AKI
Current Awareness Bulletin
February 2020

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Title: Trauma-associated acute kidney injury

Citation: Current Opinion in Critical Care; Dec 2019; vol. 25 (no. 6); p. 565-572
Author(s): Perkins Z.B.; Haines R.W.; Prowle J.R.

Objective: A summary of recent research into the epidemiology, cause, management and outcomes of trauma-associated acute kidney injury (AKI). There is an increasing focus on subtypes of AKI to better target clinical management and future research.

Recent findings: AKI associated with trauma occurs in 20-24% of patients admitted to ICU. On the basis of creatinine and/or urine output, AKI occurs in the first few days of traumatic illness. Although various associations have been identified, shock and high-volume blood transfusion are the most consistent risks for development of trauma-associated AKI. Short-term outcomes appear worse for patients with AKI, but extent of longer term kidney function recovery remains unknown. Recent research in the general critical care population is beginning to better inform AKI management; however, currently, preventive and supportive strategies remain the mainstay of AKI management after trauma.

Summary: Well-designed, prospective research is required to better understand the phenotype, pathophysiology and recovery trajectory of trauma-associated AKI. Only then can potentially unique therapeutic targets be developed for this common subtype of AKI.

Title: Fluid overload as a therapeutic target for the preservative management of chronic kidney disease

Citation: Current Opinion in Nephrology and Hypertension; Jan 2020; vol. 29 (no. 1); p. 22-28
Author(s): Palmer B.F.; Clegg D.J.

Objective: There is growing clinical evidence of adverse effects of fluid overload on kidney outcomes in patients with cardiovascular disease who are not yet receiving kidney replacement therapy. In this review, we discuss the patient populations most at risk for fluid overload, the pathophysiology associated with fluid overload, and finally treatment options.

Recent findings: The severity of fluid overload is an independent risk factor for both an increased risk of rapidly declining kidney function and increased risk for the need of kidney replacement therapy. High venous pressure within the kidney secondarily causes a decrease in kidney perfusion, which in turn signals salt retention and the resulting increase in plasma volume completes a vicious cycle propagating ongoing kidney injury. Fluid overload has also been identified as a risk factor for the combined outcome of all-cause mortality and cardiovascular morbidity. This increased risk in some studies has been identified as more important than hypertension in predicting both the increased risk of kidney disease progression and morbidity and mortality from cardiovascular disease. Once fluid status is accurately assessed, a combination of salt restriction and effective diuretic therapy is the first-line therapy to manage this complication. In those patients who require additional therapy, use of a V2 receptor antagonists can be considered. Finally, some patients may benefit from peritoneal dialysis to bring about volume removal even if they do not yet require dialysis for uremic complications.

Summary: Excess fluid or fluid overload appears to enhance chronic kidney disease progression and its treatment and resolution is a potential disease-modifying intervention.
Title: Systematic review and practical guideline for the prevention and management of the renal side effects of lithium therapy

Citation: European Neuropsychopharmacology; Feb 2020; vol. 31; p. 16-32
Author(s): Schoot T.S.; Kerckhoffs A.P.M.; Molmans T.H.J.; Grootens K.P.

Abstract: Lithium is the first line therapy of bipolar mood disorder. Lithium-induced nephrogenic diabetes insipidus (Li-NDI) and lithium nephropathy (Li-NP, i.e., renal insufficiency) are prevalent side effects of lithium therapy, with significant morbidity. The objective of this systematic review is to provide an overview of preventive and management strategies for Li-NDI and Li-NP. For this, the PRISMA guideline for systematic reviews was used. Papers on the prevention and/or treatment of Li-NDI or Li-NP, and (influenceable) risk factors for development of Li-NDI or Li-NP were included. We found that the amount of evidence on prevention and treatment of Li-NDI and Li-NP is scarce. To prevent Li-NDI and Li-NP we advise to use a once-daily dosing schedule, target the lowest serum lithium level that is effective and prevent lithium intoxication. We emphasize the importance of monitoring for Li-NDI and Li-NP, as early diagnosis and treatment can prevent further progression and permanent damage. Collaboration between psychiatrist, nephrologist and patients themselves is essential. In patients with Li-NDI and/or Li-NP cessation of lithium therapy and/or switch to another mood stabilizer should be considered. In patients with Li-NDI, off label therapy with amiloride can be useful.

Title: Intravenous contrast agents in diabetic patients taking metformin; an updated review on current concepts

Citation: Journal of Nephropathology; Jan 2020; vol. 9 (no. 1)
Author(s): Asgharpour M.; Danialy R.; Mirhashemi S.; Mirzazadeh A.; Ebrahimi S.

Abstract: Iodinated contrast agents are routinely used to diagnose a variety of diseases especially malignant tumors. They are crucial for accurate depiction of tumors, monitoring the response to treatment, and assessing possible recurrence of malignant lesions. Unfortunately, there are potential adverse effects associated with their administration. Metformin as an antidiabetic drug is prescribed widely. The drug is usually administered to control type II diabetes mellitus. One of the most important side effects of metformin is the possibility of lactate accumulation and occurrence of metforminassociated lactic acidosis (MALA), which develops under various circumstances including decreased renal function or concurrent use of toxic agents. Since, intravascular injection of iodinated contrast agents for radiologic purposes may result in kidney injury, it is suggested that metformin should be held in diabetic patients with renal failure before administration of contrast media and not to be taken by the patient again till 48 hours after the procedure and assessment of kidney function which should be normal.

Title: Long-term outcomes of acute kidney injury and strategies for improved care.

Citation: Nature reviews. Nephrology; Feb 2020
Author(s): James, Matthew T; Bhatt, Meha; Pannu, Neesh; Tonelli, Marcello
**Abstract:** Acute kidney injury (AKI), once viewed predominantly as a self-limited and reversible condition, is now recognized as a growing problem associated with significant risks of adverse long-term health outcomes. Many cohort studies have established important relationships between AKI and subsequent risks of recurrent AKI, hospital re-admission, morbidity and mortality from cardiovascular disease and cancer, as well as the development of chronic kidney disease and end-stage kidney disease. In both high-income countries (HICs) and low-income or middle-income countries (LMICs), several challenges exist in providing high-quality, patient-centered care following AKI. Despite advances in our understanding about the long-term risks following AKI, large gaps in knowledge remain about effective interventions that can improve the outcomes of patients. Therapies for high blood pressure, glycaemic control (for patients with diabetes), renin-angiotensin inhibition and statins might be important in improving long-term cardiovascular and kidney outcomes after AKI. Novel strategies that incorporate risk stratification approaches, educational interventions and new models of ambulatory care following AKI have been described, and some of these are now being implemented and evaluated in clinical studies in HICs. Care for AKI in LMICs must overcome additional barriers due to limited resources for diagnosis and management.

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**Title:** Acute kidney injury and vancomycin/piperacillin/tazobactam in adult patients: a systematic review.

**Citation:** Internal and emergency medicine; Feb 2020

**Author(s):** Ciarambino, Tiziana; Giannico, Orazio Valerio; Campanile, Amalia; Tirelli, Paolo; Para, Ombretta; Signoriello, Giuseppe; Giordano, Mauro

**Abstract:** The aim of this systematic review was to assess AKI (acute kidney injury) in adult patients, treated with vancomycin (V) + piperacillin/tazobactam (PT) compared to V monotherapy. Studies were found in Pubmed, Web of Science and Scopus databases. Articles not in English, pediatric studies and case reports were excluded. A study is eligible for inclusion if the adjusted Odds ratio (aOR) for AKI in V + PT compared to V monotherapy groups, could be extracted or determined from available data. Six retrospective cohort studies were eligible for inclusion criteria and so they were included in the analysis. All studies separately showed a significant higher risk of developing AKI (OR > 1, p < 0.05) in V + PT group compared to V monotherapy group. Considering the methodological difference of included studies, a random effect model was preferred. The model showed a pooled significant higher risk of developing AKI [OR 2.77 (95% CI 1.94, 3.96), p < 0.0001] in V + PT group compared to V monotherapy group. Association of V and PT appears to be associated with a greater risk of AKI compared to V in monotherapy. These results may serve as the impetus for further evaluation into true mechanisms behind this additive nephrotoxic effect and its potential implications on mortality.

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**Title:** Distant organ dysfunction in acute kidney injury.

**Citation:** Acta physiologica (Oxford, England); Feb 2020; vol. 228 (no. 2); p. e13357

**Author(s):** Husain-Syed, Faeq; Rosner, Mitchell H; Ronco, Claudio

**Abstract:** Acute kidney injury (AKI) is a common complication in critically ill patients and it is associated with increased morbidity and mortality. Epidemiological and clinical data show that AKI is linked to a wide range of distant organ injuries, with the lungs, heart, liver, and intestines representing the most clinically relevant affected organs. This distant organ injury...
during AKI predisposes patients to progression to multiple organ dysfunction syndrome and ultimately, death. The strongest direct evidence of distant organ injury occurring in AKI has been obtained from animal models. The identified mechanisms include systemic inflammatory changes, oxidative stress, increases in leucocyte trafficking and the activation of proapoptotic pathways. Understanding the pathways driving AKI-induced distal organ injury are critical for the development and refinement of therapies for the prevention and attenuation of AKI-related morbidity and mortality. The purpose of this review is to summarize both clinical and preclinical studies of AKI and its role in distant organ injury.

Title: Malnutrition screening and acute kidney injury in hospitalised patients: a retrospective study over a 5-year period from China.

Citation: British Journal of Nutrition; Feb 2020; vol. 123 (no. 3); p. 337-346

Author(s): Li, Chenyu; Xu, Lingyu; Guan, Chen; Zhao, Long; Luo, Congjuan; Zhou, Bin; Zhang, Xiaosu; Wang, Jing; Zhao, Jun; Huang, Junyan; Li, Dan; Luan, Hong; Man, Xiaofei; Che, Lin; Wang, Yanfei; Zhang, Hui; Xu, Yan

Abstract: Malnutrition and acute kidney injury (AKI) are common complications in hospitalised patients, and both increase mortality; however, the relationship between them is unknown. This is a retrospective propensity score matching study enrolling 46 549 inpatients, aimed to investigate the association between Nutritional Risk Screening 2002 (NRS-2002) and AKI and to assess the ability of NRS-2002 and AKI in predicting prognosis. In total, 37 190 (80 %) and 9359 (20 %) patients had NRS-2002 scores <3 and ≥3, respectively. Patients with NRS-2002 scores ≥3 had longer lengths of stay (12·6 (sd 7·8) v. 10·4 (sd 6·2) d, P < 0·05), higher mortality rates (9·6 v. 2·5 %, P < 0·05) and higher incidence of AKI (28 v. 16 %, P < 0·05) than patients with normal nutritional status. The NRS-2002 showed a strong association with AKI, that is, the risk of AKI changed in parallel with the score of the NRS-2002. In short- and long-term survival, patients with a lower NRS-2002 score or who did not have AKI achieved a significantly lower risk of mortality than those with a high NRS-2002 score or AKI. Univariate Cox regression analyses indicated that both the NRS-2002 and AKI were strongly related to long-term survival (AUC 0·79 and 0·71) and that the combination of the two showed better accuracy (AUC 0·80) than the individual variables. In conclusion, malnutrition can increase the risk of AKI and both AKI and malnutrition can worsen the prognosis that the undernourished patients who develop AKI yield far worse prognosis than patients with normal nutritional status.

Title: Risk Stratification for Postoperative Acute Kidney Injury in Major Noncardiac Surgery Using Preoperative and Intraoperative Data.

Citation: JAMA Network Open; Dec 2019; vol. 2 (no. 12)

Author(s): Lei, Victor J.; Luong, ThaiBinh; Shan, Eric; Chen, Xinwei; Neuman, Mark D.; Eneanya, Nwamaka D.; Polsky, Daniel E.; Volpp, Kevin G.; Fleisher, Lee A.; Holmes, John H.; Navathe, Amol S.

Key points: Is adding preoperative and intraoperative data associated with improved risk stratification of patients undergoing noncardiac surgery for postoperative acute kidney injury?

Findings: In this prognostic study of 42 615 patients who underwent noncardiac surgery, the addition of preoperative to prehospitalization data improved model performance (area under
the curve increased from 0.71 to 0.80) as did adding preoperative plus intraoperative data (area under the curve further increased to 0.82).

**Meaning:** Although electronic health record data may be used to accurately stratify patients at risk of postoperative acute kidney injury, there appears to be only modest improvement in performance when adding intraoperative data to risk stratification models.

**Importance:** Acute kidney injury (AKI) is one of the most common complications after noncardiac surgery. Yet current postoperative AKI risk stratification models have substantial limitations, such as limited use of perioperative data. Objective: To examine whether adding preoperative and intraoperative data is associated with improved prediction of noncardiac postoperative AKI.

**Design, Setting, and Participants:** A prognostic study using logistic regression with elastic net selection, gradient boosting machine (GBM), and random forest approaches was conducted at 4 tertiary academic hospitals in the United States. A total of 42,615 hospitalized adults with serum creatinine measurements who underwent major noncardiac surgery between January 1, 2014, and April 30, 2018, were included in the study. Serum creatinine measurements from 365 days before and 7 days after surgery were used in this study.

**Main Outcomes and Measures:** Postoperative AKI (defined by the Kidney Disease Improving Global Outcomes within 7 days after surgery) was the primary outcome. The area under the receiver operating characteristic curve (AUC) was used to assess discrimination.

Results: Among 42,615 patients who underwent noncardiac surgery, the mean (SD) age was 57.9 (15.7) years, 23,943 (56.2%) were women, 27,857 (65.4%) were white, and the most frequent surgery types were orthopedic (15,718 [36.9%]), general (8,808 [20.7%]), and neurologic (6,564 [15.4%]). The rate of postoperative AKI was 10.1% (n = 4,318). The progressive addition of clinical data improved model performance across all modeling approaches, with GBM providing the highest discrimination by AUC. In GBM models, the AUC increased from 0.712 (95% CI, 0.694-0.731) using prehospitalization variables to 0.804 (95% CI, 0.788-0.819) using preoperative variables (inclusive of prehospitalization variables) (P < .001 for AUC comparison). The AUC further increased to 0.817 (95% CI, 0.802-0.832) when adding intraoperative variables (P < .001 for comparison vs model using preoperative variables). However, the statistically significant improvements in discrimination did not appear to be clinically significant. In particular, the AKI rate among patients classified as high risk improved from 29.1% to 30.0%, a net of 15 patients were appropriately reclassified as high risk, and an additional 15 patients were appropriately reclassified as low risk.

**Conclusions and Relevance:** The findings of the study suggest that electronic health record data may be used to accurately stratify patients at risk of perioperative AKI, but the modest improvements from adding intraoperative data should be weighed against challenges in using intraoperative data. This prognostic study evaluates the addition of preoperative and intraoperative data to prehospitalization data to identify patients at risk for postoperative acute kidney injury after undergoing major noncardiac surgery.

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**Title:** Acute kidney injury as a risk factor of hyperactive delirium: A case control study

**Citation:** Journal of Critical Care; Feb 2020; vol. 55; p. 194

**Author(s):** Wan, RYY; McKenzie, CA; Taylor, D; Camporota, L; Ostermann, M

**Objective:** Delirium and acute kidney injury (AKI) are common organ dysfunctions during critical illness. Both conditions are associated with serious short- and long-term complications. We investigated whether AKI is a risk factor for hyperactive delirium.
**Methods:** This was a single-centre case control study conducted in a 30 bedded mixed Intensive Care Unit in the UK. Hyperactive delirium cases were identified by antipsychotic initiation and confirmation of delirium diagnosis through validated chart review. Cases were compared with non-delirium controls matched by Acute Physiology and Chronic Health Evaluation II score and gender. AKI was defined by the KDIGO criteria.

**Results:** 142 cases and 142 matched controls were identified. AKI stage 3 was independently associated with hyperactive delirium [Odds ratio (OR) 5.40 (95% confidence interval (CI) 2.33–12.51)]. Other independent risk factors were mechanical ventilation [OR 2.70 (95% CI 1.40–5.21)], alcohol use disorder [OR 5.80 (95% CI 1.90–17.72)], and dementia [OR 9.76 (95% CI 1.09–87.56)]. Hospital length of stay was significantly longer in delirium cases (29 versus 20 days; p = .004) but hospital mortality was not different.

**Conclusions:** AKI stage 3 is independently associated with hyperactive delirium. Further research is required to explore the factors that contribute to this association.

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**Title:** Acute Kidney Injury and CKD Associated with Hematopoietic Stem Cell Transplantation.

**Citation:** Clinical journal of the American Society of Nephrology : CJASN; Feb 2020; vol. 15 (no. 2); p. 289-297

**Author(s):** Renaghan, Amanda DeMauro; Jaimes, Edgar A; Malyszko, Jolanta; Perazella, Mark A; Sprangers, Ben; Rosner, Mitchell Howard

**Abstract:** Hematopoietic stem cell transplantation is a life-saving therapy for many patients with cancer, as well as patients with some nonmalignant hematologic disorders, such as aplastic anemia, sickle cell disease, and certain congenital immune deficiencies. Kidney injury directly associated with stem cell transplantation includes a wide range of structural and functional abnormalities, which may be vascular (hypertension, thrombotic microangiopathy), glomerular (albuminuria, nephrotic glomerulopathies), and/or tubulointerstitial. AKI occurs commonly after stem cell transplant, affecting 10%-73% of patients. The cause is often multifactorial and can include sepsis, nephrotoxic medications, marrow infusion syndrome, hepatic sinusoidal obstruction syndrome, thrombotic microangiopathy, infections, and graft versus host disease. The risk of post-transplant kidney injury varies depending on patient characteristics, type of transplant (allogeneic versus autologous), and choice of chemotherapeutic conditioning regimen (myeloablative versus nonmyeloablative). Importantly, AKI is associated with substantial morbidity, including the need for KRT in approximately 5% of patients and the development of CKD in up to 60% of transplant recipients. AKI has been associated universally with higher all-cause and nonrelapse mortality regardless of transplant type, and studies have consistently shown extremely high (>80%) mortality rates in those patients requiring acute dialysis. Accordingly, prevention, early recognition, and prompt treatment of kidney injury are essential to improving kidney and patient outcomes after hematopoietic stem cell transplantation, and for realizing the full potential of this therapy.

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**Title:** Predictive value of renal resistive index for the onset of acute kidney injury and its non-recovery: A systematic review and meta-analysis.

**Citation:** Clinical nephrology; Feb 2020

**Author(s):** Wu, Hanzhang; Liu, Kang; Darko, Isaac Newton; Xu, Xueqiang; Li, Li; Xing, Changying; Mao, Huijuan
Background: The predictive value of Doppler-based renal resistive index (RRI) for acute kidney injury (AKI) has not been fully elucidated. The present meta-analysis was carried out to disclose the correlation between AKI and RRI, and to investigate the predictive value of RRI for the onset of AKI and its recovery.

Materials and Methods: We searched PubMed, Embase, and Cochrane Library databases from inception to March 2019. The weighted mean difference (WMD) with a 95% confidence interval (CI) was used to assess the difference in RRIs between AKI and non-AKI patients. Moreover, the sensitivity and specificity were calculated, and summary receiver operating characteristic (SROC) curves were constructed. Meta-Disc and STATA were used for all statistical analyses.

Results: A total of 20 studies (14 for prediction of the onset of AKI and 6 for prediction of AKI short-term non-recovery) were included in our meta-analysis. The values of RRI (WMD = 0.07; 95% CI: 0.05 - 0.09; p < 0.0001) were significantly higher in AKI patients compared with non-AKI patients. The overall sensitivity and specificity of RRI for prediction of the onset of AKI were 72% (95% CI, 64 - 80%) and 79% (95% CI, 71 - 85%), respectively. As for prediction of AKI short-term non-recovery, the pooled sensitivity was 81% (95% CI: 64 - 91), and the pooled specificity was 80% (95% CI: 72 - 85). For the onset of AKI, the best predictive performance was observed for the RRI measured immediately after major surgery, and a cut-off value ≥ 0.715 also achieved superior predictive value.

Conclusion: This study showed that the elevation of RRI may be related to the progression of AKI, and RRI could have good overall predictive value for the onset of AKI and its short-term non-recovery. Further studies in different clinical settings and patient groups are warranted before it could be widely used in clinical practice.

Title: Prophylaxis against postcontrast acute kidney injury (PC-AKI): updates in the ESUR guidelines 10.0 and critical review.

Citation: Radiologia; Feb 2020

Author(s): Sebastià, C; Nicolau, C; Martín de Francisco, Á L; Poch, E; Oleaga, L

Abstract: The European Society of Urogenital Radiology (ESUR) updated its guidelines for prophylaxis against postcontrast acute kidney injury (PC-AKI) in 2018 (ESUR 10.0). These guidelines drastically reduce the indications for prophylaxis against PC-AKI after iodine-based contrast administration, lowering the cutoff for administering prophylaxis to glomerular filtration rates <30ml/min/1.73m2 and eliminating most of the prior risk factors. Moreover, in cases where prophylaxis is considered necessary, the periods of hydration are shorter than in the previous version. These guidelines have been approved by most radiological societies, although they have also been criticized for excessive relaxation regarding risk factors, especially by the nephrological community. In this article, we critically review the changes to the guidelines.

Title: Clinical Features and Outcomes of Immune Checkpoint Inhibitor-Associated AKI: A Multicenter Study.

Citation: Journal of the American Society of Nephrology : JASN; Feb 2020; vol. 31 (no. 2); p. 435-446
Author(s): Cortazar, Frank B; Kibbelaar, Zoe A; Glezerman, Ilya G; Abudayyeh, Ala; Mamlouk, Omar; Motwani, Shveta S; Murakami, Naoka; Herrmann, Sandra M; Manohar, Sandhya; Shirali, Anushree C; Kitchlu, Abhijat; Shirazian, Shayan; Assal, Amer; Vijayan, Anitha; Renaghan, Amanda DeMauro; Ortiz-Melo, David I; Rangarajan, Sunil; Malik, A Bilal; Hogan, Jonathan J; Dinh, Alex R; Shin, Daniel Sanghoon; Marrone, Kristen A; Mithani, Zain; Johnson, Douglas B; Hosseini, Afroz; Updey, Deekchha; Sharma, Shreyak; Gupta, Shruti; Reynolds, Kerry L; Sise, Meghan E; Leaf, David E

Background: Despite increasing recognition of the importance of immune checkpoint inhibitor-associated AKI, data on this complication of immunotherapy are sparse.

Methods: We conducted a multicenter study of 138 patients with immune checkpoint inhibitor-associated AKI, defined as a ≥2-fold increase in serum creatinine or new dialysis requirement directly attributed to an immune checkpoint inhibitor. We also collected data on 276 control patients who received these drugs but did not develop AKI.

Results: Lower baseline eGFR, proton pump inhibitor use, and combination immune checkpoint inhibitor therapy were each independently associated with an increased risk of immune checkpoint inhibitor-associated AKI. Median (interquartile range) time from immune checkpoint inhibitor initiation to AKI was 14 (6–37) weeks. Most patients had subnephrotic proteinuria, and approximately half had pyuria. Extrarenal immune-related adverse events occurred in 43% of patients; 69% were concurrently receiving a potential tubulointerstitial nephritis-causing medication. Tubulointerstitial nephritis was the dominant lesion in 93% of the 60 patients biopsied. Most patients (86%) were treated with steroids. Complete, partial, or no kidney recovery occurred in 40%, 45%, and 15% of patients, respectively. Concomitant extrarenal immune-related adverse events were associated with worse renal prognosis, whereas concomitant tubulointerstitial nephritis-causing medications and treatment with steroids were each associated with improved renal prognosis. Failure to achieve kidney recovery after immune checkpoint inhibitor-associated AKI was independently associated with higher mortality. Immune checkpoint inhibitor rechallenge occurred in 22% of patients, of whom 23% developed recurrent associated AKI.

Conclusions: This multicenter study identifies insights into the risk factors, clinical features, histopathologic findings, and renal and overall outcomes in patients with immune checkpoint inhibitor-associated AKI.

Title: Impact of acute kidney injury on prognosis of chronic kidney disease after aortic arch surgery.

Citation: Interactive cardiovascular and thoracic surgery; Feb 2020; vol. 30 (no. 2); p. 273-279

Author(s): Nakamura, Tamami; Mikamo, Akihito; Matsuno, Yutaro; Fujita, Akira; Kurazumi, Hiroshi; Suzuki, Ryo; Hamano, Kimikazu

Objectives: Postoperative acute kidney injury (AKI) is a common complication associated with increased long-term mortality after cardiothoracic surgery. However, AKI after total aortic arch replacement (TAR) is not well studied. This study aimed to investigate the prognosis and impact of AKI on the long-term outcomes of chronic kidney disease (CKD) patients undergoing TAR.

Methods: We included 208 patients who underwent TAR between September 2003 and December 2014. Patients were divided into a CKD (n = 83, 40%) and non-CKD (n = 125, 60%) group. The definition of AKI followed the Risk, Injury, Failure, Loss of kidney function
and End-stage kidney disease (RIFE) criteria. Independent risk factors for all-cause death and AKI were identified with multivariable analysis.

**Results:** Postoperative AKI was observed in 24 patients (29%) and 39 patients (31%) of CKD and non-CKD groups, respectively. The survival rate of CKD patients was significantly lower than that of non-CKD patients ($P = 0.02$). Among CKD patients, the 5-year survival rate was 57% in those with AKI group and 92% in those without AKI; prognosis was significantly poorer in patients with AKI ($P = 0.001$). In the non-CKD group, there was no difference in prognosis between patients with or without AKI ($P = 0.77$). Multivariable logistic regression analysis revealed that intraoperative blood loss of $\geq 600$ ml was the only predictor of AKI in the CKD group (odds ratio 4.32, $P = 0.04$).

**Conclusions:** CKD is associated with reduced long-term survival after TAR. Postoperative AKI strongly influences long-term survival in CKD patients only.

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**Title:** Antithrombin III expression predicts acute kidney injury in elderly patients with sepsis.

**Citation:** Experimental and therapeutic medicine; Feb 2020; vol. 19 (no. 2); p. 1024-1032

**Author(s):** Xie, Yun; Tian, Rui; Jin, Wei; Xie, Hui; Du, Jiang; Zhou, Zhigang; Wang, Ruilan

**Abstract:** Elderly people represent the age group most frequently affected by acute kidney injury (AKI). The potential of Antithrombin III (ATIII) level for predicting AKI among elderly patients with sepsis is yet to be elucidated. Therefore, the purpose of the present study was to evaluate the ability of ATIII to predict AKI nondevelopment and prognosis in elderly patients with sepsis, in an intensive care unit (ICU). The present study was retrospective and included 107 elderly patients with sepsis who had been admitted to ICUs between October 2015 and March 2018. An assessment of renal function was performed daily by measuring serum creatinine (Cr) level and urine output, and ATIII level was obtained within 48 h of sepsis diagnosis. Among all enrolled patients, 29 (27.1%) developed AKI. ATIII expression was a predictor of AKI nondevelopment [Area under the curve (AUC)-Receiving operator characteristic (ROC)=0.729; sensitivity, 0.700; specificity, 0.714], and the ATIII/Creatine ratio was also a predictor of AKI nondevelopment (AUC-ROC=0.971; sensitivity, 0.900; specificity, 1). The accuracy of ATIII (AUC-ROC=0.681; sensitivity, 0.802; specificity, 0.542) and ATIII/Cr (AUC-ROC=0.804; sensitivity, 0.596; specificity, 0.875) in predicting survival was intermediate. However, the ATIII serum level was able to accurately predict AKI nondevelopment in elderly patients with sepsis, who were admitted to ICUs. Patients were divided into low- and high-ATIII groups using either 66.95% or 55.7% as cut-off values, both of which were used for further analysis. By comparison, the ICU stay was significantly lower in the high-ATIII group [$P=0.020$ (69.95%) and 0.049 (55.7%)]) and off mechanical ventilation time, off continuous renal replacement therapy time and survival time were significantly higher in the high ATIII group [$P=0.049$, 0.048, and 0.014, respectively (66.95%); and $P=0.041$, 0.036, and 0.021, respectively (55.7%)]. The current study indicated that ATIII serum level predicts AKI in elderly patients with sepsis, and that low ATIII levels predicted a poorer prognosis.

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**Title:** Neutrophil-lymphocyte count ratio as a diagnostic marker for acute kidney injury: a systematic review and meta-analysis.

**Citation:** Clinical and experimental nephrology; Feb 2020; vol. 24 (no. 2); p. 126-135

**Author(s):** Chen, Dong; Xiao, Dong; Guo, Junchuan; Chahan, Bayin; Wang, Zhigao
**Objective:** The neutrophil-to-lymphocyte ratio (NLR) is calculated from the white cell differential blood count. Recently, NLR was identified as a potential biomarker for the prediction of acute kidney injury (AKI). We conducted this systematic review and meta-analysis to evaluate the diagnostic value of NLR for AKI in adult patients.

**Methods:** Studies in the PubMed, EMBASE, Web of Science and Cochrane Library databases were systematically searched from the date of database inception to February 28, 2019. The predictive value of NLR for AKI was evaluated by the pooled sensitivity, specificity, and summary receiver operating characteristic curve (SROC) analyses. Review Manager and Stata were used for all statistical analyses. The sources of potential heterogeneity were explored by a sensitivity analysis and subgroup analysis.

**Results:** This meta-analysis returned 89 reports, of which 9 fulfilled the inclusion criteria, accounting for 9766 patients. Bivariate analysis yielded a mean sensitivity of 0.736 (95% CI 0.675-0.790) and specificity of 0.686 (95% CI 0.601-0.759). The SROC was 0.77 (95% CI 0.74-0.81). The studies had no significant heterogeneity (Q = 0.675, p = 0.357, I2 = 0).

**Conclusions:** Our findings indicate that the NLR may be a reliable biomarker for the early detection of AKI. Our findings also provide important information and assistance for clinicians in the prediction of AKI.

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**Title:** The investigation of TIMI risk index for prediction of contrast-induced acute kidney injury in patients with ST elevation myocardial infarction.

**Citation:** Acta cardiologica; Feb 2020; vol. 75 (no. 1); p. 77-84

**Author(s):** Çınar, Tufan; Karabağ, Yavuz; Ozan Tanık, veysel; Çağdaş, Metin; Rencüzoğulları, İbrahim; Öz, Ahmet

**Objective:** Contrast-induced acute kidney injury (CI-AKI) is a well-known and life-threatening complication in patients with ST-elevation myocardial infarction (STEMI) after primary percutaneous coronary intervention (PCI). Several studies demonstrated that the Thrombolysis in Myocardial Infarction (TIMI) Risk Index (TRI) is a useful risk model in predicting early mortality in patients with acute coronary syndrome. The objective of the present study is to evaluate the predictive value of admission TRI for the occurrence of CI-AKI in patients with STEMI treated with primary PCI.

**Methods:** This retrospective study was consisted of a total of 660 consecutive STEMI patients who had undergone primary PCI from December 2015 to March 2017. The primary end-point was CI-AKI incidence after primary PCI during the in-hospital course.

**Results:** The TRI of CI-AKI group was higher than the non-CI-AKI group (24.2 (19.3-32.2) vs. 17.5 (12.9-24.3), p < .001, respectively). In multivariable logistic regression analysis, TRI was found to be an independent predictors of CI-AKI (OR: 1.055, 95% CI: 1.027-1.083, p < .001). The discriminative power of TRI with regards to occurrence of CI-AKI was superior compared to its components.

**Conclusion:** This study is the first to demonstrate that TRI can be used to predict the development of CI-AKI in patients with STEMI who undergo primary PCI. Health professionals might be able to use the TRI risk score to predict CI-AKI due to the simplicity and accessibility of this risk index.

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**Title:** Micronutrients in critically ill patients with severe acute kidney injury - a prospective study.

**Citation:** Scientific reports; Jan 2020; vol. 10 (no. 1); p. 1505

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Author(s): Ostermann, Marlies; Summers, Jennifer; Lei, Katie; Card, David; Harrington, Dominic J; Sherwood, Roy; Turner, Charles; Dalton, Neil; Peacock, Janet; Bear, Danielle E

Abstract: Malnutrition is common in patients with acute kidney injury (AKI) and the risk of mortality is high, especially if renal replacement therapy is needed. Between April 2013 through April 2014, we recruited critically ill adult patients (≥18 years) with severe AKI in two University hospitals in London, UK, and measured serial plasma concentrations of vitamin B1, B6, B12, C and D, folate, selenium, zinc, copper, iron, carnitine and 22 amino acids for six consecutive days. In patients receiving continuous renal replacement therapy (CRRT), the concentrations of the same nutrients in the effluent were also determined. CRRT patients (n = 31) had lower plasma concentrations of citrulline, glutamic acid and carnitine at 24 hrs after enrolment and significantly lower plasma glutamic acid concentrations (74.4 versus 98.2 μmol/L) at day 6 compared to non-CRRT patients (n = 24). All amino acids, trace elements, vitamin C and folate were detectable in effluent fluid. In >30% of CRRT and non-CRRT patients, the plasma nutrient concentrations of zinc, iron, selenium, vitamin D3, vitamin C, tryptophan, taurine, histidine and hydroxyproline were below the reference range throughout the 6-day period. In conclusion, altered micronutrient status is common in patients with severe AKI regardless of treatment with CRRT.

Title: Risk Factors for Acute Kidney Injury in Hospitalized Non-Critically Ill Patients: A Population-Based Study.

Citation: Mayo Clinic proceedings; Jan 2020
Author(s): Safadi, Sami; Hommos, Musab S; Enders, Felicity T; Lieske, John C; Kashani, Kianoush B

Objective: To develop and validate an acute kidney injury (AKI) risk prediction model for hospitalized non-critically ill patients.

Patients and methods: We retrospectively identified all Olmsted County, Minnesota, residents admitted to non-intensive care unit (ICU) wards at Mayo Clinic Hospital, Rochester, Minnesota, in 2013 and 2014. The cohort was divided into development and validation sets by year. The primary outcome was hospital-acquired AKI defined by Kidney Disease: Improving Global Outcomes criteria. Cox regression was used to analyze mortality data. Comorbid risk factors for AKI were identified, and a multivariable model was developed and validated.

Results: The development and validation cohorts included 3816 and 3232 adults, respectively. Approximately 10% of patients in both cohorts had AKI, and patients with AKI had an increased risk of death (hazard ratio, 3.62; 95% CI, 2.97-4.43; P<.001). Significant univariate determinants of AKI were preexisting kidney disease, diabetes mellitus, hypertension, heart failure, vascular disease, coagulopathy, pulmonary disease, coronary artery disease, cancer, obesity, liver disease, and weight loss (all P<.05). The final multivariable model included increased baseline serum creatinine value, admission to a medical service, pulmonary disease, diabetes mellitus, kidney disease, cancer, hypertension, and vascular disease. The area under the receiver operating characteristic curves for the development and validation cohorts were 0.71 (95% CI, 0.69-0.75) and 0.75 (95% CI, 0.72-0.78), respectively.

Conclusion: Hospital-acquired AKI is common in non-ICU inpatients and is associated with worse outcomes. Patient data at admission can be used to identify increased risk; such patients may benefit from more intensive monitoring and earlier intervention and testing with emerging biomarkers.
Title: Incidence, predictors and prognosis of acute kidney injury in nonagenarians: an in-hospital cohort study.

Citation: BMC nephrology; Jan 2020; vol. 21 (no. 1); p. 34

Author(s): Sousa, Andre Luis Bastos; de Souza, Leticia Mascarenhas; Santana Filho, Osvaldino Vieira; E Léda, Victor Hugo Ferreira; Rocha, Paulo Novis

Background: Given the aging of the population, nephrologists are ever more frequently assisting nonagenarians with acute kidney injury (AKI). The management of these patients presents unique characteristics, including bioethical dilemmas, such as the utilization of renal replacement therapy (RRT) at this extreme age.

Methods: We conducted a retrospective cohort study at a tertiary hospital. Over a 10-year period, 832 nonagenarians were hospitalized for two or more days. A random sample of 461 patients was obtained; 25 subjects were excluded due to lack of essential data. AKI was defined and staged according to the Kidney Disease Improving Global Outcomes (KDIGO) criteria.

Results: We analyzed data from 436 patients, mean age 93.5 ± 3.3 years, 74.3% female; 76.4% required intensive care unit (ICU). The incidence of AKI was 45%. Length of hospital stay, ICU admission, vasopressors, and mechanical ventilation (MV) were independent predictors of AKI. Overall in-hospital mortality was 43.1%. Mortality was higher in the AKI compared to the no AKI group (66.8% vs. 23.8%, p < 0.001). Only 13 patients underwent RRT; all were critically ill, requiring vasopressors and 76.9% in MV. Mortality for this RRT group was 100% but not significantly higher than that observed in 26 non-RRT controls (96.1%, p = 1.0) obtained by proportional random sampling, matched by variables related to illness severity. In multivariable analysis, age, Charlson’s score, vasopressors, MV, and AKI - but not RRT - were independent predictors of mortality.

Conclusions: AKI is common in hospitalized nonagenarians and carries a grave prognosis, especially in those who are critically ill. The use of RRT was not able to change the fatal prognosis of this subgroup of patients. Our data may help guide informed decisions about the utility of RRT in this scenario.

Title: Effect of dexmedetomidine on acute kidney injury after aortic surgery: a single-centre, placebo-controlled, randomised controlled trial.

Citation: British journal of anaesthesia; Jan 2020

Author(s): Soh, Sarah; Shim, Jae-Kwang; Song, Jong-Wook; Bae, Jae-Chan; Kwak, Young-Lan

Objective: Acute kidney injury (AKI) is a frequent and serious complication after aortic surgery requiring cardiopulmonary bypass (CPB). Dexmedetomidine, a selective α-2 adrenoreceptor agonist, may reduce AKI because of its sympatholytic and anti-inflammatory effects against ischaemia-reperfusion injury. We investigated the effect of dexmedetomidine administration on AKI after aortic surgery requiring CPB in a placebo-controlled randomised controlled trial.

Methods: A total of 108 patients were randomly assigned to an infusion of dexmedetomidine or saline at a rate of 0.4 μg kg⁻¹ h⁻¹ for 24 h starting after anaesthetic induction. The primary outcome was the incidence of AKI, as defined by the Kidney Disease: Improving Global Outcomes (KDIGO) criteria. The secondary outcomes included delirium and major morbidity. Safety outcomes were drug-related adverse events (bradycardia, hypotension).
Results: AKI occurred in 7/54 (13%) subjects randomised to dexmedetomidine, compared with 17/54 (31%) subjects randomised to saline infusion (odds ratio=0.32; 95% confidence interval [CI], 0.12-0.86; P=0.026). Secondary outcomes, including stroke, mortality, and delirium, were similar between subjects randomised to dexmedetomidine (16/54 [30%] or saline control (22 [41%]; odds ratio=0.61 [95% CI, 0.28-1.36]). The incidence of bradycardia and hypotension was similar between groups [14/54 (26%) vs. 17/54 (32%) (odds ratio:0.76 (95%CI:0.33-1.76) and 29/54 (54%) vs. 36/54 (67%) (odds ratio:0.58 (95%CI:0.27-1.26), respectively). The length of hospital stay was shorter in the dexmedetomidine group (12 [10-17] days) vs saline control (15 [11-21] days; P=0.039).

Conclusions: Pre-emptive dexmedetomidine administration for 24 h starting after induction of anaesthesia reduced the incidence of AKI after aortic surgery requiring CPB, without any untoward side-effects related to its sedative or sympatholytic effects.

Title: Practical guide to prevention of contrast-induced acute kidney injury after percutaneous coronary intervention.

Citation: Catheterization and cardiovascular interventions : official journal of the Society for Cardiac Angiography & Interventions; Jan 2020

Author(s): Bugani, Giulia; Ponticelli, Francesco; Giannini, Francesco; Gallo, Francesco; Gaudenzi, Eleonora; Laricchia, Alessandra; Fisicaro, Andrea; Cimaglia, Paolo; Mangieri, Antonio; Gardi, Ilja; Colombo, Antonio

Abstract: Contrast-induced acute kidney injury (CI-AKI) represents a common but serious complication of percutaneous coronary interventions (PCI) and in general of all those examinations requiring iodinated contrast injection which affects not only renal function but also long-term prognosis. While several prophylactic approaches were designed in order to prevent CI-AKI, most failed to demonstrate clear benefits in randomized trials, and their implementation is therefore discouraged in clinical practice. The most notorious examples include pre-procedural bicarbonate or N-acetylcysteine, and preprocedural withdrawal of ACE inhibitors/Angiotensin receptor blockers. Those strategies that were instead demonstrated effective include the appropriate use of preprocedural hydration, reduction in contrast volume utilization, adoption of techniques for zero- or ultra-low-contrast procedures, and pharmacological treatments with statins. In this brief review, we summarize the main preventive strategies into brief and pragmatic recommendations designed to improve everyday clinical practice.

Title: The use of low doses of methotrexate during peri-cell infusion period may be a risk factor for acute kidney injury in patients subjected to hematopoietic stem cell transplantation.

Citation: Annals of hematology; Jan 2020

Author(s): Ferraz, Fernanda Toledo Piza; Marra, Alexandre Rodrigues; Hamerschlak, Nelson; de Souza Durão Junior, Marcelino

Abstract: Acute kidney injury (AKI) after hematopoietic stem cell transplantation (HSCT) is associated with high mortality rates. To determine the incidence and risk factors associated with AKI in patients undergoing HSCT during the infusion period, patients admitted for HSCT from 2012 to 2015 were studied. AKI was classified according to the KDIGO (Kidney Disease Improving Global Outcomes) criteria. We analyzed the main comorbidities, underlying conditions, types of transplant, preparative regimens, and use of potentially
nephrotoxic drugs as risk factors for AKI. Among the 180 patients (median age 53 years), 69 (36.5%) developed AKI (23 KDIGO 1, 28 KDIGO 2, and 18 KDIGO 3), 49 (50.0%) undergoing allogeneic and 20 (22.3%) autologous transplantation, and 18 (9.4%) required dialysis. The main comorbidities were hypertension (38; 19.8%), and diabetes (19; 9.9%). The median pre-transplant creatinine was 0.7 mg/dl. Twenty-one patients died (10.9%). The risk factors for AKI in allogeneic HSCT were as follows: baseline estimated glomerular filtration rate (eGFR) (RR 1.12 (1.02-1.22), p = 0.019), use of vasopressors (RR 3.72 (2.20-6.29), p < 0.001), and use of methotrexate (RR 1.83 (1.08-3.11), p = 0.025). Male gender (RR 5.91 (1.65-21.16), p = 0.006), baseline eGFR (RR 1.22 (1.04-1.43), p = 0.011), and use of aminoglycosides (RR 3.92 (1.06-14.44), p = 0.041) were the risk factors for AKI associated with autologous HSCT. During hospitalization for HSCT, AKI was a common problem. The use of a low dose of methotrexate to prevent graft versus host disease was associated with its occurrence.

Title: Easy-to-use tool for evaluating the elevated acute kidney injury risk against reduced cardiovascular disease risk during intensive blood pressure control.

Citation: Journal of hypertension; Jan 2020

Author(s): Venäläinen, Mikko S; Klén, Riku; Mahmoudian, Mehrad; Raitakan, Olli T; Elo, Laura L

Objective: The Systolic Blood Pressure Intervention Trial (SPRINT) reported that lowering SBP to below 120mmHg (intensive treatment) reduced cardiovascular morbidity and mortality among adults with hypertension but increased the incidence of adverse events, particularly acute kidney injury (AKI). The goal of this study was to develop an accurate risk estimation tool for comparing the risk of cardiovascular events and adverse kidney-related outcomes between standard and intensive antihypertensive treatment strategies.

Methods: By applying Lasso regression on the baseline characteristics and health outcomes of 8760 participants with complete baseline information in the SPRINT trial, we developed predictive models for primary cardiovascular disease (CVD) outcome and incidence of AKI. Both models were validated against an independent test set of the SPRINT trial (one third of data not used for model building) and externally against the cardiovascular and renal outcomes available in Action to Control Cardiovascular Risk in Diabetes Blood Pressure trial, consisting of 4733 participants with type 2 diabetes mellitus. RESULTS Lasso regression identified a subset of variables that accurately predicted the primary CVD outcome and the incidence of AKI (areas under receiver-operating characteristic curves 0.70 and 0.77, respectively). Based on the validated risk models, an easy-to-use risk assessment tool was developed and made available as an easy-to-use online tool.

Conclusion: By predicting the risks of CVD and AKI at baseline, the developed tool can be used to weigh the benefits of intensive versus standard blood pressure control and to identify those who are likely to benefit most from intensive treatment.

Title: Incidence and Predictors of Acute Kidney Injury Following Transcatheter Aortic Valve Replacement: Role of Changing Definitions of Renal Function and Injury.

Citation: The Journal of invasive cardiology; Jan 2020

Author(s): Rodriguez, Ruben; Hasoon, Mohammed; Eng, Marvin; Michalek, Joel; Liu, Qianqian; Hernandez, Brian; Bansal, Shweta; Bailey, Steven R; Prasad, Anand
**Background:** Acute kidney injury (AKI) following transcatheter aortic valve replacement (TAVR) is a known complication. The prospective validation of various AKI definitions and estimated baseline renal function equations in the context of TAVR remains an ongoing area of research. This study examined the Valve Academic Research Consortium (VARC) 1 and 2 criteria for AKI, and impact of three estimated glomerular filtration rate (eGFR) equations (CKD-EPI, MDRD, and Cockcroft-Gault) on AKI incidence in TAVR patients.

**Methods:** Retrospective review of 120 consecutive TAVR procedures over a 4-year period was performed. AKI, including stage, was defined using the VARC 1 and VARC 2 criteria. Univariate and multivariate analyses were performed for association between AKI and known patient, hemodynamic, and procedural variables. Further logistic regression, stepwise logistic regression, and association plots were performed for the three different eGFR calculations.

**Results:** AKI occurred in 22% of VARC 1 patients and 23% of VARC 2 patients. On multivariate analysis, baseline eGFR was predictive of stage 1 AKI by CKD-EPI classification (VARC 1: odds ratio [OR], 0.93; 95% confidence interval [CI], 0.88-0.99; P=.02; VARC 2: OR, 0.93; 95% CI, 0.87-0.99; P=.03) and MDRD (OR, 0.93; 95% CI, 0.88-0.99; P=.03). Non-transfemoral approach was predictive of stage 1 AKI by VARC 2 (OR, 33.33; 95% CI, 1.6-696.41; P=.02).

**Conclusions:** The incidence and risk factor associations for AKI post TAVR vary by definitions used. Decreased GFR at baseline by both MDRD and CKD-EPI and non-transfemoral approach were associated with an increased risk of AKI post TAVR.

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**Title:** Risk of Acute Kidney Injury Associated With Medication Administration in the Emergency Department.

**Citation:** The Journal of emergency medicine; Jan 2020

**Author(s):** Hinson, Jeremiah S; Ehmann, Michael R; Al Jalbout, Nour; Ortman, Melinda J; Zschoche, Juliana; Klein, Eili Y

**Objective:** Patients who develop acute kidney injury (AKI) have a 2-fold increased risk for major adverse events within 1 year. An estimated 19-26% of all cases of hospital-acquired AKI may be attributable to drug-induced kidney disease (DIKD). Patients evaluated in the emergency department (ED) are often prescribed potentially nephrotoxic drugs, yet the role of ED prescribing in DIKD is unknown. We sought to measure the association between ED medication administration and development of AKI.

**Methods:** This was a retrospective 5-year cohort analysis at a single center. Patients with a serum creatinine measurement at presentation in the ED and 24-168 h later were included. Outcome was incidence of AKI as defined by Kidney Disease Improving Global Outcomes criteria in the 7 days after ED evaluation. Medication administration risk was estimated using Cox proportional hazards model.

**Results:** There were 46,965 ED encounters by 30,407 patients included in the study, of which 6461 (13.8%) patients met the criteria for AKI. For hospitalized patients, administration of a potentially nephrotoxic medication was associated with increased risk of AKI (hazard ratio [HR] 1.30 [95% confidence interval {CI} 1.20-1.41]). Diuretics were associated with the largest risk of AKI (HR 1.64 [95% CI 1.52-1.78]), followed by angiotensin-converting enzyme inhibitors (HR 1.39 [95% CI 1.26-1.54]) and antibiotics (HR 1.13 [95% CI 1.05-1.22]). For discharged patients, administration of antibiotics was strongly associated with increased risk of AKI (HR 3.19 [95% CI 1.08-9.43]).

**Conclusion:** ED administration of potentially nephrotoxic medications was associated with an increased risk of AKI in the following 7 days. Diuretics, angiotensin-converting enzyme
inhibitors, and antibiotics were independently associated with increased risk of AKI. Nephroprotective practices in the ED may mitigate kidney injury and long-term adverse outcomes.

Title: Definition of hourly urine output influences reported incidence and staging of acute kidney injury.

Citation: BMC nephrology; Jan 2020; vol. 21 (no. 1); p. 19
Author(s): Allen, Jennifer C; Gardner, David S; Skinner, Henry; Harvey, Daniel; Sharman, Andrew; Devonald, Mark A J

Objective: Acute kidney injury (AKI) is commonly defined using the KDIGO system, which includes criteria based on reduced urine output (UO). There is no consensus on whether UO should be measured using consecutive hourly readings or mean output. This makes KDIGO UO definition and staging of AKI vulnerable to inconsistency which has implications both for research and clinical practice. The objective of this study was to investigate whether the way in which UO is defined affects incidence and staging of AKI.

Methods: We conducted a retrospective analysis of two single centre observational studies investigating (i) patients undergoing cardiac surgery and (ii) patients admitted to general intensive care units (ICU). AKI was identified using KDIGO serum creatinine (SCR) criteria and two methods of UO (UOcons: UO meeting KDIGO criteria in each consecutive hour; UOmean: mean hourly UO meeting KDIGO criteria).

Results: Data from 151 CICU and 150 ICU admissions were analysed. Incidence of AKI using SCR alone was 23.8% in CICU and 32% in ICU. Incidence increased in both groups when UO was considered, with inclusion of UOmean more than doubling reported incidence of AKI (CICU: UOcons 39.7%, UOmean 72.8%; ICU: UOcons 51.3%, UOmean 69.3%). In both groups UOcons led to a larger increase in KDIGO stage 1 but UOmean increased the incidence of KDIGO stage 2.

Conclusions: We demonstrate a serious lack of clarity in the internationally accepted AKI definition leading to significant variability in reporting of AKI incidence.

Sources Used:
The following databases are used in the creation of this bulletin: CINAHL & Medline.

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