Royal United Hospitals Bath
NHS Foundation Trust

AKI
Current Awareness Bulletin
September 2020

A number of other bulletins are also available – please contact the Academy Library for further details

If you would like to receive these bulletins on a regular basis please contact the library.

If you would like any of the full references we will source them for you.

Contact us: **Academy Library 824897/98**

Email: **ruh-tr.library@nhs.net**

Title: Hepatorenal syndrome: pathophysiology, diagnosis, and management.

Citation: BMJ; 2020; vol. 370
Authors: Simonetto DA

Abstract: In this review, we provide critical insight into the definition, pathophysiology, diagnosis, and management of hepatorenal syndrome.

Title: Protein-Energy Wasting Assessment and Clinical Outcomes in Patients with Acute Kidney Injury: A Systematic Review with Meta-Analysis.

Citation: Nutrients; Sep 2020; vol. 12 (no. 9)

Author(s): Khor, Ban-Hock; Tiong, Hui-Ci; Tan, Shing Cheng; Abdul Rahman, Raha; Abdul Gafor, Abdul Halim

Abstract: Nutritional assessment is essential to identify patients with acute kidney injury (AKI) who are protein-energy wasting (PEW) and at risk of poor clinical outcomes. This systematic review aimed to investigate the relationship of nutritional assessments for PEW with clinical outcomes in patients with AKI. A systematic search was performed in PubMed, Scopus, and Cochrane Library databases using search terms related to PEW, nutrition assessment, and AKI to identify prospective cohort studies that involved AKI adult patients with at least one nutritional assessment performed and reported relevant clinical outcomes, such as mortality, length of stay, and renal outcomes associated with the nutritional parameters. Seventeen studies reporting eight nutritional parameters for PEW assessment were identified and mortality was the main clinical outcome reported. A meta-analysis showed that PEW assessed using subjective global assessment (SGA) was associated with greater mortality risk (RR: 1.99, 95% CI: 1.36-2.91). Individual nutrition parameters, such as serum chemistry, body mass, muscle mass, and dietary intakes, were not consistently associated with mortality. In conclusion, SGA is a valid tool for PEW assessment in patients with AKI, while other nutrition parameters in isolation had limited validity for PEW assessment.

Title: Acute kidney injury biomarkers in the critically ill.

Citation: Clinica chimica acta; international journal of clinical chemistry; Sep 2020; vol. 508 ; p. 170-178

Author(s): Amaral Pedroso, Luana; Nobre, Vandack; Dias Carneiro de Almeida, Claudmeire; da Silva Praxedes, Marcus Fernando; Sernizon Guimarães, Nathália; Simões E Silva, Ana Cristina; Parreiras Martins, Maria Auxiliadora

Abstract: Acute kidney injury (AKI) is a highly common complication in intensive care units (ICUs). Novel biomarkers might accelerate the detection and management of AKI. We performed a systematic review aiming to evaluate the performance of biomarkers for early AKI diagnosis in ICUs. MEDLINE, BVS, CINAHL, COCHRANE and EMBASE were searched for studies (2006-2019) on the use of biomarkers for AKI diagnosis. Preselected biomarkers were cystatin C, chitinase-3-like protein-1 (UCHI3L1), neutrophil gelatinase-associated lipocalin (NGAL), interleukin-18 (IL-18), kidney injury molecule-1 (KIM-1) and interferon-gamma-inducible protein 10 (IP-10/CXCL-10), measured in plasma or urine. Eleven articles with total of 2,289 patients were included. The most cited biomarker was NGAL (n = 7 studies; 63.6%). Biomarkers with the highest sensitivity (se) and specificity (sp) were urinary heat shock protein (HSP-72) (se = 100%; sp = 90%) and urinary IL-18 (se = 92%;

sp = 100%). All biomarkers' performance was influenced by the presence of comorbidities or AKI etiology. Although some biomarkers showed good performance, there was no externally validated biomarker for early AKI diagnosis. Thus, from this review, we did not indicate a novel biomarker to be promptly used in clinical practice. Prospective studies with a large number of patients are needed to expand knowledge in this field.

Title: Preterm birth and neonatal acute kidney injury: implications on adolescent and adult outcomes.

Citation: Journal of Perinatology; Sep 2020; vol. 40 (no. 9); p. 1286-1295

Author(s): Harer ; Charlton, Jennifer R.; Tipple, Trent E.; Reidy, Kimberly J.

Abstract: As a result of preterm birth, immature kidneys are exposed to interventions in the NICU that promote survival, but are nephrotoxic. Furthermore, the duration of renal development may be truncated in these vulnerable neonates. Immaturity and nephrotoxic exposures predispose preterm newborns to acute kidney injury (AKI), particularly in the low birth weight and extremely preterm gestational age groups. Several studies have associated preterm birth as a risk factor for future chronic kidney disease (CKD). However, only a few publications have investigated the impact of neonatal AKI on CKD development. Here, we will review the evidence linking preterm birth and AKI in the NICU to CKD and highlight the knowledge gaps and opportunities for future research. For neonatal intensive care studies, we propose the inclusion of AKI as an important short-term morbidity outcome and CKD findings such as a reduced glomerular filtration rate in the assessment of long-term outcomes.

Title: The impact of increased awareness of acute kidney injury in the Neonatal Intensive Care Unit on acute kidney injury incidence and reporting: results of a retrospective cohort study.

Citation: Journal of Perinatology; Sep 2020; vol. 40 (no. 9); p. 1301-1307

Author(s): Starr ; Kula, Alexander; Lieberman, Joshua; Menon, Shina; Perkins, Anthony J.; Lam, Teresa; Chabra, Shilpi; Hingorani, Sangeeta

Abstract: To evaluate the impact of nephrology integration in the NICU on acute kidney injury (AKI) incidence, provider reporting, and nephrology referral. Cohort study in a single-center NICU from January 2012 to December 2017 (n = 1464). We assessed the impact of clinical practice changes including neonatal-nephrology rounds on the incidence of AKI. AKI occurred in 318 neonates (22%). AKI occurred less frequently in those admitted after clinical practice changes ($P < 0.001$). After multivariable adjustment, clinical practice changes were associated with reduced odds of AKI (adjusted odds ratio, 0.31; 95% CI 0.22–0.44, $P < 0.001$). Provider reporting of AKI improved ($P < 0.001$) and more neonates were referred for nephrology follow-up ($P < 0.001$). Increased nephrology integration in the NICU was associated with decreased AKI incidence. While recognition of AKI improved, AKI remained poorly reported and nephrology AKI follow-up did not routinely occur. This study supports the importance of increased nephrology involvement in the NICU.

Title: Acute kidney injury: Challenges and opportunities.

Citation: Nursing; Sep 2020; vol. 50 (no. 9); p. 44-50

Author(s): DINH

Abstract: Acute kidney injury (AKI) can be a devastating diagnosis for any patient and can increase mortality during hospitalization. There can be long-term consequences for those who survive the initial insult. This article discusses AKI and its implications for nurses.

Title: The Predictive Value of Serum Uric Acid on Acute Kidney Injury following Traumatic Brain Injury.

Citation: BioMed Research International; Aug 2020 ; p. 1-8

Author(s): Wang ; He, Min; Ou, Xiao Feng; Xie, Xiao Qi; Kang, Yan

Objective: Acute kidney injury (AKI) is a prevalent nonneurological complication in patients with traumatic brain injury (TBI). We designed this study to explore the association between serum uric acid (SUA) level and the occurrence of AKI following TBI.

Methods: This is a retrospective single-center study. A total of 479 patients admitted with TBI were included in this study. We utilized SUA and other risk factors for AKI to construct a predictive model by performing multivariate logistic regression. 374 patients and 105 patients were, respectively, divided into a training set and validation set. The predictive value of the single SUA and constructed model was evaluated by drawing a receiver operating characteristic (ROC) curve. AKI was diagnosed according to the KIDGO criteria.

Results: 79 (21.12%) patients were diagnosed with AKI in the training cohort. The patients in the AKI group are older than those in the non-AKI group ($p = 0.01$). And the Glasgow Coma Scale (GCS) of the AKI group was lower than that of the non-AKI group ($p < 0.001$). In a multivariate logistic regression analysis, we found that heart rate ($p = 0.041$), shock ($p = 0.018$), serum creatinine ($p < 0.001$), and serum uric acid (SUA) ($p < 0.001$) were significant risk factors for AKI. Bivariate correlation analyses showed that serum creatinine was moderately positively correlated with SUA ($r = 0.523$, $p < 0.001$). Finally, the area under the receiver operating characteristic curve (AUC) of SUA for predicting AKI in the training set and validation set was 0.850 (0.805-0.895) and 0.869 (0.801-0.938), respectively.

Conclusions: SUA is an effective risk factor for AKI following TBI. Combining SUA with serum creatinine could more accurately identify TBI patients with high risk of developing AKI.

Title: Left Ventricular End-Diastolic Pressure Versus Urine Flow Rate-Guided Hydration in Preventing Contrast-Associated Acute Kidney Injury.

Citation: JACC. Cardiovascular interventions; Sep 2020; vol. 13 (no. 17); p. 2065-2074

Author(s): Briguori, Carlo; D'Amore, Carmen; De Micco, Francesca; Signore, Nicola; Esposito, Giovanni; Visconti, Gabriella; Airoldi, Flavio; Signoriello, Giuseppe; Focaccio, Amelia

Objectives: This study compared left ventricular end-diastolic pressure (LVEDP)-guided and urine flow rate (UFR)-guided hydration.

Background: Tailored hydration regimens improve the prevention of contrast-associated acute kidney injury (CA-AKI).

Methods: Between July 15, 2015, and June 6, 2019, patients at high risk for CA-AKI scheduled for coronary and peripheral procedures were randomized to 2 groups: 1) normal saline infusion rate adjusted according to the LVEDP (LVEDP-guided group); and 2) hydration controlled by the RenalGuard System in order to reach UFR ≥300 ml/h (UFR-guided group). The primary endpoint was the composite of CA-AKI (i.e., serum creatinine increase ≥25% or ≥0.5 mg/dl at 48 h) and acute pulmonary edema (PE). Major adverse events (all-cause death, renal failure requiring dialysis, PE, and sustained kidney injury) at 1 month were assessed.

Results: The primary endpoint occurred in 20 of 351 (5.7%) patients in the UFR-guided group and in 36 of 351 (10.3%) patients in the LVEDP-guided group (relative risk [RR]: 0.560; 95% confidence interval [CI]: 0.390 to 0.790; p = 0.036). CA-AKI and PE rates in the UFR-guided group and LVEDP-guided group were 5.7% and 10.0% (RR: 0.570; 95% CI: 0.300 to 0.960; p = 0.048), and, respectively, 0.3% and 2.0% (RR: 0.070; 95% CI: 0.020 to 1.160; p = 0.069). Three patients in the UFR-guided group experienced complications related to the Foley catheter. Hypokalemia rate was 6.2% in the UFR-guided group and 2.3% in the LVEDP-guided group (p = 0.013). The 1-month major adverse events rate was 7.1% in the UFR-guided group and 12.0% in the LVEDP-guided group (p = 0.030).

Conclusion: The study demonstrates that UFR-guided hydration is superior to LVEDP-guided hydration to prevent the composite of CA-AKI and PE.

Title: Serum neutrophil Gelatinase-associated Lipocalin at 3 hours after return of spontaneous circulation in patients with cardiac arrest and therapeutic hypothermia: early predictor of acute kidney injury.

Citation: BMC nephrology; Sep 2020; vol. 21 (no. 1); p. 389

Author(s): Choi, Yoon Hee; Lee, Dong Hoon; Lee, Jae Hee

Objective: Serum neutrophil gelatinase-associated lipocalin (NGAL) could be used as a predictive marker of acute kidney injury (AKI) in patients with return of spontaneous circulation (ROSC) after out-of-hospital cardiac arrest (OHCA) who are managed with targeted temperature management (TTM). However, the NGAL measurement timepoints vary from immediately after ROSC to several days later. The primary objective of this study was to determine an association between AKI and NGAL, both immediately (ROSC-NGAL) and 3 h after ROSC (3 h-NGAL), in OHCA patients with TTM. The secondary objective was to ascertain the association between NGAL levels in the early post-ROSC phase and the neurologic outcomes at discharge.

Methods: This prospective observational study was conducted between January 2016 and December 2018 and enrolled adult OHCA patients (≥18 years) with TTM after ROSC. The serum NGAL level was measured both immediately and 3 h after ROSC. Univariate and multivariate analyses were performed to identify the associations between AKI, poor neurologic outcome, and NGAL.

Results: Among 861 OHCA patients, 89 patients were enrolled. AKI occurred in 48 (55.1%) patients. On multivariate logistic regression analysis, 3 h-NGAL was significantly associated with AKI (odds ratio [OR] 1.022; 95% confidence interval [CI] 1.009-1.035; p = 0.001). The area under the receiver operating characteristic curve of 3 h-NGAL for AKI was 0.910 (95% CI 0.830-0.960), and a cut-off value of 178 ng/mL was identified. Both ROSC-NGAL and 3 h-NGAL were not significantly associated with poor neurologic outcome on multivariate logistic regression analysis (ROSC-NGAL; OR 1.017; 95% CI 0.998-1.036; p = 0.084, 3 h-NGAL; OR 0.997; 95% CI 0.992-1.001; p = 0.113).

Conclusions: The serum NGAL concentration measured 3 h after ROSC is an excellent early predictive marker for AKI in OHCA patients treated with TTM. Future research is needed to identify the optimal measurement timepoint to establish NGAL as a predictor of neurologic outcome and to validate the findings of this research.

Title: Acute Kidney Injury is Associated with Worse Prognosis In COVID-19 Patients: A Systematic Review and Meta-analysis.

Citation: Acta bio-medica : Atenei Parmensis; Sep 2020; vol. 91 (no. 3)

Author(s): Cheruiyot, Isaac; Henry, Brandon; Lippi, Giuseppe; Kipkorir, Vincent; Ngure, Brian; Munguti, Jeremiah; Misiani, Musa

Objective: The association between acute kidney injury (AKI) and outcome of coronavirus disease 2019 (COVID-19) has not yet been conclusively established. Therefore, we conducted a meta-analysis of recent scientific literature to assess whether AKI may be associated with worse prognosis and increased mortality in COVID-19 patients.

Methods: A systematic search of literature was conducted between 1st November 2019 and 15th May 2020 on Medline (PubMed interface) and China National Knowledge Infrastructure (CNKI) to identify potentially eligible studies. Cohort or case-control studies reporting data on AKI in patients with or without severe COVID-19 were included. Studies were divided into separate cohorts for analysis based on two endpoints (severity [severe vs non-severe] and mortality [non-survivors vs survivors]). Data were pooled into a meta-analysis to estimate pooled odds ratio (OR) with 95% confidence interval (95% CI) for either outcome.

Results: A total of 15 studies (n= 5,832 patients) were included in the analysis. Overall, AKI was found to be associated with significantly increased odds of COVID-19 severity (OR= 18.5; 95% CI 8.99-38.08) and mortality (OR= 23.9; 95% CI 18.84-30.31). No heterogeneity was observed for both outcomes (Cochran's Q= 6.21, p=0.52, I2=0% and Cochran's Q= 4.56, p=0.47, I2=0% respectively).

Conclusion: According to current data, AKI seems to be associated with worse prognosis in COVID-19 -patients. -Further investigation of the underlying mechanism of renal disease in COVID-19 would be needed to clarify possible therapeutic targets. AKI could be used as a clinical characteristic in severity classification and risk -stratification.

Title: AKI in Hospitalized Patients with COVID-19.

Citation: Journal of the American Society of Nephrology : JASN; Sep 2020

Author(s): Chan, Lili; Chaudhary, Kumardeep; Saha, Aparna; Chauhan, Kinsuk; Vaid, Akhil; Zhao, Shan; Paranjpe, Ishan; Somani, Sulaiman; Richter, Felix; Miotto, Riccardo; Lala, Anuradha; Kia, Arash; Timsina, Prem; Li, Li; Freeman, Robert; Chen, Rong; Narula, Jagat; Just, Allan C; Horowitz, Carol; Fayad, Zahi; Cordon-Cardo, Carlos; Schadt, Eric; Levin, Matthew A; Reich, David L; Fuster, Valentin; Murphy, Barbara; He, John C; Charney, Alexander W; Böttinger, Erwin P; Glicksberg, Benjamin S; Coca, Steven G; Nadkarni, Girish N; Mount Sinai COVID Informatics Center (MSCIC)

Background: Early reports indicate that AKI is common among patients with coronavirus disease 2019 (COVID-19) and associated with worse outcomes. However, AKI among hospitalized patients with COVID-19 in the United States is not well described.

Methods: This retrospective, observational study involved a review of data from electronic health records of patients aged ≥18 years with laboratory-confirmed COVID-19 admitted to

the Mount Sinai Health System from February 27 to May 30, 2020. We describe the frequency of AKI and dialysis requirement, AKI recovery, and adjusted odds ratios (aORs) with mortality.

Results: Of 3993 hospitalized patients with COVID-19, AKI occurred in 1835 (46%) patients; 347 (19%) of the patients with AKI required dialysis. The proportions with stages 1, 2, or 3 AKI were 39%, 19%, and 42%, respectively. A total of 976 (24%) patients were admitted to intensive care, and 745 (76%) experienced AKI. Of the 435 patients with AKI and urine studies, 84% had proteinuria, 81% had hematuria, and 60% had leukocyturia. Independent predictors of severe AKI were CKD, men, and higher serum potassium at admission. In-hospital mortality was 50% among patients with AKI versus 8% among those without AKI (aOR, 9.2; 95% confidence interval, 7.5 to 11.3). Of survivors with AKI who were discharged, 35% had not recovered to baseline kidney function by the time of discharge. An additional 28 of 77 (36%) patients who had not recovered kidney function at discharge did so on posthospital follow-up.

Conclusions: AKI is common among patients hospitalized with COVID-19 and is associated with high mortality. Of all patients with AKI, only 30% survived with recovery of kidney function by the time of discharge.

Title: Progression of Acute Kidney Injury to Chronic Kidney Disease in Sepsis Survivors: 1-Year Follow-Up Study.

Citation: Journal of intensive care medicine; Sep 2020 ; p. 885066620956621

Author(s): Arshad, Ainan; Ayaz, Ahmed; Rehman, Sarah; Ukrani, Ronika Devi; Akbar, Inaara; Jamil, Bushra

Objective: Despite the fact that septic acute kidney injury (AKI) is considered to be reversible, it can result in permanent kidney damage. Unfortunately, there is a scarcity of long-term follow-up studies highlighting progression to chronic kidney disease (CKD) in sepsis survivors. To address this issue, we conducted this study to assess the development of CKD in sepsis patients with AKI, and to identify risk factors associated with its development.

Methods: This retrospective cohort study evaluated medical records of patients admitted at the Aga Khan University Hospital between January-December 2017 with the diagnosis of sepsis and subsequent development of acute kidney injury (AKI). One-year follow-up data was then analyzed to determine whether the AKI resolved or progressed to chronic kidney disease.

Results: 1636 sepsis patients were admitted during the study period, out of which 996 (61%) met the inclusion criteria. 612 (61%) developed AKI during the admission. Mortality rate in the AKI group was 44% (n = 272). After 1 year, 47 (19%) patients eventually went on to develop CKD and 81% (n = 195) recovered fully. Risk factors for development of CKD were age ≥ 60 years (p = <0.001), diabetes (p = <0.001), hypertension (p = 0.001) and history of ischemic heart disease (p = <0.001).

Conclusion: Mortality rates in sepsis are alarmingly high and even those patients who manage to survive are at risk of developing permanent organ dysfunction. Our study revealed that almost one fifth of all septic AKI survivors went on to develop chronic kidney disease within 1 year, even when AKI was not severe. We recommend that clinicians focus on early recovery of renal function, irrespective of AKI severity, and ensure robust follow-up monitoring to reduce long term morbidity and mortality associated with this devastating illness.

Title: Association between preoperative aspirin and acute kidney injury following coronary artery bypass grafting.

Citation: The Journal of thoracic and cardiovascular surgery; Sep 2020; vol. 160 (no. 3); p. 712-719

Author(s): Aboul-Hassan, Sleiman Sebastian; Marczak, Jakub; Stankowski, Tomasz; Peksa, Maciej; Nawotka, Marcin; Stanislawski, Ryszard; Cichon, Romuald

Objective: To test the hypothesis that preoperative aspirin administered within 24 hours before coronary artery bypass grafting (CABG) could reduce the incidence of postoperative acute kidney injury (AKI) following CABG.

Methods: In this retrospective study, 696 patients were assigned to groups according to the time interval between their last aspirin dose administration and the time of surgery. A total of 322 patients received aspirin ≤24 hours before CABG, and 374 patients received aspirin between 24 and 48 hours before CABG. The primary outcome was postoperative AKI of any stage as defined by the Kidney Disease Improving Global Outcomes criteria. Propensity score matching selected 274 pairs for the final comparison.

Results: Multivariable analysis showed that administration of aspirin within 24 hours of CABG was independently associated with reduction of AKI incidence by 36% (odds ratio, 0.64; 95% confidence interval, 0.45-0.91; P = .014). It was also noted that patients receiving their last aspirin dose ≤24 hours before CABG had a significantly higher glomerular filtration rate at discharge compared with patients who received aspirin between 24 and 48 hours before CABG. Propensity score matching analysis showed that patients receiving aspirin within 24 hours before CABG had a lower incidence of AKI compared with patients who discontinued aspirin between 24 and 48 hours before CABG (25.1% vs 36.8%; P = .004).

Conclusions: Continuation of aspirin until the day of surgery, with the last aspirin dose administered ≤24 hours before CABG, is associated with a significant reduction of postoperative AKI.

Title: Inverse Correlation Between Incidence and Mortality of Acute Kidney Injury in Critically Ill Patients: A Systematic Review.

Citation: Shock (Augusta, Ga.); Sep 2020; vol. 54 (no. 3); p. 280-284

Author(s): Komaru, Yohei; Inokuchi, Ryota; Iwagami, Masao; Hamasaki, Yoshifumi; Nangaku, Masaomi; Doi, Kent

Objective: The reported incidence and mortality of acute kidney injury (AKI) in patients in intensive care units (ICUs) is remarkably different even with standardized AKI criteria. The aim of this study was to investigate the correlation between the incidence and mortality of patients with AKI in ICUs.

Methods: We systematically reviewed clinical studies regarding adult ICU patients with AKI using Kidney Disease: Improving Global Outcomes-equivalent criteria from 2004 to May 1, 2018. We searched MEDLINE, EMBASE, and Cochrane Library to investigate the correlation between the incidence and mortality of patients with AKI in each cohort. Studies with small number of participants (less than 500) were excluded. The correlation between the incidence of AKI and mortality of patients was evaluated using a regression model.

Results: Our review yielded 76 cohorts, comprising 564,455 patients in ICU (median age, 60.5 years; men, 59.5%). The mortality of all patients did not correlate with the incidence of AKI in each cohort; however, the mortality of patients with AKI significantly decreased

[squared correlation coefficient (R)=0.18, regression coefficient (β)=-0.25, P<0.001] as the incidence of AKI increased. This correlation was also observed in a subgroup analysis limited to the clinical setting of general ICUs, and among patients with mild or severe AKI.

Conclusions: An inverse correlation between the incidence of AKI and the mortality of patients with AKI may indicate an advantage of frequent AKI occurrence, possibly because of increased awareness and larger exposure to AKIs; further study is needed, however, to confirm the causality.

Title: DyeVert™ PLUS EZ System for Preventing Contrast-Induced Acute Kidney Injury in Patients Undergoing Diagnostic Coronary Angiography and/or Percutaneous Coronary Intervention: A UK-Based Cost-Utility Analysis.

Citation: PharmacoEconomics - open; Sep 2020; vol. 4 (no. 3); p. 459-472

Author(s): Javanbakht, Mehdi; Hemami, Mohsen Rezaei; Mashayekhi, Atefeh; Branagan-Harris, Michael; Zaman, Azfar; Al-Najjar, Yahya; O'Donoghue, Donal; Fath-Ordoubadi, Farzin; Wheatcroft, Stephen

Background: Contrast-induced acute kidney injury (CI-AKI) is a complication commonly associated with invasive angiographic procedures and is considered the leading cause of hospital-acquired acute kidney injury. CI-AKI can lead to a prolonged hospital stay, with a substantial economic impact, and increased mortality. The DyeVert™ PLUS EZ system (FDA approved and CE marked) is a device that has been developed to divert a portion of the theoretical injected contrast media volume (CMV), reducing the overall volume of contrast media injected and aortic reflux, and potentially improving long-term health outcomes.

Objectives: To assess the long-term costs and health outcomes associated with the introduction of the DyeVert™ PLUS EZ system into the UK health care service for the prevention of CI-AKI in a cohort of patients with chronic kidney disease (CKD) stage 3-4 undergoing diagnostic coronary angiography (DAG) and/or percutaneous coronary intervention (PCI), and to compare these costs and outcomes with those of the current practice.

Methods: A de novo economic model was developed based on the current pathway of managing patients undergoing DAG and/or PCI and on evidence related to the clinical effectiveness of DyeVert™ in terms of its impact on relevant clinical outcomes and health service resource use. Clinical data used to populate the model were derived from the literature or were based on assumptions informed by expert clinical input. Costs included in the model were from the NHS and personal social services perspective and obtained from the literature and UK-based routine sources. Probabilistic distributions were assigned to the majority of model parameters so that a probabilistic analysis could be undertaken, while deterministic sensitivity analyses were also carried out to explore the impact of key parameter variation on the model results.

Results: Base-case results indicate that the intervention leads to cost savings (- £435) and improved effectiveness (+ 0.028 QALYs) over the patient's lifetime compared with current practice. Output from the probabilistic analysis points to a high likelihood of the intervention being cost-effective across presented willingness-to-pay (WTP) thresholds. The overall long-term cost saving for the NHS associated with the introduction of the DyeVert™ PLUS EZ system is over £19.7 million for each annual cohort of patients. The cost savings are mainly driven by a lower risk of subsequent diseases and their associated costs.CONCLUSIONSThe introduction of the DyeVert™ PLUS EZ system has the potential to reduce costs for the health care service and yield improved clinical outcomes for patients with CKD stage 3-4 undergoing angiographic procedures.

Title: Impact of acute kidney injury on in-hospital outcomes among patients hospitalized with acute heart failure - A propensity-score matched analysis.

Citation: European journal of internal medicine; Sep 2020; vol. 79 ; p. 76-80

Author(s): Shetty, Suchith; Malik, Aaqib H; Ali, Abbas; Yang, Ying Chi; Aronow, Wilbert S; Briasoulis, Alexandros

Objective: We sought to determine the impact of acute kidney injury (AKI) on in-hospital outcomes in patients presenting with acute heart failure (AHF). Data from National Inpatient Sample (2012- 14) were used to identify patients with the principal diagnosis of AHF and the concomitant secondary diagnosis of AKI.

Methods: Propensity score matching was performed on 30 baseline variables to identify a matched cohort. The outcome of interest was in-hospital mortality. We further evaluated in-hospital procedures and complications.

Results: Of 1,470,450 patients admitted with AHF, 24.3% had AKI. After propensity matching a matched cohort of 356,940 patients was identified. In this matched group, the AKI group had significantly higher in-hospital mortality (3.8% vs 1.7%, p<0.001). Complications such as sepsis, transfusions and cardiac arrest were also higher in the AKI group (p2-fold in the AKI group. Healthcare utilization and burden of complications were higher in the AKI group.

Title: Effect of mannitol on acute kidney injury induced by cisplatin.

Citation: Supportive care in cancer : official journal of the Multinational Association of Supportive Care in Cancer; Aug 2020

Author(s): Bégin, Anne-Marie; Monfette, Marie-Lawrence; Boudrias-Dalle, Étienne; Lavallée, Emmie; Samouelian, Vanessa; Soulières, Denis; Chagnon, Miguel; Fournier, Marie-Andrée; Letarte, Nathalie; Adam, Jean-Philippe

Objective: Acute kidney injury (AKI) is a frequent dose-limiting toxicity induced by cisplatin. Mannitol has been used in hydration protocols to mitigate this adverse event but its role remains controversial. The aim of this study is to define the impact of mannitol on AKI in patients receiving cisplatin.

Methods: This retrospective observational study was conducted in cancer patients who received at least one dose of cisplatin between September 2010 and December 2016 at the Centre hospitalier de l'Université de Montréal. The primary outcome of this study was the comparison of all grade cisplatin-associated AKI between hydration protocols with or without mannitol.

Results: A total of 1821 patients were included of which 658 received mannitol whilst 1163 received hydration alone. The risk of all grade cisplatin-associated AKI was significantly lower for the mannitol group (Hazard Ratio (HR) = 0.62; 95% CI [0.42, 0.89]). This result was mainly driven by gynecologic (HR = 0.50), upper gastrointestinal (HR = 0.32), urinary tract malignancies (HR = 0.29) and lymphoma (HR = 0.33). No significant difference was seen for head and neck (HN), lung, germ cells and other cancers. However, HN cancers patients receiving mannitol had fewer grade 2 and 3 AKI. Significantly fewer AKI events were observed in HN, lung, upper gastrointestinal and urinary tract cancer when mannitol was added for cisplatin dose <75 mg/m2.

Conclusion: The results were generally driven by a decrease of grade 1 AKI for most cancers, the greatest benefit of mannitol was seen with cisplatin doses lower than 75 mg/m2 and should probably be reinstated in this setting.

Title: Be aware of acute kidney injury in critically ill children with COVID-19.

Citation: Pediatric nephrology (Berlin, Germany); Aug 2020

Author(s): Wang, Xiaowen; Chen, Xingfeng; Tang, Feng; Luo, Wanjun; Fang, Jian; Qi, Chang; Sun, Hua; Xiao, Han; Peng, Xuehua; Shao, Jianbo

Objective: Acute kidney injury (AKI) is a common complication of critically ill adult patients with COVID-19. However, currently, no studies investigate kidney impairment in children with COVID-19. We investigated incidence and treatment of AKI in pediatric patients with COVID-19 in Wuhan Children's Hospital during the early stages of the COVID-19 pandemic and discuss possible mechanisms of AKI related to SARS-CoV-2 infection.

Methods: By extracting data from electronic medical records, we conducted a retrospective observational study of kidney involvement in confirmed pediatric COVID-19 cases in Wuhan Children's Hospital during the coronavirus outbreak, from January 24 to March 20, 2020. Clinical presentations, clinical courses, laboratory findings, and medical interventions are described below.

Results: Among 238 confirmed COVID-19 cases, only three were critically ill and needed intensive care unit (ICU) admission. All three developed AKI, but AKI was not detected in any non-critically ill patients outside the ICU. Two of the three patients with AKI had prodromal gastrointestinal symptoms. Significantly elevated interleukin-6 (IL-6) levels and complement activation were observed in these patients with AKI. The three patients with AKI were treated with plasma exchange (PE) and continuous kidney replacement therapy (CKRT), resulting in one complete recovery, one partial recovery, and one mortality due to critical illness.

Conclusions: Critically ill children with COVID-19 may develop AKI, especially following prodromal gastrointestinal symptoms. An inflammatory storm and complement-mediated injury may underlie AKI development in children with COVID-19. Our study supports implantation of PE and CKRT in management of critically ill patients with AKI.

Title: Acute Kidney Injury in Primary Care: A Review of Patient Follow-Up, Mortality, and Hospital Admissions following the Introduction of an AKI Alert System.

Citation: Nephron; Aug 2020 ; p. 1-8

Author(s): Barton, Anna L; Williams, Sam B M; Dickinson, Stephen J; Parry, Rob G; Pollard, Adam

Objective: In February 2017, our laboratory implemented an electronic AKI flagging system for primary care using the NHS England AKI detection algorithm. Our study investigated the impact on patient follow-up, hospital admission, length of stay, and mortality.

Methods: Primary care results March 2017-February 2018 with an AKI test code were downloaded from the pathology computer.

Results: Over 12 months, 1,784 AKI episodes were identified; 81.3% AKI1, 11.3%, AKI2, and 7.5% AKI3. A repeat creatinine was requested within 14 days on 55% AKI1s, 84% AKI2s, and 86% AKI3s. Primary care took the repeat sample in 73.2% AKI1s and 56.7%

AKI2s and acute hospital locations for 47.4% AKI3s. Median time to hospital admission was 34 days for AKI1, 6 for AKI2, and 1 for AKI3 ($p < 0.05$). Length of stay was found to be 1, 2, and 4 days for AKI 1/2/3, respectively ($p < 0.05$). The 90-day mortality for admitted patients was 15, 18, and 21% for AKI 1/2/3, respectively ($p = 0.180$). The 90-day mortality for the non-admitted patients was 4, 9, and 50% for AKI 1/2/3, respectively ($p < 0.05$). AKI patient outcome data pre versus post the start of the AKI flag system were compared. A statistically significant reduction was found in the median length of stay for AKI1 and AKI3 and in mortality for AKI1 and AKI3 patients and for all AKIs as a whole. A further analysis was performed to take into account the difference in pre- and post-alert populations. Mortality overall was significantly improved ($p < 0.001$), and length of stay was reduced in AKI3 patients ($p = 0.048$).

Conclusion: Our study demonstrates that an electronic AKI warning alert system for primary care appears to be associated with a beneficial impact on patient management and outcome.

Title: The ageing kidney: Molecular mechanisms and clinical implications

Citation: Ageing Research Reviews; Nov 2020; vol. 63

Author(s): Fang Y.; Liu Z.; Gong A.Y.; Gong R.; Haller S.T.; Dworkin L.D.

Abstract: As human life expectancy keeps increasing, ageing populations present a growing challenge for clinical practices. Human ageing is associated with molecular, structural, and functional changes in a variety of organ systems, including the kidney. During the ageing process, the kidney experiences progressive functional decline as well as macroscopic and microscopic histological alterations, which are accentuated by systemic comorbidities like hypertension and diabetes mellitus, or by preexisting or underlying kidney diseases. Although ageing per se does not cause kidney injury, physiologic changes associated with normal ageing processes are likely to impair the reparative capacity of the kidney and thus predispose older people to acute kidney disease, chronic kidney disease and other renal diseases. Mechanistically, cell senescence plays a key role in renal ageing, involving a number of cellular signaling mechanisms, many of which may be harnessed as international targets for slowing or even reversing kidney ageing. This review summarizes the clinical characteristics of renal ageing, highlights the latest progresses in deciphering the role of cell senescence in renal ageing, and envisages potential interventional strategies and novel therapeutic targets for preventing or improving renal ageing in the hope of maintaining long-term kidney health and function across the life course.

Title: Kidney biomarkers in tropical infections: an update

Citation: Pathogens and Global Health(PGH); Aug 2020; vol. 114 (no. 6); p. 302-308

Author(s): Duarte D.B.; Oliveira M.J.C.; Frederico M.D.A.; Lacerda M.C.S.R.; Ribeiro Y.J.P.; Ribeiro M.Z.D.

Abstract: Neglected tropical diseases affect over 1 billion people, and cause 170,000 deaths each year. They result in disability, stigma and disfigurement, and also push families into poverty. Tropical infections can involve the kidney, presenting as a wide variety of ways, varying from transient urinary abnormalities to severe acute kidney injury (AKI). It is important to assess renal function in patients with tropical infections for earlier detection of AKI, appropriate treatment and prevention of Chronic Kidney Disease (CKD) outcome in some of them. There was an exponential increase in research on new kidney biomarkers

that were earlier and specific for renal damage but few in the scope of tropical infections. In this review, we focus on kidney biomarkers that are being studied in some of the most prevalent tropical infections such as visceral leishmaniasis, leptospirosis, malaria, schistosomiasis and leprosy. Further studies are needed to evaluate the usefulness of renal biomarkers in the early diagnosis of renal diseases associated with tropical infections.

Title: Sleep Apnea and the Kidney

Citation: Current Sleep Medicine Reports; Sep 2020; vol. 6 (no. 3); p. 85-93

Author(s): Marrone O.; Bonsignore M.R.

Objective: There are some uncertainties about the interactions between obstructive sleep apnea (OSA) and chronic kidney disease (CKD). We critically reviewed recent studies on this topic with a focus on experimental and clinical evidence of bidirectional influences between OSA and CKD, as well as the effects of treatment of either disease. Recent Findings: Experimental intermittent hypoxia endangers the kidneys, possibly through activation of inflammatory pathways and increased blood pressure. In humans, severe OSA can independently decrease kidney function. Treatment of OSA by CPAP tends to blunt kidney function decline over time, although its effect may vary. OSA may increase cardiovascular complications and mortality in patients with end-stage renal disease (ESRD), while it seems of little harm after renal transplantation. Excessive fluid removal may explain some of the improvements in OSA severity in ESRD and after transplantation. Summary: Severe OSA and CKD do interact negatively, mainly through hypoxia and fluid retention. The moderate mutually interactive benefits that treatment of each disease exerts on the other one warrant further studies to improve patient management.

Title: Neuroimmune Mechanisms in Signaling of Pain During Acute Kidney Injury (AKI)

Citation: Frontiers in Medicine; Aug 2020; vol. 7

Author(s): Gupta A.; Puri V.; Kumar D.; Puri S.

Abstract: Acute kidney injury (AKI) is a significant global health concern. The primary causes of AKI include ischemia, sepsis and nephrotoxicity. The unraveled interface between nervous system and immune response with specific focus on pain pathways is generating a huge interest in reference to AKI. The nervous system though static executes functions by nerve fibers throughout the body. Neuronal peptides released by nerves effect the immune response to mediate the hemodynamic system critical to the functioning of kidney. Pain is the outcome of cellular cross talk between nervous and immune systems. The widespread release of neuropeptides, neurotransmitters and immune cells contribute to bidirectional neuroimmune cross talks for pain manifestation. Recently, we have reported pain pathway genes that may pave the way to better understand such processes during AKI. An auxiliary understanding of the functions and communications in these systems will lead to novel approaches in pain management and treatment through the pathological state, specifically during acute kidney injury.

Title: Covid-19 and the kidney: From epidemiology to clinical practice

Citation: Journal of Clinical Medicine; Aug 2020; vol. 9 (no. 8); p. 1-29

Author(s): Gagliardi I.; Patella G.; Michael A.; Provenzano M.; Andreucci M.; Serra R.

Abstract: The new respiratory infectious disease coronavirus disease 2019 (COVID-19) that originated in Wuhan, China, in December 2019 and caused by a new strain of zoonotic coronavirus, named severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2), to date has killed over 630,000 people and infected over 15,000,000 worldwide. Most of the deceased patients had pre-existing comorbidities; over 20% had chronic kidney disease (CKD). Furthermore, although SARS-CoV-2 infection is characterized mainly by diffuse alveolar damage and acute respiratory failure, acute kidney injury (AKI) has developed in a high percentage of cases. As AKI has been shown to be associated with worse prognosis, we believe that the impact of SARS-CoV-2 on the kidney should be investigated. This review sets out to describe the main renal aspects of SARS-CoV-2 infection and the role of the virus in the development and progression of kidney damage. In this article, attention is focused on the epidemiology, etiology and pathophysiological mechanisms of kidney damage, histopathology, clinical features in nephropathic patients (CKD, hemodialysis, peritoneal dialysis, AKI, transplantation) and prevention and containment strategies. Although there remains much more to be learned with regards to this disease, nonetheless it is our hope that this review will aid in the understanding and management of SARS-CoV-2 infection.

Title: A Systematic Review on Guidelines and Recommendations for Urology Standard of Care During the COVID-19 Pandemic

Citation: European Urology Focus; Sep 2020; vol. 6 (no. 5); p. 1070-1085

Author(s): Heldwein F.L.; Wroclawski M.L.; Carneiro A.; Loeb S.; Sridhar A.N.; Lima F.S.; Teoh J.Y.-C.

Background: The first case of the new coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV2), was identified in Wuhan, China, in late 2019. Since then, the coronavirus disease 2019 (COVID-19) outbreak was reclassified as a pandemic, and health systems around the world have faced an unprecedented challenge.

Objective(s): To summarize guidelines and recommendations on the urology standard of care during the COVID-19 pandemic.

Evidence Acquisition: Guidelines and recommendations published between November 2019 and April 17, 2020 were retrieved using MEDLINE, EMBASE, and CINAHL. This was supplemented by searching the web pages of international urology societies. Our inclusion criteria were guidelines, recommendations, or best practice statements by international urology organizations and reference centers about urological care in different phases of the COVID-19 pandemic. Our systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement. Of 366 titles identified, 15 guidelines met our criteria.

Evidence Synthesis: Of the 15 guidelines, 14 addressed emergency situations and 12 reported on assessment of elective uro-oncology procedures. There was consensus on postponing radical prostatectomy except for high-risk prostate cancer, and delaying treatment for low-grade bladder cancer, small renal masses up to T2, and stage I seminoma. According to nine guidelines that addressed endourology, obstructed or infected kidneys should be decompressed, whereas nonobstructing stones and stent removal should be rescheduled. Five guidelines/recommendations discussed laparoscopic and robotic surgery,

while the remaining recommendations focused on outpatient procedures and consultations. All recommendations represented expert opinions, with three specifically endorsed by professional societies. Only the European Association of Urology guidelines provided evidence-based levels of evidence (mostly level 3 evidence).

Conclusion(s): To make informed decisions during the COVID-19 pandemic, there are multiple national and international guidelines and recommendations for urologists to prioritize the provision of care. Differences among the guidelines were minimal.

Patient Summary: We performed a systematic review of published recommendations on urological practice during the coronavirus disease 2019 (COVID-19) pandemic, which provide guidance on prioritizing the timing for different types of urological care. We performed a systematic review of published recommendations on urological practice during the coronavirus disease 2019 (COVID-19) pandemic, which provides guidance on prioritizing the timing for different types of urological care.

Sources Used:

The following databases are used in the creation of this bulletin: CINAHL, EMBASE, Medline & KnowledgeShare

Disclaimer

The results of your literature search are based on the request that you made, and consist of a list of references, some with abstracts. Royal United Hospital Bath Healthcare Library will endeavour to use the best, most appropriate and most recent sources available to it, but accepts no liability for the information retrieved, which is subject to the content and accuracy of databases, and the limitations of the search process. The library assumes no liability for the interpretation or application of these results, which are not intended to provide advice or recommendations on patient care.