

Supplemental Material

Supplemental Table 1. Detailed description of exclusion criteria.

Supplemental Figure 1. Study visit outline and procedures.

The figure describes the overall study visit outline and procedures.

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Supplemental Figure 2. Dot plots of CKD and hypertension status at each follow-up visit, stratified by patients with *vs.* without the outcome at the 3-month follow-up visit.

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Supplemental Table 1. Detailed description of exclusion criteria.

Preoperative AKI could not be reliably excluded.

Clinical signs of acute urinary tract obstruction, glomerulonephritis or hepatorenal syndrome.

Nephrotoxic drugs administered pre-operatively (e.g., aminoglycosides, amphotericin) or intravenous contrast administration within 48 hours preceding cardiac surgery.

Estimated glomerular filtration rate (eGFR) < 15 ml/min/1.73m² or treated with chronic dialysis.

Past solid organ or hematopoietic transplant.

Metastatic or systemic cancer receiving active treatment.

Insertion of left ventricular assist device.

Acute infective endocarditis.

Predicted survival ≤ 12 months as determined by treating physicians or site investigator.

Died prior to the 3-month visit.

Hospitalized ≥ 90 days (thus unable to perform the 3 month post-discharge study visit).

Kidney failure at the 3-month visit.

Enrolled in another study which might affect measurements or outcomes of this study.

Pregnancy or breastfeeding.

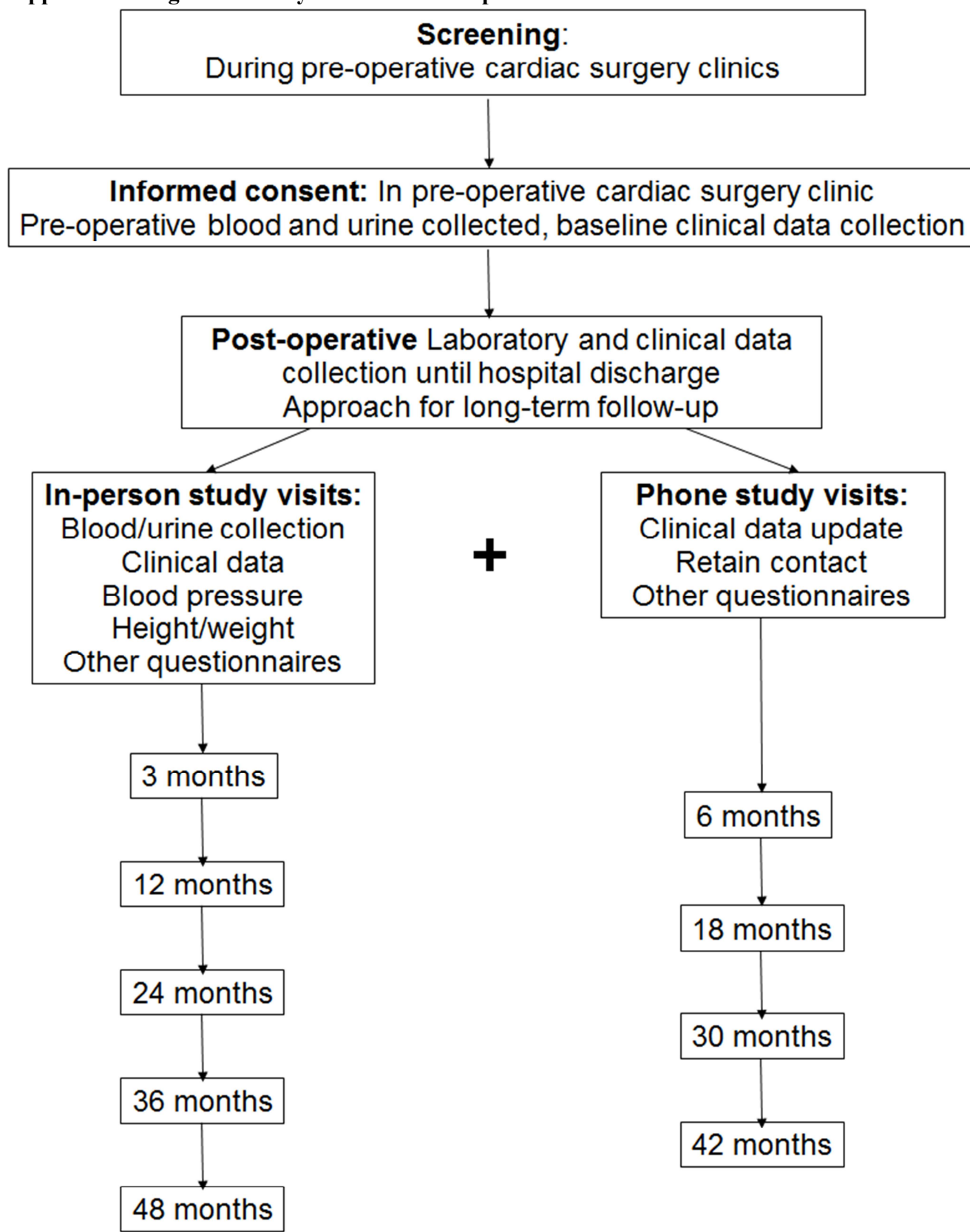
Incarcerated, institutionalized or otherwise unable to participate in the study within a home, community or clinical setting.

Inability to provide informed consent or assent.

Unable to provide ≥ 1.6 mL of urine for diaper wearers or 5 mL of urine for non-diaper wearers at the 3 and 12-month visits.

Unable to provide ≥ 0.175 mL of plasma at the 12-month visit.

Supplemental Figure 1. Study visit outline and procedures.



Supplemental Table 2. Baseline/post-operative characteristics and outcome prevalence rates by participating center.

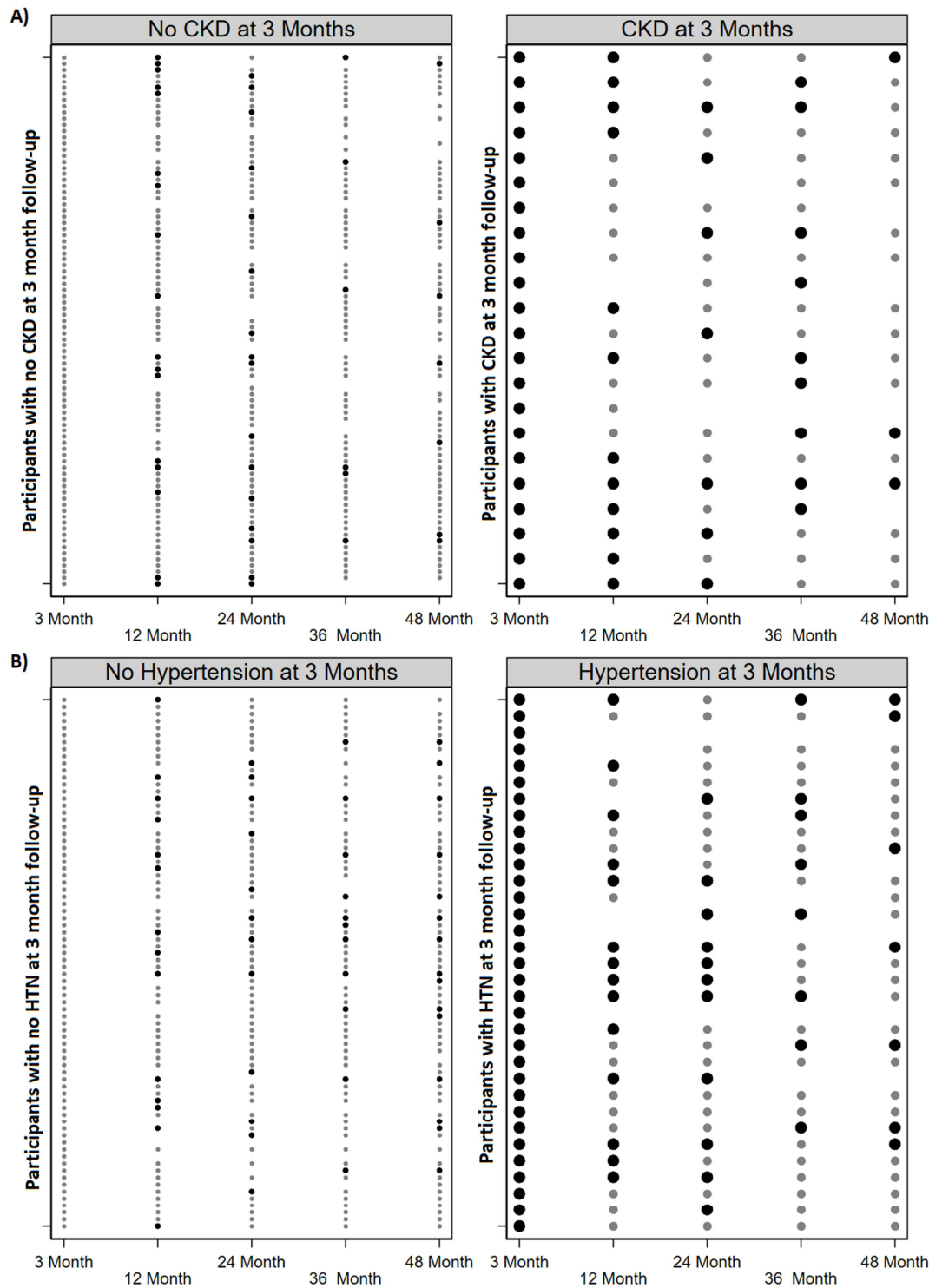
Characteristic	CCHMC (n=41)	Montreal (n=83)
<i>Demographic</i>		
Age at surgery (months)	12.0 (4.8, 61.2)	18.0 (4.8, 110.4)
Male sex	17 (41%)	47 (57%)
Non-white	8 (20%)	8 (10%)
<i>Pre-operative characteristics and medication</i>		
Cyanotic heart disease	19 (46%)	12 (14%)
Previous heart surgery	20 (49%)	32 (39%)
Prematurity ^a	7/40 (18%)	15/81 (19%)
Any non-renal comorbidity	26 (63%)	46 (55%)
ACE inhibitors	10 (24%)	1 (1%)
Diuretics	16 (39%)	19 (23%)
Aspirin or NSAIDS	10 (24%)	7 (8%)
<i>Pre-operative renal characteristics</i>		
eGFR (mL/min/1.73m ²)	107 (94, 119)	125 (104, 153)
Identifiable renal comorbidity ^a	2/40 (5%)	6 (7%)
<i>Post-operative renal characteristics</i>		
RACHS-1 surgical severity score ≥ 3	21 (51%)	39 (47%)
Aminoglycosides	2 (5%)	13 (16%)
NSAIDs	37 (90%)	20 (24%)
Aspirin	12 (29%)	10 (12%)
ACE inhibitors or ARB's	9 (22%)	6 (7%)
Diuretics	39 (95%)	77 (93%)
Vasopressors	22 (54%)	56 (67%)
Complications	10 (24%)	77 (93%)
Invasive mechanical ventilation ≥ 2 days	3 (7%)	20 (24%)
Renal replacement therapy	1 (2%)	0 (0%)
ICU length of stay (days)	3 (2, 4)	4 (3, 6)
Hospital length of stay (days)	6 (5, 10)	8 (6, 12)
<i>Outcomes^a</i>		
AKI	15 (37%)	42 (51%)
AKI Stage 2 or worse	6 (15%)	22 (27%)
3 Month CKD	6/35 (17%)	16/74 (22%)
3 Month hypertension	12/36 (33%)	21/73 (29%)
3 Month hypertension and/or CKD	17/36 (47%)	34/69 (49%)

12 Month CKD	11/31 (35%)	21/79 (27%)
12 Month hypertension	9/30 (30%)	23/72 (32%)
12 Month hypertension and/or CKD	17/31 (55%)	33/73 (45%)
24 Month CKD	7/31 (23%)	17/73 (23%)
24 Month hypertension	9/33 (27%)	19/73 (26%)
24 Month hypertension and/or CKD	15/30 (50%)	30/70 (43%)
36 Month CKD	8/28 (29%)	10/70 (14%)
36 Month hypertension	8/29 (28%)	13/71 (18%)
36 Month hypertension and/or CKD	15/28 (54%)	20/66 (30%)
48 Month CKD	7/27 (26%)	9/69 (13%)
48 Month hypertension	6/32 (19%)	17/71 (24%)
48 Month hypertension and/or CKD	12/28 (43%)	22/69 (32%)

Continuous variables expressed as median (interquartile range).

^aOne or more missing values, specified by denominator.

Supplemental Figure 2. Dot plots of CKD and hypertension status at each follow-up visits, stratified by patients with vs. without the outcome at the 3-month follow-up visit.



Legend: Panel A) CKD outcome. Panel B) Hypertension outcome. Left- and right-side graphics are patients without and with the 3-month outcome, respectively. Each row of dots represents an individual participant. Black dots: participant has the outcome. Gray dots: participant does not have the outcome. Abbreviations: CKD: chronic kidney disease; HTN: hypertension.

Supplemental Table 3. Distribution of eGFR and of UACR in participants without and with CKD at each follow-up visit.

	3 month	12 month	24 month	36 month	48 month
Estimated glomerular filtration rate (eGFR) ml/min/1.73m², median (min, max)					
No CKD	125 (69, 210)	122 (85, 230)	120 (90, 202)	122 (90, 175)	120 (90, 187)
With CKD	126 (73, 211)	123 (80, 220)	128 (77, 192)	113 (69, 194)	115 (77, 156)
Albumin to creatinine ratio (UACR) (mg/g), median (min, max)					
No CKD	16.05 (0.07, 69.23)	12.25 (0.04, 74.07)	11.11 (0.03, 28.89)	9.39 (0.04, 27.14)	9.23 (0.02, 29.41)
With CKD	66.75 (0.13, 233.33)	57.48 (0.06, 333.33)	53.23 (10.53, 400.00)	48.24 (5.88, 225.45)	37.36 (3.54, 126.83)

Supplemental Table 4. Adjusted associations^a between AKI with CKD and with hypertension at 3 months to 48 months follow-up study visits.

CKD Adjusted Relative Risk (95% CI)		Hypertension Adjusted Relative Risk (95% CI)	
<i>3 month visit</i>		<i>3 month visit</i>	
AKI	1.86 (0.89-3.87)	AKI	1.71 (0.95-3.09)
Age <2 years	0.38 (0.17-0.86)	Age <2 years	1.65 (0.88-3.12)
		Mech vent ^b ≥2 days	0.87 (0.42-1.77)
<i>12 month visit</i>		<i>12 month visit</i>	
AKI	1.14 (0.63-2.06)	AKI	2.16 (1.18-3.95)
Age <2 years	0.62 (0.33-1.14)	Age <2 years	2.52 (1.21-5.22)
		Mech vent ^b ≥2 days	1.59 (1.02-2.46)
<i>24 month visit</i>		<i>24 month visit</i>	
AKI	0.81 (0.38-1.70)	AKI	1.25 (0.66-2.36)
Age <2 years	1.12 (0.54-2.34)	Age <2 years	1.22 (0.60-2.47)
		Mech vent ^b ≥2 days	1.95 (0.98-3.90)
<i>36 month visit</i>		<i>36 month visit</i>	
AKI	1.18 (0.50-2.79)	AKI	0.88 (0.41-1.88)
Age <2 years	0.61 (0.25-1.49)	Age <2 years	1.96 (0.87-4.44)
		Mech vent ^b ≥2 days	0.68 (0.22-2.08)
<i>48 month visit</i>		<i>48 month visit</i>	
AKI	1.11 (0.44-2.77)	AKI	1.00 (0.49-2.02)
Age <2 years	0.64 (0.25-1.65)	Age <2 years	2.48 (1.09-5.66)
		Mech vent ^b ≥2 days	0.89 (0.35-2.27)

^a Covariates to include in the log-binomial multivariable regressions were selected as follows: age < vs. ≥ 2 years old at surgery was included a priori; other covariates were included if they were associated with AKI and with the outcome in univariable analyses at a p-value < 0.05.

^b Mech vent ≥2 days refers to invasive mechanical ventilation duration of ≥2 days.

Supplemental Table 5. Association of having the CKD outcome at the 3 month visit with having the CKD outcome at future visits in the total sample and by post-operative AKI status.^a

	Without 3 month CKD	With 3 month CKD
Total cohort		
n/total (%) with 12 month CKD	17/77 (22%)	12/21 (57%)**
n/total (%) with 24 month CKD	16/75 (21%)	7/20 (35%)
n/total (%) with 36 month CKD	6/71 (8%)	9/21 (43%)**
n/total (%) with 48 month CKD	7/69 (10%)	3/18 (17%)
Non-AKI patients only		
n/total (%) with 12 month CKD	12/44 (27%)	5/9 (56%)
n/total (%) with 24 month CKD	12/43 (28%)	2/10 (20%)
n/total (%) with 36 month CKD	5/42 (12%)	4/10 (40%)
n/total (%) with 48 month CKD	5/41 (12%)	1/8 (13%)
AKI patients only		
n/total (%) with 12 month CKD	5/33 (15%)	7/12 (58%)*
n/total (%) with 24 month CKD	4/32 (13%)	5/10 (50%)*
n/total (%) with 36 month CKD	1/29 (3%)	5/11 (45%)**
n/total (%) with 48 month CKD	2/28 (7%)	2/10 (20%)

* = $p < 0.05$ and ** = $p < 0.005$, for difference in proportions with CKD outcomes between groups without vs. with the CKD outcome at 3 months.

^a Note that only participants with data at both visit assessments (e.g., data available at both 3 *and* 12 months) are included in analyses, therefore denominators will change, depending on the follow-up visit being evaluated.

Supplemental Table 6. Prevalence of hypertension (based on BP and/or use of anti-hypertensive medication) by post-operative AKI, post-operative AKI Stage 2 or worse and age < vs. ≥ 2 years old at surgery, from 3 months to 4 years after cardiac surgery discharge.

Outcome prevalence by presence of post-operative AKI Stage 1 or worse, versus no AKI										
	3 month		12 month		24 month		36 month		48 month	
	AKI	No AKI	AKI	No AKI	AKI	No AKI	AKI	No AKI	AKI	No AKI
Hypertension (Systolic or Diastolic, or on Antihypertensives)	23/47 (49%)	21/64 (33%)	26/46 (57%)*	18/57 (32%)	18/47 (38%)	19/59 (32%)	13/44 (30%)	18/56 (32%)	13/46 (28%)	19/57 (33%)
Outcome prevalence by presence of post-operative AKI Stage 2 or worse, versus no AKI or Stage 1 AKI										
	3 month		12 month		24 month		36 month		48 month	
	\geq Stage 2 AKI	No AKI or Stage 1	\geq Stage 2 AKI	No AKI or Stage 1	\geq Stage 2 AKI	No AKI or Stage 1	\geq Stage 2 AKI	No AKI or Stage 1	\geq Stage 2 AKI	No AKI or Stage 1
Hypertension (Systolic or Diastolic, or on Antihypertensives)	13/23 (57%)	31/88 (35%)	16/23 (70%)**	28/80 (35%)	9/22 (41%)	28/84 (33%)	7/20 (35%)	24/80 (30%)	6/21 (29%)	26/82 (32%)
Outcome prevalence by age at surgery < vs. ≥ 2 years old										
	3 month		12 month		24 month		36 month		48 month	
	<2 yrs	≥ 2 yrs	<2 yrs	≥ 2 yrs	<2 yrs	<2 yrs	≥ 2 yrs	<2 yrs	≥ 2 yrs	<2 yrs
Hypertension (Systolic or Diastolic, or on Antihypertensives)	25/54 (46%)	19/57 (33%)	28/48 (58%)	16/55 (29%)**	19/53 (36%)	18/53 (34%)	16/48 (33%)	15/52 (29%)	18/50 (36%)	14/53 (26%)

* = $p < 0.05$ and ** = $p < 0.005$, for difference in proportion with outcome between the two comparison groups at each study visit.