

Changing Paradigms in Acute Kidney Injury: From Mechanisms to Management

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Recent advances in the field of acute kidney injury (AKI) have provided key insights into understanding the mechanisms and pathways of AKI and its effects on other organs. Biomarkers have been identified that have provided new tools and techniques to characterize this disorder and facilitate point-of-care testing. Multiple underlying mechanisms contribute to the pathophysiology of AKI including genetic and epigenetic modifications, environmental influences and, more importantly, inherent mechanisms within the kidney offer challenging perspectives for clinical and translational research. This issue summarizes proceedings from the 6th University of Alabama at Birmingham (UAB)-University of California San Diego (UCSD) O'Brien Core Center for AKI Research symposium held during the 21st Annual Continuous Renal Replacement Therapy meeting in San Diego, California, USA, on Tuesday, February 16, 2016.

The overall goal of this symposium was to provide a review of the most recent developments in the field and describe emerging knowledge from basic and translational research. The meeting included 21 experts invited from around the world and over 100 participants were in attendance. Symposia sessions focused on defining key molecules and mechanisms involved in the pathogenesis and repair from AKI. The role of the non-selective, cal-

cium (Ca²⁺)-permeable cation channel of the transient receptor potential melastatin 2, and iron in mediating oxidative stress in AKI were discussed. New targets for intervention were described including autophagy, sphingolipid signaling, macrophage, complement and tubular transport mechanisms [1–6]. A major theme was to explore the contributors to progression of AKI to chronic kidney disease, and speakers provided elegant overviews of the experimental evidence and molecular mechanisms that are in play [7, 8].

Although it has been difficult to translate findings from experimental models to human interventions, several topics focused on translational research applied to clinical care demonstrating that the field is promising for AKI. Advances in understanding the role of micro-RNA regulation of injury and repair pathways [4], organ cross-talk and lipid pathways were discussed. Knowledge obtained from pre-clinical models is now being applied to

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evaluating gene delivery approaches, remote ischemic pre-conditioning and novel approaches with lipoic acid [1] and mineralocorticoid receptor antagonism for prevention and management of AKI [5].

Results from ongoing clinical studies were discussed to define the best strategies for effective management of patients. Serum creatinine measurements continue to be the mainstay for detecting and diagnosing AKI, however, are subject to biologic and measurement variations. The patterns of creatinine elevation and alterations in urinary volume continue to evolve as biomarker signals to improve our ability to diagnose AKI [9, 10]. Ronco and Chawla [11] provided an overview of the role of kidney damage biomarkers to detect subclinical AKI prior to functional changes, thus providing a rationale for expanding our current definitions for AKI. Functional stress testing with diuretics was discussed as techniques to establish the integrity of the tubules and capacity of the kidney to provide a novel technique to evaluate patients with AKI. Protocol management and follow-up for AKI patients has been a controversial area given the heteroge-

neity of the disease; however, the experience from the UK described by Selby et al. [12, 13] to improve the basic care of AKI appears to be promising in improving outcomes.

The UAB-UCSD O'Brien Center has taken a major role in providing biomedical resources for investigators pursuing AKI-related research by identifying emerging trends and technologies and pursuing these opportunities through enhancement of core resources and educational outreach to investigators through workshops and seminars. This symposium highlighted the exciting developments in the field and provided a forum for exchange of ideas among basic scientists and clinicians. The proceedings from this conference provide a unique collection that we hope will stimulate further thought and continued investigations in the field.

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