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Introduction

- Acute kidney injury (AKI) is common in critically ill patients with up to a quarter of patients receiving renal replacement therapy (RRT) ^{1,2}.
- Patients who are critically ill also frequently receive iodinated contrast for a variety of investigations and interventions such as angiography.
- The administration of iodinated contrast to patients with AKI receiving RRT may potentially cause further injury and hinder kidney recovery. On the other hand, iodinated contrast facilitates angiography and improves the diagnostic yield of computed tomographic (CT) scans and may help with clinical care.
- While iodinated contrast may be nephrotoxic, there is limited information regarding the effects of the receipt of iodinated contrast in patients with AKI, particularly dialysis requiring AKI (AKI-D) ³.

Methods and Materials

- Single-centre, retrospective cohort study that included all patients admitted to St Michael's Hospital, Toronto, Canada with AKI who received RRT from January 2007 to December 2022.
- We excluded patients who died during the index hospitalization, patients with pre-morbid estimated glomerular filtration rate (eGFR) < 15ml/min/1.73m², patients who initiated RRT at another site and patients with missing pre-morbid serum creatinine (Cr) and whose admission Cr was greater than 200µmol/L.
- Primary exposure was receipt of any form of iodinated contrast within 2 weeks of commencing acute dialysis
- For patients with missing pre-admission creatinine values whose admission creatinine was 200 µmol/L or less, we imputed the value of the admission creatinine as the pre-admission serum creatinine.
- The **primary outcome** of our study was to evaluate the effect of the receipt of iodinated contrast on dialysis dependence at hospital discharge.
- A propensity score was created using inverse probability of treatment weighting (IPTW) to determine the probability of receipt of contrast.
- We performed sensitivity analyses for patients with 0 vs multiple contrast exposures, patients with vs without pre-morbid Cr values and patients who were on RRT at the time of contrast exposure vs not on RRT at the point of contrast exposure.
- Subgroup analyses were performed for patients with vs without chronic kidney disease, SOFA score and medical vs surgical diagnosis.

Results

- Of the 1597 patients who underwent dialysis for AKI-D from 2007 to 2022, 792 patients were included in the data analysis (see Figure 1).
- Patients who received iodinated contrast were more likely to be younger, admitted to ICU at the time of dialysis initiation and receive vasopressor and ventilatory support.

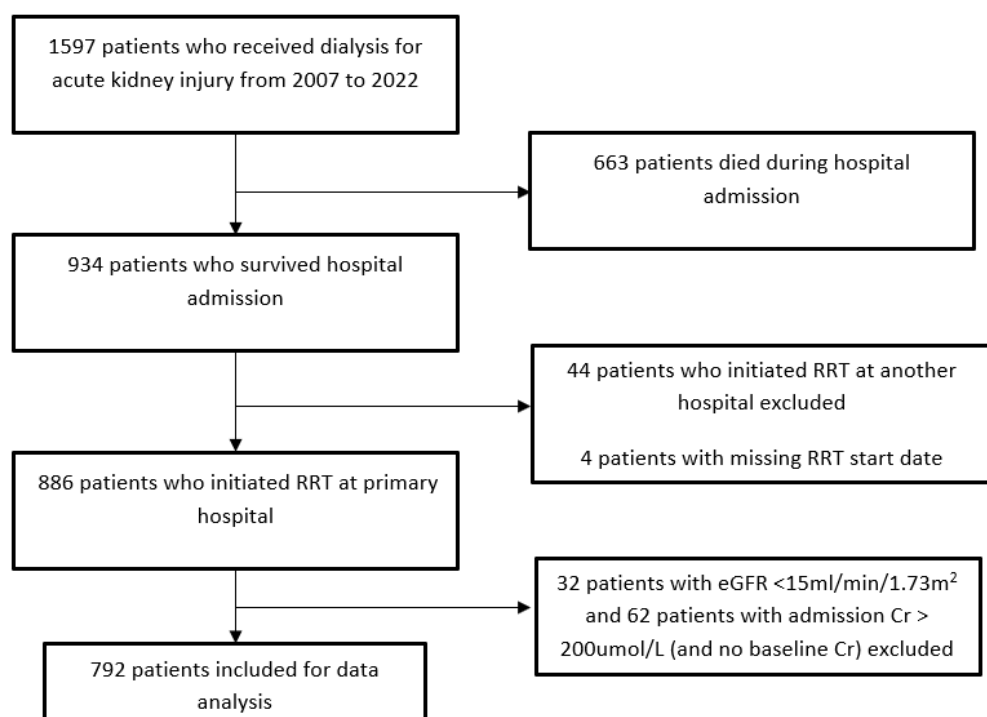


Figure 1. Cohort Participants

Results

	Iodinated Contrast (n = 223)	No Iodinated Contrast (n = 569)	All Patients (n = 792)	P value
Age – years	60.1 ± 13.5	63.1 ± 15.5	62.2 ± 15.0	0.013
Male sex – no. (%)	152 (68.2)	376 (66.1)	528 (66.7)	0.635
Preexisting DM – no. (%)	53 (23.8)	171 (30.1)	224 (28.3)	0.093
Charlson Comorbidity Score – mean	2.52 ± 2.20	2.95 ± 2.49	2.83 ± 2.42	0.024
Premorbid eGFR – ml/min/1.73m ²	73.5 ± 28.8	68.9 ± 30.5	70.2 ± 30.1	0.051
Admission serum Cr	247.4 ± 257.9	312.4 ± 315.8	294.1 ± 301.9	0.006
Weight – kg	88.3 ± 26.5	84.7 ± 27.3	85.7 ± 27.1	0.136
Cardiac Surgery – no. (%)	23 (10.3)	87 (15.3)	110 (13.9)	0.088
Characteristics at RRT initiation				
Admitted to ICU at RRT initiation – no. (%)	200 (89.7)	396 (69.6)	596 (75.3)	<0.001
Mechanical ventilation – no. (%)	162 (75.0)	254 (44.7)	416 (53.1)	<0.001
Vasoactive support – no. (%)	146 (65.8)	227 (40.0)	373 (47.3)	<0.001
Cr at RRT initiation – µmol/L	454.7 ± 248.4	502.8 ± 266.2	489.2 ± 262.0	0.020
SOFA score (mean)	13.6 ± 3.9	11.6 ± 4.4	12.2 ± 4.4	<0.001
Initial dialysis modality – no. (%)				<0.001
CRRT	84 / 223 (37.7)	104 / 566 (18.3)	188 / 792 (23.7)	
SLED	27 / 223 (12.1)	71 / 566 (12.5)	98 / 792 (12.4)	
IHD	112 / 223 (50.2)	394 / 566 (69.2)	506 / 792 (63.9)	

- After weighting by the propensity score for the receipt of iodinated contrast, recipients and non-recipients of contrast had comparable characteristics.
- The receipt of iodinated contrast was **not** associated with a higher likelihood of RRT dependence at hospital discharge (Odds Ratio (OR) 1.39, 95% Confidence Interval (CI) 0.92 – 2.05).
- In a sensitivity analyses where only patients who were receiving RRT on the day of contrast administration were included (n = 187), there was a significant association between receipt of contrast and discharge on RRT (OR 1.73, 95% CI 1.13 – 2.56).
- Subgroup analyses did not reveal any differences in patients with or without chronic kidney disease and SOFA score. However, patients with a surgical diagnosis who received contrast had a higher risk of RRT on discharge (OR 2.12, 95% CI 2.23 – 7.86).

Discussion and Conclusion

- Among patients with AKI who received RRT, the receipt of contrast **was not associated** with persistent RRT dependence at hospital discharge.
- Iodinated contrast administration can lead to enhanced diagnostic certainty and therapeutic benefits. Our study findings provide a degree of reassurance to clinicians and suggest that contrast administration, if indicated, should be prioritized over the theoretical risks of perpetuating AKI.
- A judicious approach to the administration of iodinated contrast in patients with AKI-D remains warranted as longer-term implications on kidney function remains undefined.
- Our study adds to a recent study suggesting the iodinated contrast administration in patients with AKI was not associated with persistent AKI on discharge or RRT initiation within 6 months³.

References

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