THE RAINBOW CONTINUUM OF RENAL OUTCOMES IN CKD PATIENTS FOLLOWING AKI-ON-CKD: A PLEA FOR MORE EMPHASIS ON RENOPREVENTION.

Macaulay Amechi Onuigbo MD MSc FWACP FASN MBA (1,2)
Nneoma Agbasi RMN MSc PGDip (3)

1Mayo Clinic College of Medicine, Rochester, MN, USA.
2Department of Nephrology, Mayo Clinic Health System, Eau Claire, WI, USA.
3North East London NHS Foundation Trust, United Kingdom.

OBJECTIVES

Background: Whereas the syndrome of acute kidney injury on chronic kidney disease (AKI-on-CKD) is well acknowledged, there remains this mistaken collective consensus among physicians that usual (full) renal recovery is the default outcome. Nevertheless, increasing evidence in the nephrology literature validates the view that quite often, this renal recovery is incomplete, or worse still, that AKI-on-CKD can indeed quickly precipitate acute yet irreversible ESRD, the later representing the newly described syndrome of rapid onset end-stage renal disease (SORO-ESRD).

We analyzed renal outcomes in a Northwestern Wisconsin Mayo Clinic Health System Renal Unit AKI-on-CKD cohort between 2002 and 2013 to determine the vagaries of this continuum of renal recovery following AKI in a priori stable CKD patients.

METHODS

This is a retrospective analysis of renal outcomes of all patients who demonstrated AKI-on-CKD in a Mayo Clinic Health System Renal Unit in Northwestern Wisconsin, USA, between November 2002 and June 2013.

All patients with AKI episodes superimposed on a priori stable CKD were pulled from all available EMR and paper records, and individual real-time patient-level serum creatinine trajectories were recorded and graphed from before the AKI event to individual end points.

Individual endpoints consisted of death, or recovery of renal function, or need for temporary RRT, or in some instances need for RRT in excess of 90 days.

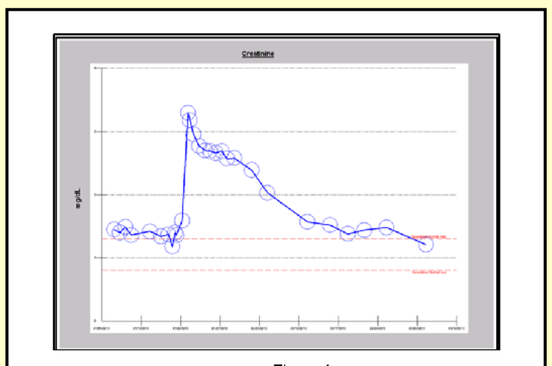

Figure 1

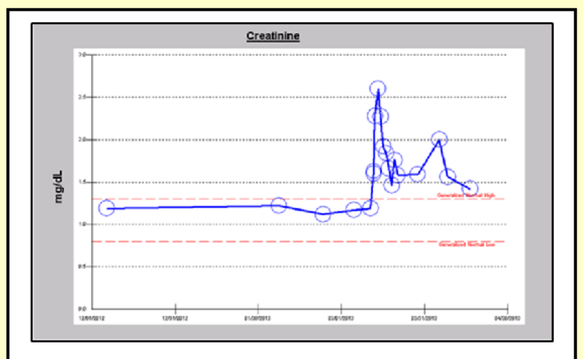

Figure 2

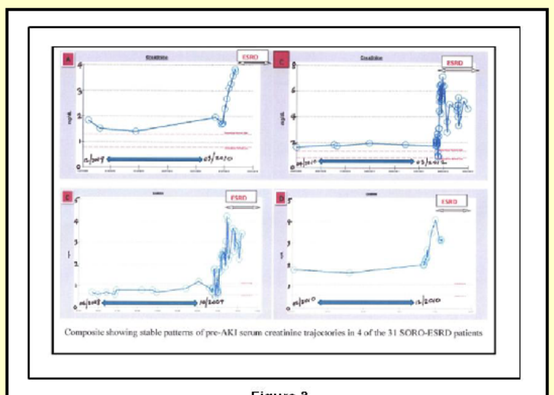

Figure 3

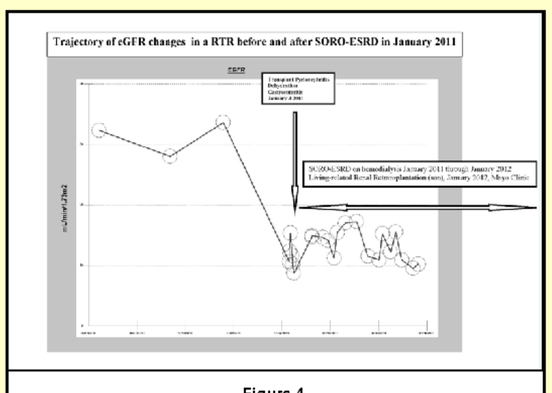

Figure 4

RESULTS

Four renal outcomes patterns were identified:

1. Full rapid recovery, within days to weeks; with terminal eGFR within 10% of baseline eGFR (Figure 1).

2. Partial recovery, within days to weeks; with terminal eGFR >10% below baseline eGFR (Figure 2).

3. Rapid-onset yet irreversible ESRD; usually within 2-4 weeks, occurring in native kidneys (Figure 3).

4. Rapid-onset yet irreversible ESRD; usually within 2-4 weeks, occurring in renal allografts (Figure 4).

CONCLUSIONS

We have recognized 4 patterns of renal outcomes following AKI-on-CKD, representing a rainbow continuum ranging from rapid complete recovery on one end of the spectrum of renal recovery, through partial incomplete renal recovery from the acute insult, and all the way to rapid precipitate yet irreversible ESRD, or SORO-ESRD, at the other end of the spectrum.

Hitherto, in the current nephrology literature, the relationship between AKI and CKD progression has been blamed on the so-called 'residual confounding'. However, in this analysis, we have demonstrated a direct real-time translation from a priori stable CKD to acute yet irreversible ESRD, or SORO-ESRD (Figures 3 and 4).

Given the absence of effective treatments for AKI outside of renal replacement therapy, there remains this overarching necessity to emphasize preventative nephrology or "**RENOPREVENTION**" which encompasses the principles of identifying at-risk CKD patients, avoiding nephrotoxics, regular monitoring of serum creatinine in at-risk CKD patients, the vigorous prevention or treatment of peri-operative hypotension, and further still, the preemptive withholding of all potential nephrotoxics, including ACEIs and ARBs,during major surgical procedures, with administration of iodinated contrast, and during critical illness.

REFERENCES:

Ponte B et al. Nephrol. Dial. Transplant. 2008; 23: 3859–3866.
Pannu & Nadim. Crit Care Med. 2008;36:S216–23.
Coca SG et al. Am J Kidney Dis. 2009;53:961–73.
Wald R et al. JAMA, 2009; 302: 1179–1185.
Ishani A et al. J. Am. Soc. Nephrol., 2009; 20: 223–228.
Okusa MD et al. Clin. J. Am. Soc. Nephrol., 2009;4:520-522.
Onuigbo MA. Renoprevention vs. Renoprotection. QJM 2009; 102:155–167.
Onuigbo MA. Syndrome of rapid-onset end-stage renal disease. Ren Fail. 2010;32(8):954-958.
Venkatachalam MA et al. Am. J. Physiol. Renal Physiol., 2010 Mar 3. [Epub ahead of print].
Kelly KJ et al. Am. J. Nephrol., 2010;32:469-475.
Onuigbo M & Onuigbo N. Eds. LAP GmbH 11 and Co. KG. 2011.
Tolwani A. N. Engl. J. Med., 2012 Dec 27;367(26):2505-14.
Perazella M. Kidney Int. 2012;81:1172–9.
Onuigbo MAC, Onuigbo NTC. In HEMODIALYSIS: how, when and why. NOVA Science Publishers; 2012:443-485.
Onuigbo MA. Renoprevention: A New Concept for Reengineering Nephrology Care. Ren Fail. 2013;35(1):23-8
Onuigbo MAC. SORO-ESRD in two consecutive RTRs. Indian J Nephrol. 2013 May;23(3):222-5.
Onuigbo MA et al. The syndrome of rapid onset ESRD. Volume 1. NOVA Publishers, 2013: 109-125.
Onuigbo & Achebe. AKI-on-CKD. In: M Onuigbo, Ed. Vol 1. NOVA Publishers, 2013; 91-108.
Yaqoub R et al. Am J Kidney Dis. 2013;62(6):1077-1086.
Onuigbo MA et al. SORO-ESRD in Mayo Clinic HD patients. Indian J Nephrol. 2014; 24(2): 75-81.

51ERA-EDTA
96--MP
G) Acute Renal Failure. G2) Human studies.
MACAULAY ONUIGBO
DOI: 10.3252/pso.eu.51era.2014
Poster presented at: 51 ERA-EDTA CONGRESS AMSTERDAM THE NETHERLANDS MAY 31 - JUNE 3 2014