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A RISK ASSESSMENT TOOL AND DECISION TREE FOR PARAQUAT POISONING

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Background: There is no known treatment for paraquat self poisoning. Assessment of prognosis has therefore become an important aspect of clinical management of patients with paraquat self poisoning in both the developed and the developing world. The best marker of prognosis has been the plasma paraquat level. However a plasma paraquat level is never available in developing world hospitals and its availability is restricted to a few hospitals in the developed world. Other markers of organ dysfunction (serum creatinine, ALT, Bilirubin, WBC and plasma dithionite test) have been suggested as potential markers of prognosis. These studies however have not compared different markers or been validated in a large cohort. The current study attempted to investigate whether easily available clinical and biochemical tests could be used as markers of prognosis.

Methods: Consecutive patients admitted to 6 hospitals of Sri Lanka were consented for this study. Patient's admission and daily biochemistry results and a number of clinical parameters were recorded. Their outcomes (death in-hospital and up to 3 month post discharge) were also recorded. Visual inspection of data and ROC curves were used to define the best cut-points for each marker in predicting death or survival.

Results: Urine dithionite test done within 24 hours post ingestion proved to be an excellent initial screening test. The urine dithionite test had a sensitivity of 0.97 in predicting death, meaning a negative test result was highly predictive of survival. ROC curve analysis of admission serum creatinine and rise of creatinine within 24 hours admission, admission plasma paraquat concentration and SIPP scores demonstrated high areas under the ROC curve (AUC-ROC) and specificity in predicting death. First day creatinine levels above 2.6 mg/ dL and a rise of >1.3 mg/dL in the next 24 hours, admission plasma paraquat >1.7 ug/dL and a SIPP score >10.3 predicted death. The Proudfoot nomogram was also an excellent tool to estimate prognosis. Higher reported volumes of ingestion, higher admission ALT, serum bilirubin and WBC were all associated with increased chance of death. However, the ROC curve analysis revealed that these variables had relatively lower AUC-ROC and specificity.

Conclusions: The above factors can be combined in sequence to create a decision tree with markers of prognosis with >95% specificity & sensitivity to guide physicians managing patients. In many cases this means urgent plasma paraquat levels are not required to estimate prognosis.