CLINICAL PROFILE AND OUTCOMES OF CRRT IN PARAQUAT ASSOCIATED ACUTE KIDNEY INJURY- A STUDY FROM A TERTIARY CARE HOSPITAL IN SOUTH INDIA

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INTRODUCTION

Paraquat is N, N'-dimethyl-4, 4 '-bipyridinium dichloride, a non-selective herbicide that destroys weeds on contact by formation of superoxide anion during photosynthesis. Paraquat poisoning is a major health problem world-wide, especially in the Asian countries where the mortality rate is as high as 60% to 90%. Paraquat ingestion is mainly suicidal, leading to fulminant organ failure manifesting as acute respiratory distress syndrome (ARDS),hepatic failure (ALI) and acute kidney injury (AKI). The mortality continues to be high despite appropriate RRT, with most patients succumbing to ARDS, while some progressing to pulmonary fibrosis. CRRT has largely become the standard of care in many nations for the treatment of AKI in patients with multi organ dysfunction.

AIM OF THE STUDY

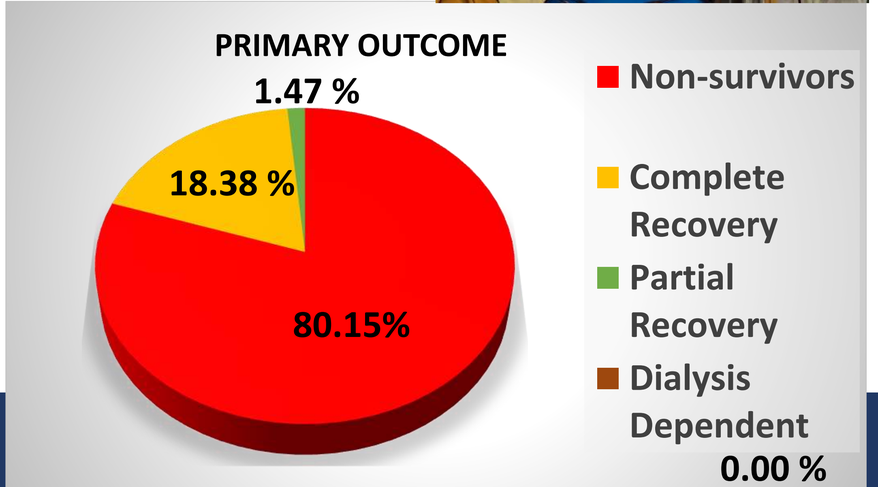
- To determine the clinical profile and outcomes of paraquat AKI treated with CRRT.

METHODOLOGY

Study Design: Observational study

Study Duration: July 2022 to July 2025 (3 years)

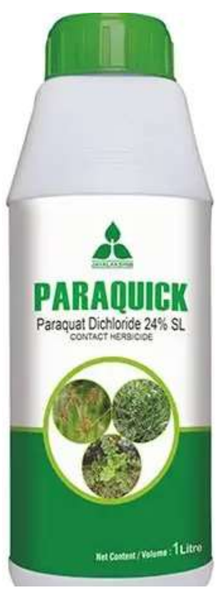
Inclusion criteria: Patients with paraquat ingestion associated AKI admitted in Gandhi Hospital during the study period and who underwent CRRT. Patients admitted with paraquat poisoning were treated with IV steroids, Vit C and IV NAC as standard of care. One session of hemoperfusion was done for patients presenting within 72 hours of ingestion for a duration of 3 hours using the HA 230 filter. AKI was diagnosed as per KDIGO 2012 AKI definition. Baseline data including age, gender, quantity of paraquat consumed and organ involvement was recorded. CRRT was done in those who had multi-organ dysfunction with Baxter CRRT Prismaflex system using the Prismaflex 100 CRRT filter(surface area 0.9m2) funded by the government health scheme for a maximum period of 24 hours. Laboratory parameters at the time of admission, before and after CRRT were recorded. Organ dysfunction assessed using the qSOFA score. Anticoagulation used was unfractionated heparin. All patients were followed up until discharge or death. The primary outcome of the study was to measure the mortality. Secondary outcomes were to assess CRRT characteristics.



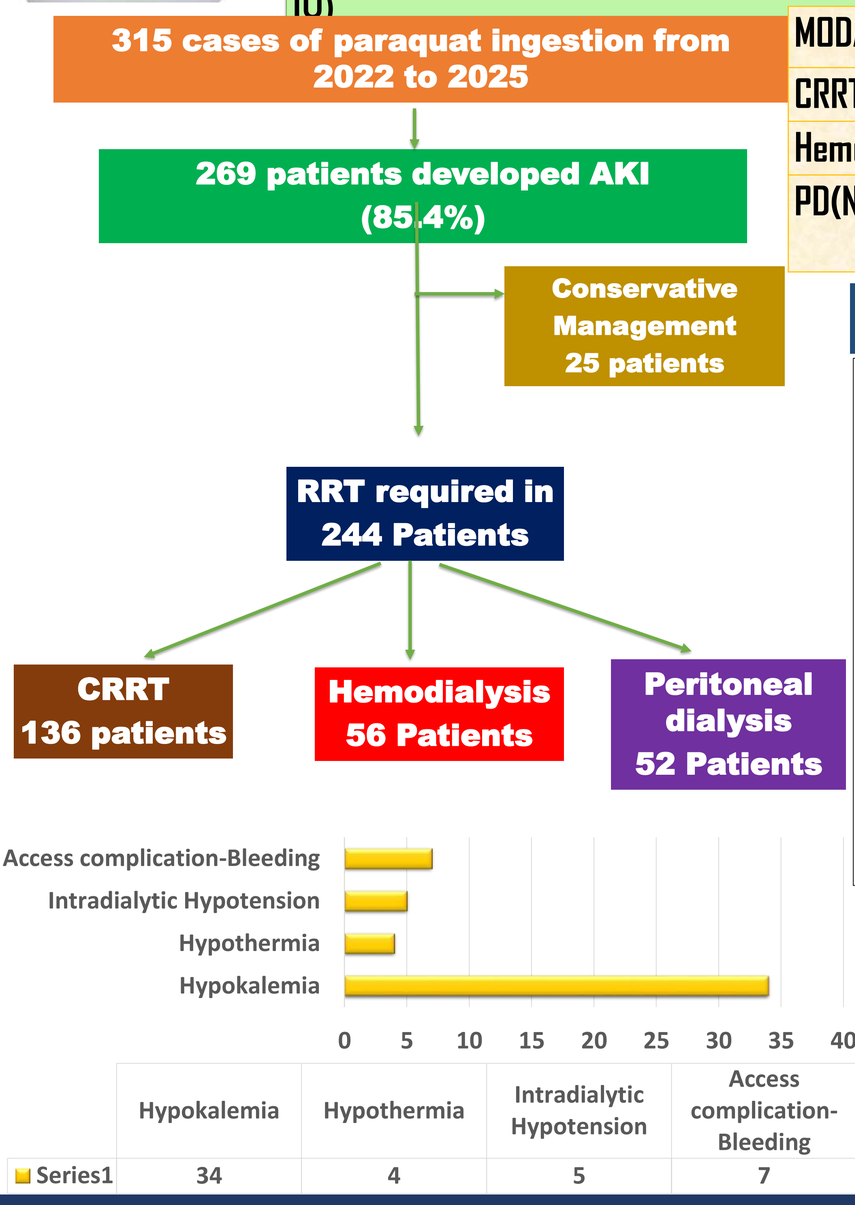
RESULTS

- The mean age of presentation was 22 ± 4 years.
- 109 (80.15%) patients were male.
- In 91.91% of the cases(125 patients) the poisoning was intentional/suicidal.
- The mean quantity of paraquat consumed was 22.6 ± 13.7 ml
- The mean time to hospitalisation after ingestion was 34.2 ± 19.9 hours.
- Mean time to initiation of CRRT after hospitalisation 58.2 ± 24.2 hours.
- Mean duration of hospital stay was 5.4+/- 3.9 days.
- Mean qSOFA at presentation 2.1 +/- 0.3

CRRT OUTCOME	Value
Mean duration	20.2 +/- 6.1 hours
Mean Effluent	27.2 +/- 1.8 ml/kg/hr
Mean blood flow	167 +/- 8 ml/hr
Mean pre blood (ml/hr)	155 +/- 45 ml/hr
Mean dialysate (ml/hr)	821 +/- 84 ml/hr
Mean replacement (ml/hour)	610 +/- 85 ml/hr
Mean urea clearance/session (in mg/dL)	88.2 +/-28.2 mg/dL
Mean creatinine clearance/session	2.6 +/- 1.2 mg/dL
Mean ml of Heparin used/hr (1ml=1000 IU)	2.2 +/- 0.4 ml/hr
Heparin free sessions	32 patients
Clotting during session	10 patients



Characteristic	Survivors (N=27)	Non-Survivors (N=109)	P value
Age	22+/-2 years	21+/-3 years	0.216
Gender			
Male	10 (37.04%)	99 (90.82%)	
Female	17 (62.96%)	10 (9.18%)	0.531
Mean quantity of Paraquat consumed	10.21 +/- 6.5 ml	29.32 +/-9.23 ml	0.023*
Mean time of presentation after consumption	18.56 ± 10.7 hours	39.7 ± 12.9 hours	0.005*
Hemoperfusion done	26 (96.29%)	14 (12.84%)	<0.001*
Mean time to initiation of CRRT after hospitalisation	48.2 ± 24.2 hours	59.6 ± 28.3 hours	0.671
Mean duration of hospital stay	15.9 +/- 6.9 days	5.6 +/- 3.5 days	<0.001*
qSOFA at presentation	1.5 +/- 0.4	2.4 +/- 0.2	0.004*
Systolic BP	116 +/- 6 mm of Hg	96+/- 8 mm of Hg	0.021*
Mean duration of CRRT	23.2 +/- 3.2 hours	21.5 +/- 6.1 hours	0.624
Mean Effluent	26.1 +/- 4 ml/kg/hr	25 +/- 3.2 ml/kg/hr	0.141
Mean blood flow	185 +/- 9 ml/hr	157 +/- 4 ml/hr	0.231
Mean Preblood	135 +/- 45 ml/hr	155 +/- 35 ml/hr	0.132
Mean dialysate	832 +/- 74 ml/hr	811 +/- 80 ml/hr	0.234
Mean Replacement	632 +/- 95 ml/hr	610 +/- 82 ml/hr	0.453
Mean urea clearance/session	80.2 +/-23.2mg/dL	89.1 +/-24.3 mg/dL	0.089
Mean creatinine clearance/session	2.56 +/- 1.2 mg/dL	2.12 +/- 3.2 mg/dL	0.132
Mean ml of Heparin used/hr (1ml=1000 IU)	2.1 +/- 0.5 ml/hr	2.3 +/- 0.6 ml/hr	0.192



MODALITY OF RRT	Survivors	Non-survivors
CRRT(N=136)	27 (19.85%)	109 (80.15%)
Hemodialysis (N=56)	10 (17.85%)	46 (82.15%)
PD(N=52)	9 (17.31%)	43 (82.69%)

CONCLUSIONS

1. CRRT of even 24 hours duration in a resource constraint setting is salvageable in Paraquat AKI with multi organ dysfunction.
2. Large scale RCTs are required for confirming the efficacy of CRRT in paraquat AKI over other extra corporeal therapies
3. Outcomes of Paraquat AKI are influenced by quantity of ingestion, latency of presentation, hemodynamic instability and qSOFA score and not dependent on the modality of RRT and CRRT characteristics.

LIMITATIONS

1. Single-center study.
2. Due to resource constraints, CRRT could be done for 24 hours duration only for each patient and for a maximum of one session and single framework of prescription was given to all patients.