Improving Mortality Prediction in Patients Undergoing CRRT

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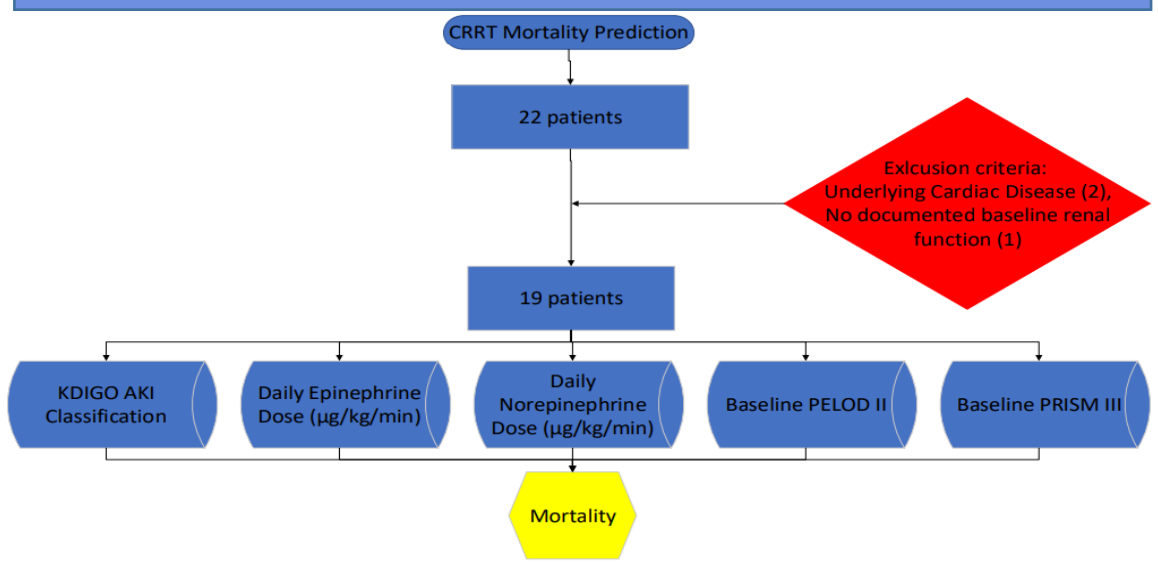
Abstract

Mortality rates in pediatric intensive care units continues to decline despite the treatment of increasingly complex patients and diseases. [1,2] Given this, there continues to be great interest in predicting outcomes for patients to both improve targeting for research trials and to select patients most appropriate for aggressive therapies; however, there still is not a uniform, consensus definition of the sickest patients or the best way to quantify mortality risk. This retrospective analysis presents single center data of 22 patients who underwent CRRT for management of AKI and compares their respective PELOD-II, PRISM III, KDIGO stratification and vasopressor infusion rates relative to mortality. The limitation of utilizing PELOD-II, PRISM III and KDIGO scores when compared to vasopressor infusion rate is that the aforementioned variables require frequent laboratory monitoring in order to utilize, while vasopressor infusion rates only require accurate documentation at the time of administration.[3,4,5]

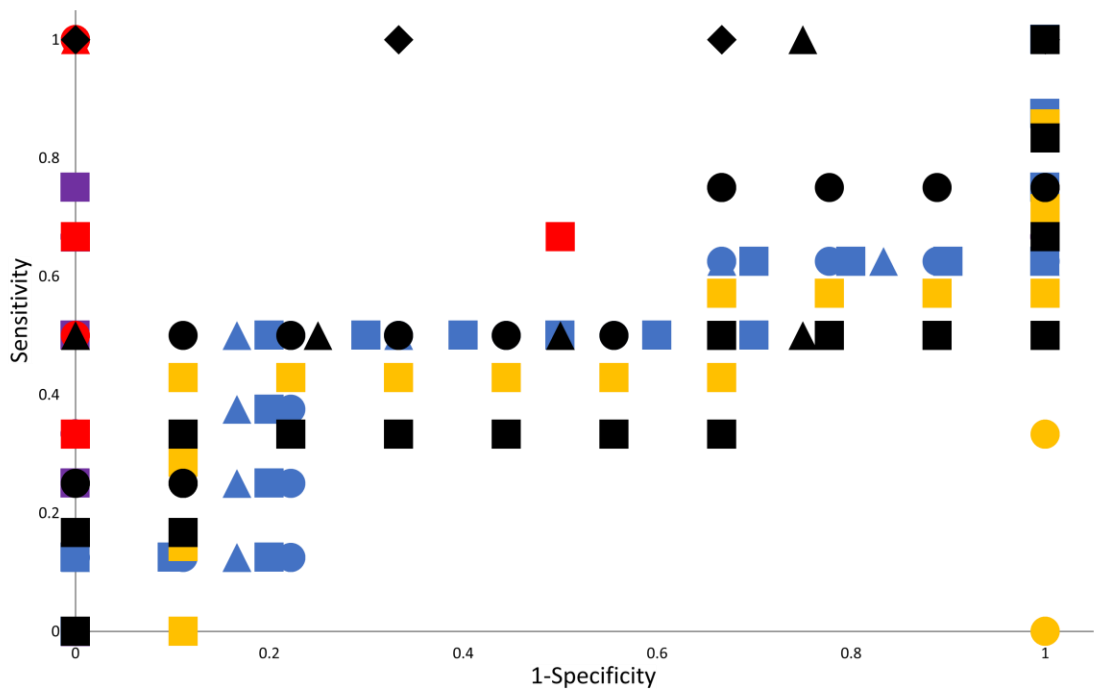
Materials and Methods



Results

Stratification Criteria (# of patients)	Sensitivity	Specificity	p-value (chi-squared)
Epinephrine ≥ 0.05 mcg/kg/min (10)	38%	82%	1.0
Epinephrine ≥ 0.10 mcg/kg/min (9)	38%	91%	1.0
Epinephrine ≥ 0.15 mcg/kg/min (9)	38%	91%	1.0
Norepinephrine ≥ 0.05 mcg/kg/min (5)	25%	82%	0.995
Norepinephrine ≥ 0.10 mcg/kg/min (3)	25%	91%	0.995
Norepinephrine ≥ 0.15 mcg/kg/min (3)	25%	91%	0.998
KDIGO AKI Stage I (18)	80%	0%	0.979
KDIGO AKI Stage II (17)	80%	0%	0.989
KDIGO AKI Stage III (14)	80%	40%	0.092
PELOD II ≥ 5 (16)	88%	18%	0.985
PELOD II ≥ 10 (4)	38%	90%	0.999
PELOD II ≥ 15 (1)	13%	100%	0.999
PRISM III ≥ 5 (15)	75%	18%	0.979
PRISM III ≥ 10 (13)	50%	18%	0.963
PRISM III ≥ 15 (6)	25%	64%	0.998
PRISM III ≥ 20 (4)	13%	72%	0.999
PRISM III ≥ 25 (1)	13%	100%	0.999

Receiver Operator Characteristic for Mortality Prediction



Epinephrine ≥ 0.05 mcg/kg/min
AUC = 0.667
Epinephrine ≥ 0.10 mcg/kg/min
AUC = 0.667
Epinephrine ≥ 0.15 mcg/kg/min
AUC = 0.667

PELOD II ≥ 5
AUC = 0.429
PELOD II ≥ 10
AUC = 0

Stage I AKI
AUC = 0.463
Stage II AKI
AUC = 0.458
Stage III AKI
AUC = 0.479

Norepinephrine ≥ 0.05 mcg/kg/min
AUC = 1
Norepinephrine ≥ 0.10 mcg/kg/min
AUC = 1
Norepinephrine ≥ 0.15 mcg/kg/min
AUC = 1

PRISM III ≥ 5
AUC = 0.370
PRISM III ≥ 10
AUC = 0.556
PRISM III ≥ 15
AUC = 0.625
PRISM III ≥ 20
AUC = 1

Conclusions

Given that only 19 patients were included for statistical analysis there are predictably limitations within the statistical analysis performed. Despite that, multiple of the variables used have high AUC and for future studies and clinical practice may provide adequate prediction for patients at greatest risk of mortality. As previously discussed, prediction of mortality is difficult given the number of confounders over the course of a disease. Further, current, commonly used tools require multiple variables for complete analysis, some of which are not always available to practitioners. Given the data presented herein it may be worthwhile to perform a similar analysis on a larger patient population to determine the efficacy of these variables in predicting mortality.

References

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