71.4	15.3 (6.3-37.3)		32.2 (9.5-108.8)	
Adult cohort (n=398)					
Quintile 1 (<3.2)	22.8	1.0 (referent)	<0.001	1.0 (referent)	<0.001
Quintile 2 (3.2-5.2)	26.3	1.2 (0.6-2.5)		1.0 (0.4-2.1)	
Quintile 3 (5.3-7.7)	28.8	1.4 (0.7-2.8)		1.1 (0.5-2.4)	
Quintile 4 (7.8-15.2)	51.3	3.6 (1.8-7.1)		2.6 (1.2-5.7)	
Quintile 5 (>15.2)	77.2	11.4 (5.5-24.1)		7.7 (3.2-18.3)	

^a uMMP-7 expressed as the mean levels within the first 6 hours after CBP.

^b AKI is defined as an increase in the serum creatinine level to ≥ 0.3 mg/dl within 48 hours or $\geq 50\%$ in 7 days.¹

^c In children, adjusted for age, preoperative eGFR, preoperative UACR, RACHS-1 ≥ 3 , CPB time >120min and sites;² in adults, adjusted for age, gender, diabetes, hypertension, preoperative eGFR, preoperative UACR, preoperative serum albumin, CPB time >120min and sites.³

Abbreviations: uMMP-7, urinary matrix metalloproteinase-7; OR, odds ratio, CI, confidence interval.

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Supplementary Table 2. AUC and other variables in adult patients with or without preexisting CKD

Variables	eGFR before operation (ml/min/1.73m ²)		P
	30-59 (n=33)	≥60 (n=365)	
Age, year	57.2±10.8	45.2±15.1	<0.001
Male, n (%)	24 (72.7)	146 (40.0)	<0.001
Preexisting clinical conditions			
Diabetes, n (%)	6 (18.2)	14 (3.8)	<0.001
Hypertension, n (%)	13 (39.4)	56 (15.3)	<0.001
Preoperative characteristics			
eGFR, ml/min per 1.73 m ² ^a	50.3±8.5	97.5±20.5	<0.001
UACR, mg/g Cr	56 (12-119)	13 (6-36)	<0.001
Serum creatinine, μmol/L	130.8±31.7	71.6±16.1	<0.001
Serum albumin, g/L	35.3±4.8	38.9±5.2	<0.001
Prediction severe AKI ^b by uMMP-7			
AUC (95%CI)	0.72 (0.54-0.90)	0.77 (0.69-0.85)	
Best cutoff (μg/g Cr)	16.9	7.6	
Sensitivity	0.64	0.78	
Specificity	0.84	0.66	

^a eGFR was determined by the Chronic Kidney Disease Epidemiology Collaboration equation (2009).

^b Severe AKI was defined as an increase in serum creatinine level to ≥2.0 times baseline or acute dialysis.

Supplementary Table 3. Mean levels of uMMP-7 within the first 6h post CBP in patients who left the hospital with or without resolution of AKI

	Renal function at discharge in survivors	
	AKI recovered	AKI unrecovered
Children		
Patients number	102	17
Hospital stay, day	18 (13-24)	19 (8-34)
Serum creatinine at discharge, $\mu\text{mol/L}$	25.2 \pm 24.7	35.5 \pm 16.6
uMMP-7 within the first 6h post CBP, $\mu\text{g/g Cr}$	13.4 (6.6-24.0)	22.0 (9.3-48.1)
Adults		
Patients number	136	23
Hospital stay, day	25 (19-34)	23 (18-34)
Serum creatinine at discharge, $\mu\text{mol/L}$	77.1 \pm 22.3	189.5.1 \pm 60.8
uMMP-7 within the first 6h post CBP, $\mu\text{g/g Cr}$	9.7(4.7-18.7)	17.7 (12.4-33.0)